

A STUDY OF DIATHESIS.

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"I sometimes wish, indeed, that there could be a sabbatical year in medicine during which all research and publication should cease, so that we might have leisure to sift the grain from the chaff and to consolidate the ground already won and plan out fresh advances; to get out of the trees, in short, and survey the wood as a whole. But that, I recognise, is merely a dream."

Sir.R.Hutchison: "The Progress and Present Aspect of Medical Science".

Brit.Med.Journ. 9.1.37. p.57.

INTRODUCTION.

In spite of the voluminous work that has been carried out on the Continent and in America on diathesis and the human constitution, apart from Garrod's short essay, "The Inborn Factors in Disease", and a few isolated papers in the medical press, there has been no systematic attempt in this country to define the scope of diathesis or to indicate the manner of its operation since Jonathan Hutchinson wrote his "Pedigree of Disease" in 1884. Yet the importance of the subject is assumed by all who have to deal extensively with general medicine, and even the layman knows something of the relationship between high blood pressure and florid complexions. Finding after a little time in general practice, that I was diagnosing some people as suffering from pre-hyperthyroidism and realising that this was a diagnosis of my own invention, I set out to prove whether I had reasonable grounds for thinking of such a condition.

I recalled that in my student days, going through the wards, I was repeatedly impressed by the general similarity in facial and general appearance of men with duodenal ulcer, and that still later, as a house-surgeon, I had made observations on the likeness of men with prostatic hypertrophy, distinguishing between these people and those suffering from urinary retention due to a small atrophic prostate. Still more recently, as a physician in charge of a large out-patient department, I

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came to be impressed with the very striking ^{general} similarities found in women past middle life with osteo-arthritis of the knees, and in hospital and general practice detected special peculiarities common to subjects of gall bladder disease.

There were, of course, other diseases which I considered had a definite relationship to the general morphological features of the individual, but I was at a loss to differentiate them or to assess their value until I read Draper's "Disease and the Man", when I realised the value of the anthropometric method. Through his work I was led to see how persistently the idea of diathesis had clung to the general principles of medicine in spite of eclipses at various intervals.

Another work that had previously quickened my interest in general medical progress and enquiry was the inspiring life-story of Sir James Mackenzie, "The Beloved Physician", by R. McNair Wilson, supplemented by Mackenzie's own work, "The Future of Medicine". (1) Mackenzie considered that the progress of medicine was most effectively to be advanced by the careful correlation of symptoms before physical signs of actual disease appeared, with that advanced stage "when the disease has progressed so far that it has caused destruction or modification of tissue, and when its presence is revealed by a physical sign", so that with further knowledge we may be able to stay the process. It soon became apparent that the study of diathesis was in fact the study of "the predisposing stage in which the individual is free from disease but liable to be attacked either from some inherent weakness or from an outside source".

A further question, arising from our knowledge of psychological processes, began to press for consideration, as to how far the invisible influences of the environment and the patient's own mental reactions to stress mould and precipitate demonstrable changes in the organs of the body. In other words, does the state that precedes disease have any recognisable features and can it be defined in psychological language? What is the relation between neurosis and diathesis, or between psychosis and diathesis?

The conception of diathesis is based on the assumption that disease springs out of potentiality or predisposition. It involves the idea that 'what man is' is related to his diseases. Any historical survey of the subject, therefore, must deal with the growth of the ideas about the fundamental nature of man and their co-relationship with his diseases. This, therefore, gives us at the outset three main avenues of approach:- 1) The Philosophical: 2) The Clinical and 3) The Correlation of Philosophical and Clinical. These also correspond respectively with 1) knowledge of man gained from introspection: 2) knowledge of man gained from the study of others, and 3) a synthesis of these two kinds of knowledge. These again correspond with 1) subjective and rational, i.e. 'a priori' reasoning: 2) objective and empirical, i.e. 'a posteriori' reasoning, and ³⁾ their correlation with each other. At the outset it must appear presumptuous for one man to attempt to deal with the nature of man from both philosophical and clinical standpoints, to say nothing of trying to correlate these two aspects, but as little or no attempt to do this has yet been made, it seems fitting

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that the task be, at any rate, attempted, in order that others may be encouraged to succeed where the writer has failed.

From historical study, then, we seek to find out what the philosophers have said about the nature of man and what the clinicians, in order that we may try to link up these different kinds of knowledge so that out of it may develop a philosophy of medicine; we may leave to the philosophers themselves the issue as to what validity our particular conclusions have for them, so long as we can affirm at the outset that we are interested in pure reason and metaphysic not primarily for their own sake so much as for the sake of those who need healing.

It is the writer's conviction that we need to give the word 'schizophrenia' a much wider connotation than is usual at present, in order that we may not consider those usually so labelled as so very different from ourselves. In the writer's use of the term, it is the universal hindrance to maturity. In order, therefore, to make clear the issue implicit in this last statement, three contentions are suggested:- That schizophrenia is the cause of individual incompleteness; 2) That health or perfection is only relative to age, stress and strain; and 3) That health implies limitation, which in itself is a kind of schizophrenia or partiality. By contrast to this we may define health as 1) a state of acceptance of all that is implied in the subject - Object relationship: 2) it is relative to age, stress and strain, being a moveable, changing relationship between the organism and its environment: and 3) it is the harmonious interplay of potential cosmic influences with actual physical and

limiting conditions. In this sense, therefore, schizophrenia is a relative term, needing for its cure increasing differentiation, and yet this is a process that is never really completed.

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THE GENERAL CHARACTERISTICS OF DIATHESIS.

Chapter. I

PHILOSOPHICAL INTRODUCTION.

.....The result of the new science was to cut the real into two halves, quantity and quality, the former being credited to the account of bodies and the latter to the account of souls. The ancients had raised no such barriers....between soul and body. For them.....the body was not defined by geometrical extension, nor the soul by consciousness. If the $\psi\upsilon\chi\eta$ of Aristotle, the entelechy of a living body, is less spiritual than our 'soul', it is because his $\sigma\acute{o}\mu\alpha$, already impregnated with the Idea, is less corporeal than our 'body'. The scission was not yet irremediable between the two terms. It has become so, & thence a metaphysic that aims at an abstract unity must resign itself either to comprehend in its synthesis only one half of the real, or to take advantage of the absolute heterogeneity of the two halves in order to consider one as a translation of the other. Different phrases will express different things if they belong to the same language.....But if they belong to two different languages, they might, just because of their radical diversity of sound, express the same thing. So of quality and quantity, of soul and body. It is for having cut all connection between the two terms that philosophers have been led to establish between them a rigorous parallelism, of which the ancients had not dreamed, to regard them as translations and not as inversions of each other; in short, to posit a fundamental identity as a substratum to their duality. The synthesis to which they rose thus became capable of embracing everything. A divine mechanism made the phenomena of thought to correspond to those of extension, each to each, qualities to quantities, souls to bodies.

The main purpose of the present study is to provide a historical record of a certain branch of medicine (our 1950 B.C.) to the present day provided by this historical record of a certain branch of medicine.

The historical record of a certain branch of medicine is a record of the development of that branch of medicine from its origin to the present day.

Synopsis.

The need for a philosophy of medicine arises from the threat of schizophrenia. We need to be aware of :-

- 1).our spiritual nature,
- 2).our physical needs,
- 3).objective orientation,
- 4).historical orientation.

Some of the philosophical problems relevant to medicine are indicated.

The whole sweep of the years from the time of Homer (say 1000 B.C.) to the present day provides us with a historical record of 4 main trends:-

1).The Homeric tradition represents man as essentially immortal;that is to say that at death his soul leaves the body and enters on a new phase of existence in the underworld. This conception of soul as the shadow-self is to some extent incorporated through St.Paul into the Christian tradition, but is also implicit in the Pythagorean doctrine of the transmigration of souls.

2).The Platonic and Aristotelian conceptions of soul and body, or Form and Matter, imply a dualism which also runs through the Christian tradition probably finding their supreme culmination in the Scholasticism of the Middle Ages.

3).The Spirit of the Renaissance, in awakening interest in objectivity, constitutes a complete break with the scholastic tradition and has the effect of bringing to birth the completely different outlook of modern science.Its concern with the infinitely small through the use of the microscope, as well as with the infinitely large through the use of the telescope, constitute a tremendous widening of conception in the potentialities in the universe.

4). The discovery of evolution and the technique of psycho-analysis throw tremendous light on the nature of man's soul, portraying its antiquity and yet indicating its novelty, suggesting both its contact with lower forms of life and also its destiny as emerging to some higher form,

where both descent and ascent are possible, and where both analysis and synthesis are able to add to the potentialities in human nature.

The great need of our time is to be able to see how to make out of the individual a whole man from these four trends which lie in him:- 1) his amorphous spiritual forces: 2) his apparently paradoxical constitution as a 'soul-body': 3) his potentialities for living in the ever increasingly complex material world: 4) along with his historical continuity with the whole race of mankind.

The conception that is in my mind is that in the broad sweep of history we see on a large scale what is inherent in ourselves, and that to be able to read the signs of the times is to acquire insight into our own particular needs. They may be re-stated as follows:-

1) The necessity for realising the tension of our own spiritual nature, in both its moral and non-moral aspects.

2) The necessity for bringing our spiritual faculties into close relationship with our physical needs.

3). The necessity for re-directing our energies, ^{after they have undergone the preliminary process of differentiation through analysis,} out into the objective world of the material universe.

4). The necessity for keeping alive our historical sense
 a) by realising our kinship with all our predecessors, whether as beasts or brutes, and yet at the same time b) by accepting all the responsibilities of individuality for the present.

To realise these necessities is to help to restore the breach between the science of today and the philosophy of yesterday. We can only heal schizophrenia by being aware of our own schizophrenia, and the divorce of objectivity from the reality of the self, constitutes the most potently schizophrenic influence of our time.

The cleavage between philosophy and medicine, initiated by Hippocrates, was inevitable and desirable for the development of both, for just as the growing organism has repeatedly to lose its original identity in cell-division, so the growth of art and science requires differentiation to bring out its potentialities. But the growing organism is also involved in the process of synthesis of integration. The problem of the one and the many - or of monism and pluralism - is therefore inherent in the process of growth. The more undeveloped the organism, the more unified it is; the more developed it is, the more divided it is, and yet the differentiations of cellular activity i.e. of structure, involved in our growth are not merely associated with differentiations of function, but are also being directed by the unitary principle of individuation. The problem of the one and the many is the problem of origins and destinies, of the convergence in a single organism of all the forces of the past with resulting divergences in function and structure, but awaiting the realisation of convergence in the awareness of selfhood.

Let us enumerate the medical importance of this problem:-

- 1). It is implicit in the contrast between the schizoid and cycloid personalities - there is a strange solitariness in the schizoid, a strange amorphous unity, calling for further differentiation. But there is a schizoid aspect to the thoroughgoingness of the cycloid, which is indicated by his inability to relate his emotional drives to particular situations. There may be something schizoid in the very diversity of the interests of the cycloid, preventing the process of integration.
- 2). It may be that the distortion of emotional expression (i.e. libido) into too concentrated channels, has disrupting influences on the whole process of cell division, making possible the regressive variety of cell division found in new growth.
- 3). The process of ageing of the tissues is largely a process of over-concentration, and the contrast between the lability of new growth formations and the stability of ageing processes is more apparent than real.
- 4). Cellular organisation is governed by the principle of teleology as indicated by Claude Bernard's dictum 'Function fait l'organe.' The lack of organisation in new growths bespeaks a similar lack of individual organisation: the evidence of organisation in fibrotic changes bespeaks a too intense individual organisation.

The doctrine of diathesis belongs to that 'no man's land' between philosophy and medicine. It is therefore beset by all the unpractical abstractions of the metaphysician on

the one hand, and the merely empirical observations of the busy clinician on the other. It might, therefore, be very much open to question whether any good purpose could be served by tracing the ramifications of such a doctrine down through the centuries. But as Raphael's cartoon of Plato pointing up to heaven, and Aristotle pointing down to earth, suggests a fundamental difference in temperament between idealist and realist, so ~~that~~ philosopher and physician would do well I believe, each to listen to what the other has to say about the nature of man. But the doctor needs assurance that the philosopher can really help, while the philosopher knows from his own experience of illness how helpful the doctor can be, even when he talks 'nonsense'!

And so we embark on the perilous task of trying to reconcile the theoretical speculations of philosophy with the matter-of-fact realities of sick charwomen and whining neurotics! At the outset we are beset by the difficulty of knowing where to begin. Should we first trace the belief in the Homeric tradition (approx. 10th century, B.C.) as to man's survival after death, and his conception of the ghost-soul as the shadowy image of man's personality, leaving the body through the mouth or gaping wound and enjoying his excursion in Hades, or should we confine ourselves to the supposed effects on the body of different kinds of supernatural visitation? I believe it to be of supreme importance that we bridge the gulf between the metaphysical and the physical and that unless we are willing to theorise, as well as to be practical, we stand in danger of losing our life in our

busy attempts at preserving it.

The relationship between philosophy and medicine is best seen from the synthetic point of view as an antagonism of conflicting interests. Thus the concerns of each study may be tabulated:-

Medical Science is objective:	Philosophy is subjective.
" " " factual :	" " problematic.
" " " to do with phenomena.	" " to do with underlying realities.
" " " 'a posteriori' in its logic.	" " 'a priori'.
" " " experimental.	" " rational.

These provide working differences which are more distinctively true for some scientists or philosophers than others, though a break from what I have designated as the more typical mode of expression for one branch, normally either means that the scientist is becoming a philosopher, as for instance Whitehead and H.Spencer who begin by being scientific in outlook but who then make a philosophy of their scientific studies, while the most typical illustration of the philosopher turning scientist is probably that of Aristotle, though here again the philosophical attitude is probably more apparent than the scientific.

From a medical point of view, the most helpful way of looking at the problems of philosophy is to try to believe that every philosophy has its partial validity, and that the criteria for its ultimate validity are conditioned by the following factors:-

1) The degree to which it is capable of reconciliation with objective truth, i.e. with the spirit and facts of science.

2) Its essential limitation by the thought of the age out of which it is born; thus evolution and Freudian psychology at once 'date' philosophies born before these discoveries were enumerated, and give a fresh starting-point for further philosophical thought.

We may express these factors in different language:-

1) ~~3)~~ Its ability to reconcile what is apparently contradictory, within the limits of the knowledge of each particular age.

2) ~~4)~~ The ability of individuals to tolerate the point of view of those whose experience must inevitably predispose them to believe certain things about the nature of the universe which may appear to others as completely contradicted by their own particular experience.

In this connection it is helpful to look at the Formal laws of logic, or Three Primary laws of Thought, which date back to the time of Aristotle. These are:-

1. The law of Identity. "Whatever is, is".
2. The law of Contradiction. "Nothing can both be and not be!"
3. The law of Excluded Middle. "Everything must either be or not be!"

As a matter of fact, though these laws appear to be self-evident, they are neither so axiomatic as they are supposed to be, nor so assured by the philosophers who might hesitate to deny them, for the whole trend of philosophical thinking is to make the commonsense view of the

universe out to be different from what it appears, and without considerable amplification we may indicate that the Laws of Thought are capable of formulation in the following terms:-

1) The law of Identity: ~~(Reality)~~, is a compound of what is, (as an appearance ^{of} phenomenon) with the reality of which it is composed (noumenon), but which is in fact quite different from what it appears to be. This is inherent in most philosophical thinking from the time of the Ionians, who said that water (Thales) or fire (Heracleitus) was the supreme reality, to the present when F.H. Bradley wrote his 'Appearance and Reality'. (1886-1924)

2) The law of Contradiction: Though Reality is both appearance and reality, each of which separately may be said to conform to the law of identity, in actuality they are usually contradictory, in the sense that the apparently static thing is in reality a mass of moving electro-physical particles, and the apparently moving or changing thing is bound or fixed by the laws of conservation of matter and energy. This also is implicit in the doctrines of Parmenides and Heracleitus, as well as in the philosophy of Bergson.

3) The law of included Middle: "Everything may both be and not be", in the sense that the truth about Reality is usually a synthesis of thesis and antithesis. This constitutes Hegel's famous triad.

We may now proceed to enumerate some of the questions that have concerned the philosophers, without further trying to indicate their importance from a psychiatric point of view, though many of them come in for consideration in the following pages.

1. The question of the relation of the universal to particulars, known also as the doctrine of the one and the many. This doctrine was adumbrated particularly by Plato and Aristotle but was very prominent in the thought of the Middle Ages. It involves distinction between Monism and Pluralism.
2. The relation of soul to body. Sometimes it is spoken of as the Mind-Body relationship or the principle of psycho-somatic unity, but as these words involve many different conceptions, it is advisable to formulate the sense in which the words are used before confusion becomes worse confounded.
3. The Nominalist - Realist controversy.
4. The Rationalism-Empiricism Controversy.
5. The nature of the external world in terms of the Idealist-Realist controversy.
6. The nature of knowledge: the problem of epistemology.
7. The problem of determinism and free-will.
8. The problem of causality, of change, cause and effect.
9. The correspondence-coherence-pragmatism theories of truth.
10. The subject-object relationship.
11. The doctrine of predicates.
12. The space-time continuum.

13. Parts and Wholes: Partiality and Totality.
14. Analysis and Synthesis.
15. The ascent and descent of man.
16. The nature of sanity and of maturity.
17. Insight and knowledge.
18. Judgment and delusion.
19. Conviction and obsession.
20. Faith and doubt.
21. Conscience and the goodwill.
22. Idea and impulse. (urge or instinct).

Chapter. 2.

HISTORICAL AND GENERAL SURVEY.

From out olde felde, as man seith,
Cometh al the new corn from yeer to yere;
And out of old bookes, in good feith,
Cometh al this new science that men lere.

Chaucer: "Parlement of Foules."

Synopsis.

Ideas of disease and temperament in China and India: the rise of the humoral hypothesis.

Diathesis in the time of Hippocrates, and Galen: during the Renaissance, and up to the middle of the nineteenth century.

The rise of pathology and bacteriology temporarily tends to obscure its importance, but this is gradually modified by advances in endocrinology, morphology, anthropometry, anatomy, the correlation of anthropometry with psychological and psychopathological states, genetics, general anthropology, the anthroposcopic method, biochemistry, general medicine and paediatrics.

Diathesis assumes its chief clinical significance, however, only in relation to psychiatric conceptions, and especially to the psychobiological approach.

In tracing the beliefs of man down through the ages as to the nature and origin of disease, we must first be struck by the early supernatural conceptions that man's infirmities were due to the visitation of a spirit. It was part of the belief of primitive man that the inexplicable must be accounted for by this 'something other' that is not man, and if we are to do justice to the history of the doctrine of diathesis it is important to note its connection with the metaphysical even though now in the full bloom of science we may not find it necessary to account for the untoward in human experience by having recourse to such mystical explanations as evil spirits or curses.

The earliest statement of the problem of the human soul in terms of opposites is in the Zoroastrian conception of Ormuzd and Ahriman, Ormuzd representing the god of light, and the embodiment of the manifest, and Ahriman representing the active power of darkness, the force of the void, drawing into its bottomless pit all the agents of light. These two principles respectively represent the forces of cosmos and chaos, order and confusion, evolution and dissolution, sanity and dementia.

In the 8th century B.C. we hear of the more elaborate conception of the Chinese cosmogony which ascribed the origin of all things, man included, to the two antithetic principles of Yang and Yin. This is surely a very early attempt to account for the apparent duality in psychosomatic relationships. Man was considered to be a micro-

organism in a macro-organism. He is a miniature heaven and earth, engendered by the Tao - the law of Yang and Yin - the mother of all things. The Yang and the Yin were originally the bright sunlit side and the dark cold side of a hill: where there is light and shade, stimulus and quiescence which seem to characterise all nature and life, for the fluid nature of things was inherent in the Chinese doctrine of the Tao or the way, in which there was continual ebb and flow. The Chinese doctrine was that these creative and destructive forces are the fundamental principles underlying the whole of creation. "They are mutual affinities, complementary to each other, as well as mutual antipathies. They possess a catalytic action. Their interaction creates, and their separation destroys, all objects in nature." (1) Morse (2) has compiled a table of categories in which the different qualities of Yang and Yin are contrasted, though I do not suppose that he intends us to believe that the Chinese were as conversant with such phenomena as anodes and cathodes as the table indicates.

Yang.	Yin.
Heaven.	Earth.
Sun.	Moon.
Monad.	Duad.
Day.	Night.
Male.	Female.
Positive.	Negative.
Life.	Death.
Creating.	Destroying.
Hot.	Cold.
Spiritual.	Material.
Anode.	Cathode.
Anabolic.	Catabolic.
Acid.	Base.

(cont)	Yang.	Yin.
	Highest.	Lowest.
	Left side.	Right side.
	Organs.	Viscera.
Leaves, flowers, branches. →		Trunks and roots. →
	Broad.	Narrow.
	Eyes.	Ears.
	Nose.	Mouth.
	Energy.	Inertia.
	Delirium.	Unconsciousness.
	Straight.	Crooked.
	Mania.	Coma.
	Fever.	Cold.
	Good.	Bad.
	Strong.	Weak.
	Clear.	Turbid.
	Activity.	Acquiescence.
	Penetration.	Absorption.
	South.	North.
	Light.	Darkness.
	Active.	Passive.
	Vitalising.	Weakening.
	Dryness.	Humidity.
	Expanding.	Contracting.
	Irritability.	Non-irritability.
	White.	Black.
	Outside.	Inside.
Coating of vessels. →		Lining of vessels. →
	Tall.	Short.
	Limited.	Unlimited.
	One.	Many.
	Back.	Abdomen.
	Universal.	Particular.
	Breathing.	Circulation.
	Fast.	Slow.
	Strong. (pulse).	Feeble.
	Odd.	Even.
	Belongs to breath. →	Belongs to blood. →
	Osiris. (of Egypt)	Isis.
	Symbol: Azure dragon. →	Symbol: Orange tiger. →
Represented by a long line. →		Represented by a broken line. →

According to the balance of Yang and Yin depended purity or baseness of character, health or disease, success or non-success. Besides the two basic principles were five basic elements, mineral, wood, water, fire and earth, but 'the Tao engenders all things, nourishes them, develops them and fosters them, perfects them, ripens them, tends them and protects them.' (3)

About 600 B.C. three Indian physicians, Caraka, Susruta, and Vagbhata held that health is the expression of the normal composition of the three elementary substances, air, mucus and bile. (4) They described 6 kinds of madness due to 1) improper food, 2) derangement of the wind, 3) combination of wind, bile and phlegm, 4) strong emotions, 5) violent passions and 6) poison.

Thales was probably the first distinctly Greek philosopher, and at Miletus in the early part of the 6th. century B.C. was concerned to know what really lay behind the substance of things. He decided that behind the apparent solidity of matter was something more fluid, and that this liquid - water - had real claim to be considered more ultimate than the solid things which surrounded him. Anaximenes, the last of the early Milesians, however, came to the conclusion that in mist there was something more ultimate than water, and that therefore air or vapour should be considered more basic. Heraclitus (540-475 B.C.) was more impressed by the phenomena of change than his predecessors, and deciding that it is impossible to step twice into the same river, because fresh waters are forever flowing into it, said that man is no exception to this process. "He is kindled and put out like a light in the night time". Therefore not water, nor mist, but fire is the ultimate ground of the world. Parmenides (c.500 B.C.) denied the appearance of change and multiplicity in the world, and said that these things were pure illusion. 'Only the one exists,

and that one is eternal, immutable, immovable and indivisible.' (5) ~~It was to~~ Empedocles (490-430 B.C.) a Sicilian skilled in the art of medicine, ~~who~~ refuted the monistic doctrine of Parmenides, setting up the pluralistic doctrine that the ground of reality was the four basic elements - earth, water, air and fire. By this he believed that one could explain both the changelessness of things and the change in their shifting relations. Out of this hypothesis the school of Pythagoras elaborated their doctrine of mixture or crasis in the body. Health was thought to depend on a balance of the four fluids of the body. But Pythagoras, as well as being interested in the more physical aspects of health, was an exponent of the need for personal development, and to him is attributed the doctrine of the Three Lives. "Just as there are three sorts of people who attend the Olympic games - those who come to buy and sell, those who come to compete, and those who come simply to look on - so mankind in general may be classified as lovers of wealth, lovers of honour, and lovers of wisdom (Philosophoi.); and this last type is higher than the other two..... Philosophy, so Socrates is made to say in one of his Pythagorean moods, is the highest music; in the contemplation of absolute truth one may find the serenity which frees him from the distractions of the body and prepares him for an ultimate release." (6) To Socrates is ascribed the maxim 'know thyself', and in some ways his insight into its far-reaching implications ^{was} ~~were~~ probably clearer to ~~him~~ than ^{it was} ~~they were~~ to Freud. 'Let none' he says 'persuade you to cure his head with this medicine (a certain leaf) who shall not have first presented his soul to be

cured by you with the incantation. For the fault of the present time respecting men is this that certain persons endeavour to become physicians without a knowledge of either (temperance or health)'.

'For all things proceed from the soul, both the good and the bad, to the body and to the whole man; that the soul was cured by certain incantations; and that these incantations were beautiful reasons; and that such temperance was generated in the soul, which when generated and present can easily impart health both to the head and to the rest of the body.' (7)

"To Alkmaeon of Croton, the Pythagorean, is ascribed the first formulation of the doctrine of humors. An equilibrium must be maintained between the hot, cold, moist and dry 'humors' or constituents of the tissues. The fluids that must be combined in proper proportion to produce this result were the blood, which was hot and moist; the phlegm, which was cold and moist; the black bile, which was cold and dry; and the yellow bile, which was cold and moist. The idea of black and yellow bile was arrived at by examinations of the various colours of vomitus or feces. Colds, catarrh, pleurisy and pneumonia were the result of the predominance of the cold moist humor, phlegm, which was secreted in the brain, filtered down through the ethmoid foramen and produced catarrh of the throat, then dropped down into the lungs, to become the cause of bronchitis, pneumonia and pleurisy. This belief was aided by the fact that in the cold season of

winter and in the cold constitutions of the aged these diseases predominated. Black bile, accumulating in different parts of the body, was the cause of cancer in these parts. Accumulating in the brain, it caused melancholia or the atrabilious disease. In the spring when the warm sunshine and warm rains came on, there was a predominance of blood, or the warm moist fluid....

In the autumn, the cold, moist, or yellow bile predominated with the cold rains of the equinoctial season. Air, including "spirit" (pneuma, spiritus), entered the body through the lungs and skin and was carried to the heart by all the branches reaching the surface of these organs. The spiritus or soul was divided into three parts; the spiritus naturalis, or natural spirit, the principle of growth and nutrition which had its seat in the liver, entered the blood from there, and presided over growth and nourishment; the spiritus vitalis or vital spirit, which resided in the heart, and was carried to all parts of the body, being the very life principle or vital heat which really kept us alive, and the spiritus animalis or soul spirit, which lived in the brain and gave to living beings the power of sensation and motion".(8)

The separation of medicine from philosophy according to Celsus(1st.century A.D.) was due to Hippocrates (born c. 460 B.C.). He was an older contemporary of Plato's, but being more interested in the phenomena of disease than in abstract discussion, can be said to have contributed sub-

stantially in this philosophic age to the philosophy of medicine more by his empiricism than by his speculations. He was, however, an observer of people, as every true clinician is, and to him we are indebted for his delineation of five different types, though of course his contributions to the art and science of medicine have been of tremendous importance for more than 20 centuries. That Hippocrates was something also of a metaphysicist is suggested by his conception of hysteria as a 'moving uterus' - an idea he elaborated from Democritus. Draper suggests that he was also aware of the significance of conscious and unconscious factors as indicated in the following extract:-

"He who forms a correct judgment of those signs which occur in sleep, will find that they have a great efficacy in all respects; for the mind is awake when it ministers to the body, being distributed over many parts; it is not then master of itself, but imparts a certain portion of its influence to every part of the body, namely, to the senses, to the hearing, seeing, touch, walking, acting, and to the whole management of the body, and therefore its cogitations are not then in its own power. But when the body is at rest, the soul, being in a state of movement, steals over the organs of the body, manages its own abode, and itself performs all the actions of the body; for the body, being asleep, does not perceive, but the soul being awake, beholds what is visible, hears what is audible,

walks, touches, is grieved, reflects, and in a word, whatever the offices of the soul or body are, all these the soul performs in sleep. Whoever, then, knows how to judge of these correctly, will find it a great part of wisdom." (9)

His main attitude, however, to philosophical speculation is indicated by the following extract:-

"Some say, both physicians and sophists, that it is impossible to understand medicine, unless we know what man is, how he originated, and how he became, in the beginning of an actual body...but for myself, I believe, that all these forms of speech of sophists and physicians, and all that they write on nature belongs to the business of writing and not to medicine itself."(10)

He wrote of those who lived exposed to hot winds as having "humid heads and pituitous constitution, and their bellies subject to frequent disorders owing to the phlegm running down from the head; the forms of their bodies, for the most part, are rather flabby, they do not eat or drink much. The women are sickly and subject to excessive menstruation, then many are unfruitful from disease and not from nature, and they have frequent miscarriages."

The second type he considered was found in cities exposed to cold winds. "The men must have the discharges downwards of the alimentary canal hard, and of difficult evacuation, while those upwards are more fluid, and rather bilious than pituitous. Their heads are sound and hard, and

they are liable to burstings (of vessels) for the most part. Such constitutions must be given to excess of eating, but not of drinking. Such people are liable to be rather long-lived, in disposition they are rather ferocious than gentle. The women are of a hard constitution, from the waters being hard, and their menstrual discharges are not regular, but in small quantity and painful. Phthisis frequently intervenes after childbirth."

The third type described by Hippocrates lives in "cities exposed to winds between the summer and winter risings of the sun", and their characteristics are better general health because of the more moderate climate and because the waters are purified by the direct rays of the sun. Such people are well coloured and blooming. "The inhabitants have clear voices and in temper and intellect are superior to those which are exposed to the north. The diseases are few in number, and of a feeble kind, and bear a resemblance to the diseases which prevail in regions exposed to hot winds. The women there are very prolific and have easy deliveries."

The fourth type lives in the west - in a very unhealthy situation. The inhabitants are pale and feeble. Their voices are rough and coarse owing to the state of the air. They are partly subject to all the afore-mentioned diseases, not having any peculiar to them.

The fifth is formed by marshy stagnant water and forms bile. "They are apt to engender phlegm and bring on

hoarseness; those who drink them have large and obstructed spleens, their bellies are hot and emaciated. Their shoulders, collar bones and faces are emaciated. Such persons are voracious and thirsty. In addition they are very subject to dropsies of a most fatal character. In winter younger persons are liable to pneumonia and maniacal affections. Women are subject to oedema and leucophlegmasia; when pregnant they have difficult deliveries."

There is, therefore, an early description of the supposedly basic types, 1) the phlegmatic, lymphatic or pituitous; 2) the bilious; 3) the sanguine; 4) the melancholy; 5) the choleric. (11)

We have already noted the opposing views of Heraclitus, that everything is in a state of change, and those of Parmenides that reality is constant. Plato (d. 347 B. C.) pointed out that our perception of qualities in the environment, such as heat and cold, were at any rate to some extent relative, and therefore tended to deny the reality and the permanency of substance. "Then we are sure of this, in however many ways we look at it, that what is completely, is completely knowable, what in no way is, is in every way unknowable." There is, he said, a difference between the things that we can know and the things that we cannot know, and between these we may set belief or opinion, which like knowledge is a power or faculty; it is not exactly representative of what is, like certain knowledge which tells of what truly and completely is, nor is it so dark and formless as

ignorance, which is of that which completely is not, but it is about that which partly is and partly is not. In relation to the world of sense, therefore, we must realise that our opinions do not constitute knowledge. The real world for Plato, then, is the world of Forms, or Ideas, since these constitute objects of real knowledge. It is the distinction between what is universal and what is particular, between the absolute and the relative, between the world where Forms are real and knowable and the world where things sensed are less real because less certainly knowable. Indeed the one is concerned with things perceived by the soul and the other with things perceived by the body, and though we may think at first glance that these latter are more real than the former, we need to find that world where we gain our perspective, for in Plato's view, it is the Form that bestows even the semblance of reality to the things of sense.

This view is expressed in the couplet by Spenser:-

"Of the soul the body form doth take,
For soul is form and doth the body make."

To Plato, the Forms represent objective realities, having an existence quite apart from the individual, though he contends that we only come to recognise them because the soul has a pre-existence which has, as it were, made it cognisant of the qualities that the Forms possess. He extended his conception of the real unchanging world of Forms and the less real changing world of substance in his simile of the twice bisected line. "Let there be a line cut

in two unequal parts," the one representing the visible, the other the intelligible world; divide each again and let them represent the bright and the dark parts of the visible and intelligible worlds respectively. In other words, schematically we may represent reality as made up of the following entities:-

Visible world	{	<u>Bright</u> : Objects	{ plants. animals. works of art and nature.
		<u>Dark</u> : Images	{ shadows reflections.
Intelligible world	{	<u>Bright</u> :	Truths.
		<u>Dark</u> :	Opinions and hypotheses.

To these correspond four operations of the soul:-

{	Faith.
	Conjecture.
	Reason.
	Understanding.

What then is the relation between the soul and the body? Plato's famous illustration of the horse and its rider suggested that there could be assumed in that relationship the following:-

1. That the horse as representing the body had a life of its own.
2. That the rider as representing the soul also had a life of its own.
3. That the soul had the faculty of directing the course of the body, though no doubt with improper supervision the body could aimlessly take the soul where it wished.
4. That whereas the central property of the soul was purpose or will, that of the body was energy.

The discrepancy that is inherent in these two similes of the soul as Form and the soul as purpose may be attributed to the weakness of all analogical modes of expression.

Aristotle (384-322.) extended the conception of the Form to that process of potentiality which determines actuality, ~~as~~ as he was more interested in biology than Plato, so his conceptions were more suited to such natural phenomena as those of growth. He accounted for the existence of things by his doctrine of the four causes. These were:-

- 1).the material cause:
- 2).the formal cause:
- 3).the efficient cause:
- 4).the final cause:

The material cause is the germ from which the organism springs, or the stone from which the statue is carved out: the formal cause is an extension of Plato's doctrine of Forms and represents the law which determines the specificity of growth, that kind begets kind, or the idea of the statue in the sculptor's mind that determines its embodiment in stone: the efficient cause is the agent from which the material cause springs, as the original oak that gave rise to the acorn which forms the material cause for the oak, or the activity of the sculptor in producing his statue: while the final cause represents a very important aspect of Aristotle's philosophy and constitutes the idea of completion in a goal (telos), so that what is potentially in the acorn becomes finally actualised as an oak in its full

stature, and what began as an idea in the sculptor's mind finds its fulfilment as the completed statue. In regard to the development of the individual this was to be expressed in terms of a relationship between the soul and the body, for the body is the material cause of the organism; the soul is its efficient cause, producing its movements; also its formal cause, determining the form of the individual organism; and lastly, its final cause, being the end for the sake of which the body exists.

Aristotle brought the conception of soul in to a much more intimate relationship with all animate life in his conception of it as the vital principle, distinguishing living organisms from inorganic things. He ascribes to it five principle activities:-

- 1). The vegetative process of nutrition, growth and reproduction.
- 2). Appetite, impulse or desire (i.e. conation).
- 3). Sensation.
- 4). Power of spontaneous movement in thought.
- 5). Rational thought, which alone is peculiar to man.

Galen (12 & 13) (c.A.D.150) distinguished four simple constitutional types, the dry, the moist, the hot and the cold, and four other compound constitutions, the warm-dry, the cold-dry, the warm-moist and the cold-moist, along with a ninth in which no quality was in excess, because a perfect arrangement ensured a harmonious constitution, which was named the balanced.

The theory of medicine seems to adhere, without considerable deflection, to the Galenic tradition for about 1500 years, as reference to Chaucer and Shakespeare indicate. Thus we have Chaucer's (1340-1400) description of the doctor in the Prologue to the Canterbury Tales:-

'With us was a Doctour of Phisyck,
 In al this world ne was ther noon him lyk
 To speke of phisik and of surgerye;
 For he was grounded in astronomye.
 He kepte his pacient a ful greet del
 In houres, by his magik natural.
 Wel coude he fortunen the ascendent
 Of his images for his pacient.
 He knew the cause of everich maladye,
 Were it of hoot or cold, or moiste, or drye,
 And where engendred, and of what humour;
 He was a very parfit practisour....
 Wel knew he the olde Esculapius,
 And Deiscorides, and eek Rufus,
 Old Ypocras, haly, and Galien.'

Later still in the time of Shakespeare, the humoral doctrine obviously still formed part of the commonly accepted belief as is found in such passages as the following:-

Portia: 'I urged you further, then you scratched your head,
 And too impatiently stamp'd with your foot:
 Yet I insisted, yet you answer'd not;
 But with an angry wafture of your hand
 Gave sign for me to leave you: so I did;

Fearing to strengthen that impatience
 Which seem'd too much enkindled; and withal
 Hoping it was but an effect of humour,
 Which sometime hath his hour with every man.
 It will not let you eat, nor talk, nor sleep;
 And, could it work so much upon your shape
 As it hath much prevail'd on your condition,
 I should not know you, Brutus.'

Julius Caesar. Act.ii. Sc.1.

Mark Antony: His life was gentle; and the elements
 So mix'd in him that Nature might stand up
 And say to all the world, 'This was a man!'

Julius Caesar. Act.v. Sc.4.

In 'Merry Wives of Windsor' similarly there are frequent references to the humours, such as the cholers, the melancholy and jealousy, and in Act.iii, Sc.1. a slighting reflection to the French doctor, Caius, by Sir Hugh Evans:-

'He has no more knowledge in Hibocrates and Galen,- and he is a knave besides; a cowardly knave, as you would desires to be acquainted withal.'

In Henry iv. Act iii. Sc.1. also we have:-

Hotspur: 'Now I perceive the devil understands Welsh;
 And 'tis no marvel he' so humorous.
 By'r lady, he's a good musician.'

Lady Percy: 'Then should you be nothing but musical
 for you are altogether governed by humours.
 Lie still, ye thief, and hear the lady sing in
 Welsh.'

A literary allusion to the doctrine of humors of psychiatric interest is to be found in Pope's introduction to his 'Rape of the Lock' (1711) where he describes the Rosicrucians who affirmed the inhabitation of the four elements by spirits who were called Sylphs (air), Gnomes (earth), Nympths (sea), and Salamanders (fire). "The Gnomes or Demons of Earth delight in mischief: but the Sylphs, whose habitation is in the Air, are the best condition'd creatures imaginable. For they say, any mortals may enjoy the most intimate familiarities with these gentle spirits, upon a condition very easy to all true Adepts, an inviolate preservation of Chastity."

So far the humoral doctrine appears to have been more a subject for poets than for scientists, but if we remember the comparative youth of the modern scientific spirit we may be able to see in perspective something of the significance of the sweep of the years from Hippocrates onwards. Leaving aside the influence of the rise of Christianity in the development of neo-Platonism through Plotinus and Porphyry and through the philosophy of the schoolmen and the rise of the Universities in the Middle Ages we have to trace the more objective approach initiated by

Hippocrates but incorporated in the healing tradition that ran concomitently with the philosophical attitude of mind. Indeed we may say of the whole range of the practice of healing from pre-Hippocratic times to the present that there have been these two main streams, the one rational, philosophic and more subjective, the other empirical, scientific and more objective; but so far these streams have not met, though there are indications that they are going to do so. Indeed the whole cleavage of attitude between philosophy and science is the leading symptom of the world's schizophrenia, that primarily time alone will heal. We must now trace the features of the more objective currents of thought emerging from the Middle Ages.

While the humoral doctrine therefore was certainly part of the current belief of the Tudor period, Paracelsus (1493-1541) was responsible for a more chemical outlook on disease and its processes, and during the Renaissance the nature of individual bodily conditions was thought to be dependent on a predominance of such elements as salt, sulphur and mercury. To this period also belongs the belief in the preponderance of acid or alkaline fluids, so that the conception of acidosis is at least 400-500 years old.

"Paracelsus conceived the idea that disease was a disharmony of normal functions (life under altered conditions), e.g. hereditary as in goitre, or diathetic as in gout and stone. These diathetic diseases, he regarded as "tartaric" processes, caused by the precipitation of substances

ordinarily voided from the body. His 5 causes of disease (entia) were cosmic agencies (ens astrorum); pathological poisons (ens venene) including auto-intoxications and contagia; natural causes (ens naturale) or predisposition to disease from organic defects; psychic causes (ens spirituale) and divine intervention (ens deale)." (14)

Della Porta (15) (1536-1615) of Naples must be considered an early forerunner of the physiognomical school, for he estimated human character by the features, noting the presence of characteristic animal traits in the appearance of the individual, to which he assigned a particular psychological characteristic.

Sylvius (16) (1614-1672) approached the question from the anatomical point of view in his theory of the predisposition to tuberculosis among those of certain constitutional make-up which rendered them susceptible to external influences; and also made observations on the ductless glands and acidosis.

In 1652 Spigelius (17) described a ratio between intestinal and bodily length, while in Padua in 1654 Elsholzius (18) devised one of the first systematic anthropometric methods for clinical studies.

In 1670 Lower (19) stated that the secretion of the pituitary, which previously had been thought to be associated with the mucous discharge from the nose, was poured into the blood and mixed with it. In 1766 Albrecht van Haller (20) the father of modern physiology, mentioned

the thyroid, thymus and spleen as glands not having ducts, but which of necessity emptied into the veins.

To Théophile de Bordeu (21) (1722-1776) in 1775 must be given credit for first stating the doctrine that not only each gland, but each organ of the body, is the workshop of a specific substance or secretion, which passes into the blood, and that upon these the integration of the body depends. The doctrine of humours is thus gradually coming to have a specifically physiological flavour more in keeping with the modern theory of the internal secretions and 'hormonic equilibrium'.

In 1790 John Hunter, (22) though ~~primarily an anatomist~~, insisted on the relation between function and structure and made interesting observations on the relation of the gonads to the general constitution.

The term 'internal secretion' was first employed by Claude Bernard (23) in 1855, and as this was the year in which Addison (24) described the symptoms associated with adrenal hypofunction, later known as 'Addison's disease', that date assumes considerable importance in the history of endocrinology.

The most important development of the humoral hypothesis is its termination in modern endocrinology. A few outstanding contributions to this very immense field of medicine were the observations of Moritz Schiff (25 & 26) made between 1859 and 1884, on the results of thyroidectomy, of Pierre Marie (27) on acromegaly in 1886, of Schöfer and

Oliver (28) on adrenal secretion in 1895, of Frolich (29) on hypopituitarism in 1901, of Cushing (30) on the pituitary in 1912, and of Tandler and Gross (31) on the gonads in 1913.

While the importance of endocrine physiology and pathology was thus becoming apparent, a therapeutic advance of outstanding importance was the successful treatment of myxoedema by thyroid extract reported by G.R.Murray (32) in 1891, and at that point we must leave the very incomplete account of the humoral hypothesis, to consider another aspect of the historical development of the conception of diathesis.

We have already noted some of the observations of Hippocrates on the relationship between physical build and pathological tendencies.

From 1801-1805 Georges Cuvier (33) published his works on comparative anatomy and this was associated with a general increase of interest in anatomy, not only among the medical profession, but also among artists, whose interests in anthroposcopy were encouraged by a book by Pieter Camper entitled "On the Connection between the Science of Anatomy and the Arts of Drawing, Painting, Statuary, etc", (34).

In London in 1804 was published a second edition of four volumes called "Essays on Physiognomy: for the promotion of knowledge and the love of mankind", which were a

translation of the work of Lavater, a Lutheran pastor.(35)He reflected the growing interest in correlation between form and function. "Were the lion and the lamb for the first time placed before us, had we never known such animals, never heard their names, still we could not resist the impression of the courage and strength of the one, or of the weakness and sufferance of the other.... Each species of beast has, certainly, a peculiar character, as it has a peculiar form. May we not hence, by analogy infer that predominant qualities of the mind are as certainly expressed by predominant forms of the body, as that the peculiar qualities of a species are expressed in the general form of the species?"

At about this time also there began to be more definite attempts at formulating the different bodily types. De Troisvevre (37) published in 1821 a monograph dividing men into three types:- 1)the cerebral, with a preponderance of head over thorax and abdomen, 2) the thoracic and 3) the abdominal. Probably this man developed the ideas of his teacher Hallé (39) who lived in Paris about 1820. In 1823 Puchelt (39) devised a classification of disease-types based more on physiological than anatomical features:- 1) the arterial constitution with marked irritability, comprising the sanguineous and choleric types, 2) the venous constitution usually associated with a phlegmatic or melancholic temperament. 3) the lymphatic constitution and 4) the nervous constitution.

Another Frenchman to advance the validity of the

diathetic concept was Bouchard (40) who by his careful clinical observations was instrumental in getting the arthritic diathesis widely recognised by noting the relationship between gout, obesity, diabetes, chronic rheumatism, biliary and renal stone, migraine, eczema, asthma, and suggesting that arthritism was a diathesis characterised by a general slackening down of metabolism.

The diathetic concept was maintained in France by a succession of writers who usually implied by it a predisposition to disease, rather than the more specific feature of hereditary proclivity, so commonly associated with it, in this country.

The British clinicians, Addison (24) and Laycock(41) further advanced the constitutional concept of disease, the former by his description of the type of person with "somewhat large and bulky frame, and with a strongly marked tendency to the formation of fat", who developed pernicious anaemia, and by his general stress on the need for considering the individuality of each patient, and the latter by his detailed account of the significance of the modifications in the shape of the various members of the body. Thomas Laycock wrote a series of articles on "Physiognomical Diagnosis", in which he discussed these topics, and illustrated his theme by references to his colleagues! He was careful to define his terms and spoke of diathesis as being a tendency, cachexia as being the actual development of a diseased condition, and the constitution as applying to all general

conditions, whether tendencies or results of tendencies. According to him, temperament is the uniting of constitutional elements and therefore he classified them as 1) nervous, 2) sanguine, 3) fibrous or biliary, 4) phlegmatic, 5) lymphatic and 6) melancholic, and as examples cited members of the Hunter family. From these temperaments he delineated the main features of the diatheses, which he considered were 1) the neuro-vascular, 2) the neuro-arthritis, and 3) the scrofulous. As recently as 1927, Maitland Ramsay (42) writing of diathesis as a bodily condition predisposing to a particular disease spoke of the same three categories as neurotic, arthritic and scrofulous.

From 1877 onwards there had been working in Padua a group of men who derived much practical help towards the solution of their clinical problems from their morphological studies. Di Giovanni (43) published in 1881 an account of his work in which he propounded the idea that anomalies in embryonic development or "morphological discord" might result in morbid processes in adult life. He expanded this tenet in another rule, that the individual was being incessantly transformed according to morphological and functional correlations, and to the law of adaptation to the environment, and therefore that the individual might offer different morbid aspects at different periods of life. His third general principle was that at every epoch of life, the cause of disease resides in a special morbidity - by which he meant presumably what Rostan had described previously,

as the preponderance (or insufficiency) of one system over another leading to disease-processes. He further contended that the development of external bodily features was an indication of the degree of development of the internal organs. In the thorax, for example, the greater the width of the first and second intercostal spaces, and the greater the length of the manubrium sterni, the greater the development of the right side of the heart with correspondingly defective development of the left ventricle and aorta, which is longer and narrower than normal. This idea was later elaborated by Benecke (44&45) and Brugsch (46), the former holding that a small aorta was a mark of inferior constitutional development. Di Giovanni was the pioneer of the anthropometric method and from his investigations he described four morphological types, 1) an ideal, 2) anasthenic, designated "the first morphological combination", 3) a ^hstenic, "the second morphological type", and 4) "the third morphological type", identified by Draper as the "pernicious anaemia type". His work was carried on by Viola (47) at Bologna and by Nicola Pende (48 & 49) (48 & 49).

The anatomical studies of Benecke in 1879 on the abdomen as well as the thorax, were extended by Treves (50) in 1886, who drew attention to the differences that existed between the intestinal lengths of carnivorous and herbivorous animals. He demonstrated that in the former the intestine was short, while in the latter it was long and tortuous.



Bean (51) extended these observations in 1912 by applying the knowledge to man, and in 1915 Bryant (52) and Goldthwait (53) drew up a detailed description of the carnivorous and herbivorous types of man. Stockard (54 & 55) reaffirmed some of the observations of Godin (56) in 1903 on alternations of growth in length with that in width, but further contributed to the subject by his distinction of linear and lateral types, and by his insistence that the constitution of an individual is actually a different thing at different life-periods.

Research in general anthropology has also compelled the attention of those who find themselves attracted by the study of the human constitution, notably in the early days Blumenbach, (57 & 58) Broca (59), and Francis Galton, (60,61,62) that very versatile Englishman who interested himself in so many different topics and was able to bring new light to them all, whether he was considering criminology, the occurrence of twins, the perception of sound, the nature of genius, colour-blindness or the physiognomical appearances of phthisis by the method of composite portraiture. In later times Hrdlička (63) has noted physical differences between the American and the Briton, a relatively shorter thorax and longer abdomen being more typical of the former.

In France, Sigaud (64) and his pupils have used the anthroposcopic method, believing that to know the whole man includes seeing him in his entire native nude state. They

attached a great amount of importance to the shape of the face and skull, to the exclusion of other parts of the body, and tended to lay more emphasis on the influence of environment than most workers in this field. MacAuliffe(65) maintained the tradition set by Sigaud and classified 4 types of men, 1) the cerebral, 2) the thoracic or respiratory, 3) the abdominal or digestive and 4) the muscular or athletic.

In this country Keith (66 & 67) has brought the results of endocrinological research in line with anthropology and has very cleverly contended that the broad divisions of race depend on the predominance of one or other of the glands of internal secretion.

During the years 1850-1900 medicine was dominated by the cellular pathology of Virchow (68) and consideration of the patient as a whole gradually became submerged in the pathological lesion, or the specimen, which was considered to be the 'sedes morbi'. Its most outstanding error was the belief that the cell-contents are the controlling feature of the whole organism. The rise of bacteriology during this time even further transferred the responsibility for disease from the cell to the bacillus.

In 1859 Pasteur (69) set himself to solve the question as to whether bacteria were spontaneously generated or whether they were introduced from the air. The work of Koch (70 & 71) and the application of the new science to surgery by Lister (72), diverted the attention of clinicians from the soil to the seed, and as a result the latter

came to hold a position of exaggerated importance. The work of Emil Fischer (73) in the new science of biochemistry for a time also helped to focus the interest of clinicians away from the individual to the test-tube.

Although the immediate effect of the new interest was to divert the minds of the profession to external chemical agents, more recently this has enormously strengthened the revival of diathetic principles. The whole sphere of endocrinology is intimately bound up with biochemistry, for the chemical formula of adrenalin has been discovered making its preparation synthetically possible; one of the active principles of thyroid gland has been isolated by Kendall (74) and its formula is known; the intimate relationship between calcium metabolism and the parathyroid gland has been repeatedly demonstrated and lately much advanced by Hunter (75); and knowledge of the action of insulin was much facilitated by studies in blood chemistry. The work of Garrod (76) on the "Inborn Errors of Metabolism" is also an excellent illustration of the close union that exists between chemistry and diathesis. Further examples are offered by the disease-potentialities arising from variations in the acid secretions of the stomach emphasised by Bennet, Ryle (77) and Hurst (78 & 79), and by the conception of acid-base equilibrium initiated by the work of L.J. Henderson (80) and Hasselbach (81) and given clinical significance by the work of Sellards (82), Osman (83), Cameron (84) and many others.

Although the rise of any speciality may almost inevitably be associated in the minds of those promulgating it, with a distortion of perspective, yet the very multiplicity of new viewpoints may, in itself, be a reminder that the unifying principle must be sought, not in these, but in the integrity of the individual, which consists pre-eminently in the reconciliation of the subjective with the objective self, of personal motive with special interest. So although medicine for the best part of 70 years has produced, or been closely identified with all sorts of interesting ancillary sciences, this very wealth of interest has served to remind us that man's deepest welfare lies not in this or that particular speciality, so much as in his personal orientation to any or all of them.

The influence of evolutionary concepts on our notions of disease, has, in general, been slow in emerging from all the welter of biological data associated with the broad principle, but we may formulate the following ways in which the concept has advanced our ideas of disease-processes.

1. Although the correlation between structure and function had been suggested by Galen and J. Hunter, its significance was further brought into line with biological principles in the suggestion by Lamarck (85) in 1809 that variations are produced by the effects of use and disuse upon organs, by the response of the organism to external stimuli, and by direct inheritance of these

acquired characters.

2. As a corollary to this the growth of the organism is dependent both on its internal and external milieu.
3. The storehouse of individual potentiality for good or ill is somehow resident in the germ-plasm (Weismann) (86 & 87)
4. In this basic principle rests the validity of the relatively new science of genetics. [Mendel (88), Castle (89), Davenport (90 & 91), Crew (92), Gates (93), and Baur, Fischer and Lenz (94)]
5. The conception of evolution carries along with it, as an alternating principle the conception of dissolution. [H. Spencer (95), J. Huxley Jackson (96)]
6. Growth is a biphasic process in which phases of growth in height alternate with growth in width. [Godin. (97)]
7. The two basic physical types represent one in which the phase of growth in height preponderates, and the ~~at~~ other in which the phase of growth in breadth preponderates. [Viola (47)]
8. Specific morbidity resides in this relative preponderance of one phase over another. [Di Giovanni] (43).
9. Disease-proclivity also resides in the different age-periods of life, as indicated in the following table from J. Bauer (98).

1. Exudative, catarrhal, or eosinophilic diathesis, with normal, flushed or pale complexion.

Skin surfaces.	Infancy.	Childhood.	Puberty.	Middle age.	Old age.
1.					
Exanthemata.					
a) primary.	Milk-rash.	Prurigo.	Urticaria.	Quincke's oedema.	Pruritis
	Prurigo	Urticaria.	(idiosyncrasy)	Urticaria. (idiosyncrasy)	
b) secondary	Eczema.	Glandular swellings			
usually infections.	Intertrigo.				
	Abscess.				
Mucous surfaces.					
2.					
Enanthemata.					
a) primary.	"Fluid swellings".	Geographical tongue.	Asthma.	Asthma.	Asthmatic
	Desquamations	Asthma.	Asthmatic bronchitis.	Asthmatic bronchitis	bronchitis.
	Geographical tongue	Asthmatic bronchitis	Hay fever.	Hay fever.	
b) secondary.	Coryza.	Coryza.	Coryza.	Coryza.	Coryza.
usually infections.	Angina.	Angina.	Angina.	Angina.	Bronchitis.
	Pharyngitis.	Pharyngitis.	Pharyngitis.	Pharyngitis.	Capillary bronchitis.
	Laryngitis.	Laryngitis.	Laryngitis.	Laryngitis.	Bronchopneumonia.
	Bronchitis.	Bronchitis.	Bronchitis.	Bronchitis.	Conjunctivitis.
	Capillary bronchitis.	Capillary bronchitis.	Cystopyelitis. (coli)	Cystopyelitis. (coli)	Blepharitis.
	Bronchopneumonia.	Bronchopneumonia.			
	Blepharitis.	Blepharitis.			
	Gastroenteritis.	Gastroenteritis.			

II. Lymphatic, hypoplastic diathesis with normal or pale complexion.

	Infancy.	Childhood.	Puberty.	Middle age.	Old age.
1. Lymphatic symptoms.					
a) primary.	En- larged glands of neck. Tissues fat & watery.	Enlarged glands of neck. Tissues fat & watery. Adenoids. Enlarged follicles. Persist-ent thymus. En- larged spleen. Enlarged glands in neck, axilla, growing medias-tinum & mesentery.	Adenoids En- larged follicles. Persist-ent thymus. En- larged spleen. En- larged glands in neck, axilla, growing medias-tinum & mesent-ery. Mul- tiple gland en- large- enlarge- ments. Lympho- cytosis.		Lym- phatic hyper- plasia becomes less ap- parent.
b) secondary. usually infections.	Coryza. Angina. (palate & phar- ynx) Laryn- gitis. Bronch- itis. Capil- lary bronch- itis. con- juncti- vitis. Ble- phar- itis.	Coryza. Angina. (palate & pharynx) Laryn- gitis. Bronch- itis. Otitis media & sequelae. Scrofula.	Coryza. Angina. (palate & phar- ynx) Laryn- gitis. Bronch- itis. Miliary tuber- culosis.	Coryza. Angina. (palate & phar- ynx) Laryn- gitis. Bronch- itis. Otitis media & sequelae. Miliary tuber- culosis.	Liabil- ity to in- fectious diseases.

II. (cont.)

	Infancy.	Childhood.	Puberty.	Middle age.	Old age.
b).		'Epidemic stiff-neck. ?Meningitis. Nephritis.	'Epidemic stiff-neck'. Nephritis. Polyneuritis. Polyarthrit.	'Epidemic stiff-neck'. Nephritis. Polyneuritis. Polyarthrit. Cryptogenic septico-pyaemia.	
2. Hypoplastic symptoms.		Rigid arteries. Droplet heart. Amaurotic family idiocy. Friedreich's Ataxia. Haemolytic icterus. Abiotrophies.	Rigid arteries. Droplet heart. Long flat thorax. Genital defects. Chlorosis. Abiotrophies.	Rigid arteries. Droplet heart. Indications of myocardial insufficiency with decompensation. Long flat thorax. Visceropathy. Genital dysfunction. Arteriosclerosis. Emphysema.	Arteriosclerosis. Cardiac insufficiency.

III. Neuro-Arthritic Diathesis, with normal, flushed, pale or dull, or plethoric complexion.

	Infancy.	Childhood.	Puberty.	Middle age.	Old age.
1. Metabolic dysfunction	Unstable weight & temp- erature.	Abnormal thinness or fatness. Aceto- naemia. P.U.O. Urataria. Phosphat- uria. Aceto- nuria. Glycos- uria. Calculi of kidney & bladder.	Abnor- mal thin- ness or fatness. P.U.O. Urti- caria. Phos- phat- uria. Calculi of kid- ney & bladder. Dia- betes.	Abnormal thinness or fatness. Gout. Diabetes. Uraturia. Phosphat- uria. Cystin- uria. Alkapt- onuria. Oxalat- uria. Calculi of kidney & bladder. Gallstones. Arterio- sclerosis. Oto- sclerosis. Presenile cataract. Glaucoma.	Diabetes Gout. Arterio- sclerosis. Oto- sclerosis. Cataract. Glaucoma.
2. Arthritic manifest- ations.	-	-	-	Chronic or recurrent muscular rheumatism (eg. lumbago, torti- collis.) Arthritis deformans of non-in- fectious & non- gouty nature. Uricaemia (hip- disease) Heberden's nodes. Characteristic arthritis.	Chronic or recurrent muscular rheumatism (eg. lumbago, torti- collis.) Arthritis deformans of non-in- fectious & non- gouty nature. Uricaemia (hip- disease) Heberden's nodes. Characteristic arthritis.

III. (cont)

	Infancy.	Childhood.	Puberty.	Middle age.	Old age.
3. Skin manifestations.	Impetigo. Papulo-vesicular eczema. Urticaria.	Urticaria. Prurigo. Eczema. Hyperidrosis. Chilblains.	Urticaria. Eczema. Seborrhea. Acne. Furunculosis. Psoriasis. Neurodermatitis. Lichen simplex. Quincke's oedema. Chilblains.	Urticaria. Eczema. Seborrhea. Acne. Furunculosis. Psoriasis. Neurodermatitis. Lichen simplex. Quincke's oedema.	Pruritis. Eczema. Neurodermatitis.
4. Psychopathological disorders. Idiosyncrasies, of Chemical or biological allergies.	"Prodigies!" Heterodystrophies. of Pfaunder.	Hysteria. Pavor nocturnus Hemicrania. Neuralgia. Masturbation. Anaphylaxis (Serum' disease.)	Hysteria. Neuras-thenia. Hemicrania. Neuralgia. Masturbation. Asthma. Idiosyncrasy. Hay fever.	Psychopathicity. (cf. Kraepelin) Psychoneurosis. Neuras-thenia. Hysteria. Hemicrania. Neuralgias. Asthma. Idiosyncrasy. Hay fever.	Depressive states & psychoneuroses. Neuralgia.
5. Spasmodophilia.	Convulsions. Laryngospasm. Tetany.	Convulsions. Tetany. Epilepsy?	-	Epilepsy??	-

Inspired by the work of Czerny (99) and Finkelstein (100) on the food reactions in different kinds of children, and the trend of medicine, as indicated, we find that paediatricians are putting increasing emphasis on the diatheses of childhood; this is exemplified by the writings of Cameron (84), Lapage (101), Pearson and Wyllie (102), and Griffith and Mitchell (103). It is, of course, in the child that diathesis first manifests itself, and greater understanding of this aspect of life must have its effect in forestalling disease in later life, while the whole subject has within it the possibilities of giving a new orientation to preventive medicine, which through the modern movement of Child Guidance, seems likely to play an increasing part in the life of the community.

From the time of Thomas Laycock, before Pasteur's work temporarily obscured the importance of the study of the human constitution, to the present day, with an occasional gap, there has been a notable succession of men whose balance was not disturbed by the rise of the new science of bacteriology. This succession included Jonathan Hutchinson (104) who in 1881 lectured in London before the Royal College of Surgeons on diathesis, dyscrasia and temperament. He wrote, "our forefathers, who knew far less about the details of pathology than we do, attached far more importance to such matters as temperament and diathesis..... The change of sentiment is a result of the advance in knowledge, yet I think that it might easily be shown that it has gone too

far, and that we now neglect unwisely the study of those differences between man and man of which for the most part physiology takes no cognisance, but which may yet prove of much importance in modifying the processes of disease." In the same year Sir James.F.Goodhart (105) writing on diathesis in the rheumatism of childhood expressed himself as follows:- "now, in general terms my idea of diathesis is this:- a something represented by a certain bodily conformation, which is characteristic of its parentage, is possessed of a vital machinery which tends to work in a characteristic way; and which in turn tends to transmit its methods of working to its progeny. Diathesis, therefore, seems to me to be equivalent to family strain, and so reading it, I should call hereditary genius a diathesis, or rather a manifestation of one."

I have been unable to trace any important contribution to the clinical aspect in this country from 1881 till 1908, the year that Dyce Duckworth (106) modernised the old fourfold classification of arthritic, scrofulous or lymphatic, nervous and bilious diathesis. He wrote of the need in the arthritic for a different diet from that for the lymphatic or scrofulous, and emphasised the distinctive features of each group. Thus the scrofulous diathesis is characterised by a poor reaction to all maladies, which if not fatal are followed by a long convalescence. He stressed the idea that the scrofulous individual is not tuberculous, though he has that predisposition. The scrofulous is "ens in potent-

ia", the tuberculous "ens in actu". Other clinicians in this country have also contributed to a revival of interest in diathesis and brought the concept in line with modern advances in medicine. Such men include Garrod (107 & 108), Hurst (109), Ryle (110), Langdon-Brown (111), and Maitland Ramsay (112), while Lord Dawson devoted quite a large part of his introductory Address to the B.M.A. meeting of 1932 to various aspects of this subject and commended to the clinicians greater attention to the "inborn trends". (113).

In a similar vein Sir Robert Hutchison (114) spoke in 1936 of the need for reorientation in medical theory necessitated by the need for a new synthesis of modern discovery with traditional concepts (due to 1) the rise of biochemistry, 2) the discovery of the endocrines, and 3) the striking advances in medical psychology we owe largely to Freud.

The most significant feature, however, of the awakened interest in diathesis lies not so much in its relationship to traditional medicine down through the ages, as in its relationship to personal habits of life, and the necessity for treating the man in his entirety in order to modify his pathological trends most radically. In other words we are coming to see that disease is just as much related to temperamental inadequacies as to pathological changes; that behind the disease there has been a life-style, and that without modification of the life-style treatment may only

be palliation. If we are to be physicians most truly, we must become metaphysicians. It has long been our custom to lay stress on the history lying behind the present illness, but we know now from our knowledge of psychology that there are yet more significant things to be learnt about our patients, and for this we shall need to take greater pains in taking histories, and be more alive to the family constellation and all that lies behind this, than we have been heretofore. With more attention to detail, we shall find more significance in the time and circumstances that precede the onset of disease, and not least, be able to indicate what bridges must be crossed before one unhealthy phase is followed by another healthy one. If looking back we can see new significance in the circumstances precipitating illness, looking forward we shall not be slow to see that there are indications of wider potentialities for fuller life and new opportunities for finding health at deeper and deeper levels. The study of diathesis is closely related to the study of types, but conformity to type may be relative to too limited opportunity, and we must not become slaves to any system of type psychology, though we should be willing to learn all that we may from its study.

It is only of comparatively recent years that as physicians we have learnt the universal prevalence of psychotic trends in the community, though down through the ages saints and the great dramatists have known it. We owe largely to Freud(115) the recognition of the psychopathology

of everyday life, though Shakespeare rarely fails to portray it for us, and there are few of the really great who have not known it. Perhaps the newest discovery of the modern psychology is its nomenclature, but it has also provided medicine with a new goal, and helped us to formulate new principles of treatment. Our predecessors may have been aware of these things, but they did not see fit to write about them in the way that is customary today. It may be that their silence in these matters showed them to be wiser than ourselves, and it may be that having discovered itself, as it were, the new psychology will be less consciously in our minds when we have appropriated its principles and let it become unconscious, so that we can allow ourselves to become more able clinicians, able to read the signs of the times as they are revealed to us in our patients, while we do not forget that the disease is less important than the individual, the physical state of less significance than the psychiatric.

If we were to try to enumerate the delineators of characterological types we should have to begin with the dramatists, poets and novelists, picking out here and there flashing insight, profound character-study and prophetic gift, but if one waited till one was well acquainted with the Greek tragedians, as well as with the writers in one's own tongue, one would never really embark on this most important work of correlating physical disability with personal deficiency. So if we are to complete this historical

résumé of those who have realised the importance of personality in relation to disease, we must wittingly leave out those of long ago, in favour of those of this more or less present age, upon the comparative greatness of whom, the verdict of time alone will ^{be} adequate to speak.

To the psychiatrists pre-eminently we **must** in our present light, give pride of place for their recognition of mental states as being uniquely different from the diseases of general medicine, and Kraepelin(116) stands out supremely for his recognition of the fact that a mental patient is not so much a sufferer from a disease with many symptoms, as applies in general medicine, as pre-eminently a sufferer from a disturbance of the normal periodicity of affectivity. In other words his illness is phasic, rather than stationary, a process in time rather than a local lesion, and dynamic rather than static. It is this disturbance in tempo which gives new significance to the personal history, and we are indebted to Adolf Meyer(117 - 120) for his emphasis on the need for seeing the patient in relation to his life-history, as it were longitudinally, as well as vertically, in terms of the present. The case-history, therefore, must include much more of the patient's experiences than is customary, and an attempt must be made to define just why a particular mental state or clinical syndrome should arise in a given patient, at a given time, with such hereditary and environmental factors operative.

Meyer describes the psychobiological functioning

as function of the person as a unit as opposed to the function of parts. "This functioning is the result of organisation, growth, metabolism and specialization of the personality. It is the emergence from lower integrative levels to the highest. It is more than a summation of these lower levels; it possesses all of their characteristics but is ultimately governed by laws of functioning applying explicitly to the resulting functions of the he or she." (121) In Meyer's view the experiences and traits which make up the personality constitute the psychosis; in other words it is a genetic dynamic view, emphasising mental disease as a growing process, a cumulative result of habit patterns and actions and reactions with which the individual faces his environment. Thus the individual's growth and development is studied through his life facts and life experiences, and in the etiology of mental disease psychobiology urges a pluralistic view.

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CHAPTER 3

THE INFLUENCE OF HEREDITY

Savage creatures seek

Their loves in wood and plain - and God renews
His ancient rapture! Thus He dwells in all,
From life's minute beginnings, up at last
To man - the consummation of this scheme
Of being, the completion of this sphere
Of life: whose attributes had here and there
Been scattered o'er the visible world before,
Asking to be combined, dim fragments meant
To be united in some wondrous whole.
Imperfect qualities throughout creation,
Suggesting some one creature yet to make,
Some point where all those scattered rays should meet
Convergent in the faculties of man.

Robert Browning: Paracelsus

The study of diathesis begins with the study of origins
and ends with the fulfilment of destinies.

SYNOPSIS:

Our conception of the scope of heredity comprises the following:-

- 1) The image of the Web of Life .
- 2) The idea of the struggle for existence .
- 3) The factor of variability .
- 4) The operation of natural selection .
- 5) The possibility of the transmission of acquired characters .
- 6) Metaphysical aspects of heredity .
- 7) The possibility of reversion .
- 8) The law of ancestral inheritance .
- 9) Mendel's Laws:-
 - a) Uniformity
 - b) Splitting
 - c) Independence .
- 10) Mutations .

Relationship between heredity, stature and various pathological tendencies.

What is often considered hereditary ^{may be} is very often the family tie which is capable of modification by appropriate ^{treatment} action.

The study of twins provides a convenient method for defining the scope of heredity and environment.

The diverse results of hybridising [are summarised.]

By way of introduction to the study of the influence of heredity on diathesis, it is convenient to take the names of Lamarck, Charles Darwin, Weismann, Mendel and Francis Galton and consider their main contributions. Charles Darwin (1) will forever stand out pre-eminently as the chief exponent of the doctrine of evolution which may be summarised in J. A. Thompson's (2) words, as the belief that 'the present is the child of the past and the parent of the future'. For our present purpose we may say that Darwin promulgated four important doctrines:-

1) The Image of the Web of Life by which all living creatures are inter-related and inter-dependent. Nothing stands by itself, for vegetation depends for its fertilisation on insect life, and the processes of such diseases as bilharziasis and malaria are maintained by parasitic kinds of existence involving a third factor between the parasite and man -- the host. Similarly in the phosphorescence of some animals there is a transfer of chemical energy into light, by the activation of the enzyme luciferase to luciferin. Here, then, is another kind of inter-dependence between different forms of physical manifestations mediated through the activities of these particular phosphorescent animals. The idea of diathesis holds in it just all the possibility of interchange between organisms and environment, nature and nurture, the endogenous and the exogenous, the expressed and the impressed. The fertilisation of the female ovum by the sperm is surely the most basic fact in the philosophical consideration of the subject-object relationship, and is implied in this conception of the web of life, like the warp and woof that runs through all existence, where male and female elements perpetually cross and re-cross each other.

2) The Struggle for Existence is a formula for all the manifold efforts and answers-back that the living creature makes when it finds

itself up against environing difficulties and limitations, and these include the reactions which secure the welfare of oneself and one's kin. Here again is a basic conflict in human life, the call to feed oneself, against the no less insistent urge to love one's mate and one's offspring. How can the self meet all the claims that spring out of this clash between subject and object, between egoism and altruism, especially when they seem so paradoxical?

3) Variability is defined as 'the welling up of novelties so that children differ from their parents and peas in a pod differ' (3). It has been said that this is the most difficult problem in the whole of biology, to know why and how these variations occur; but in regard to this it is important to realise that life itself contains immeasurable potentialities for change, and that there is nothing cast-iron about the genetic capabilities of the germ-plasm.

Darwin spoke of continuous and discontinuous variations, by which he implied, in the one case, the re-occurrence in a subsequent generation of characteristics found in a previous generation, and in the other case, a break in that succession of appearances. Darwin also conceived the notion of correlated variations, though this was not formulated exactly until after his death, when the genes were described, and it was realised, on the one hand, that a change in one gene often affected a number of different structures, and on the other hand, that a number of genes were often responsible for the emergence of one particular structure. Here is the root of the problem of the One and the Many. Here is adumbrated the whole sequence involved in the problem of the unity in diversity, multiplicity in singleness. Right down to ultra-microscopic entities, the microcosmic representations of potentiality, there is the ines-

timable but elemental, the invisible but dynamic, the phenomenal but also the noumenal.

4) Natural Selection is the term given to that 'sifting of the new departures that living creatures show, the winnowing of their experiments' (4). It is part of the struggle for existence, but it involves the survival of what has survival value. What shall continue to be, and what shall fall out of the march of time? This depends on the function of the organism in relation to its own space-time continuum and varies for different species, but as Virchow (5) used to teach, what serves a need for one set of conditions, constitutes a disease-process for another. Thus as McEwen (6) pointed out, the re-growth of the stag's antlers constituted such an active growth of cellular tissue as almost to resemble that found in tumour-formation, while at the time of their being shed, the necrotic process resembled those necroses usually regarded as definitely pathological. Similar examples are to be found in the leucocytosis that follows digestion and pregnancy, or the ^{lymph}leucocytosis (up to 40%) that is normal in early childhood, the polycythaemia of high altitudes or the ^{occurs}angina innocens that ~~comes on after~~ ^{arise} violent exercise. In fact there are very many symptoms that ~~come on~~ ^{arise} in health, such as dyspnoea, epistaxis, cramp, post-prandial lethargy, hallucinations, the helplessness of laughter, or the wakefulness of a mind attentive to its own peculiar originality, which frequently bring ^{might} ~~patients~~ ^{some people} for medical advice when other ^{would not think of it} people would seek ~~different forms of interpretation.~~ ^{far} ^{outside the scope of medicine} But there is no dividing line that separates the symptom of health from the symptom of disease, and no pathological partition separating the prognostically grave from the prognostically innocuous.

What, then, is the meaning of disease? We cannot deny that

in itself it has some sort of survival value from the mere fact that many of us make our livelihood by its deprivations, but that in itself is inadequate, because that makes the one (the physician) too dependent on the many (the sick), without any apparent compensation in disease for the sick. It is the purpose of this study of diathesis to point the profession to a goal, rather than to be content with a mere descriptive discourse on what has been and is. What does disease mean evolutionally, in terms of ends and goals? Is the relationship of disease with personality beyond the scope of medicine, because as yet we cannot define genius in terms of neurones or hormones, or is the day coming when to survive we must help our patients and ourselves to find what has survival value for us both? We are still dealing, then, with the fundamental philosophical criteria of values though ^{we}er express it in scientific language. There is, therefore, lethal selection, by which what is unwanted is pruned; there is reproductive selection, by which is implied the propagation of specially delicate but new and desirable phenotypes, by protective or special tending; while germinal and sexual selection operate to bring together new mates and to arrange for new individual dispositions.

Involved in the whole problem of selection is the evolution of material and the sieves, in which are included food, the physical and climatic environment, the surrounding animate life with all its various psychological inter-reactions, selection in mating, conditions of vegetation, the development of society and state and the whole totality of forces involved in the macrocosm.

The importance of germinal selection brings us to the third name mentioned -- that of Weismann. To him we owe the central idea of evolution, that of the continuity of the germ-plasm. The germ-cells owe their capacity of development to the fact that they are

the unspecialised descendants of the parental fertilised ovum, and heredity is only possible through the formation of such germ-cells. It is convenient to discuss in connection with Weismann's name :-

- 1) the possibility of the transmission of acquired characters;
- 2) metaphysical aspects of heredity.

Lamarck (7) first propounded the doctrine of the transmissibility of acquired characters. He formulated two laws:-

a) that the frequent and sustained use of any organ strengthens it, develops it, increases its size, and gives it strength proportionate to the length of time of its employment; on the other hand, the continued lack of use of the same organ sensibly weakens it, so that in time it may disappear.

b) Nature preserves everything that she has caused the individual to acquire - and at the same time contrives to keep in abeyance those qualities that she has eliminated.

The potentiality for change, however, according to Weismann is (8) in the germ-plasm, which contains the plastic elements of life, in all their impressionable form. How can we think of things being acquired, when the germ-plasm itself holds within it all this potentiality for variation? Biologists, it seems, have for too long sought to settle this question by ^{experiment and} argument, and without realising the unity of the forces of nurture and nature, have made a false dichotomy of them. 'The cosmos is one and indivisible' --yes, that is true, but it none the less does divide and differentiate. There are undoubtedly forces in the cosmos that may be defined as environmental and also forces within the growing organism that may be defined as hereditary, but the rule of life makes a unity of these separate forces. The phenotype is the product of genotypic and

paratypic influences. The miracle of the germ-plasm is so stupendous as to evoke from us the cry 'it is all-powerful - silent, irresistible, perpetual, manifold in its unfolding, yet conforming to type in all its potentiality'. Very well, then, let us allow it all its different ways of evolving, with its capacity for springing surprises on us, as well as for repeating its forbears - for its sudden changes, the sports and the gradual ones, the mutations, but let us not forget that life does not develop in vacuo, but only in an ever acting and reacting environment. The capacity for breathing no doubt once resided in the germ-plasm, but it is contingent on the outside air for its actuality. Germ-cells require for their fulfilment not only physical development, but also the amphimixis brought about by sexual selection, which again is dependent on previous environmental influences. So it is with diathesis, every tissue response is potential in the organism, but the exact mode of response is contingent on the environmental stimulus. It is the very wide limits of variability that exasperate many clinicians when they discuss the subject of diathesis. "This type is consonant with this disease, you say, but cases of this disease occur in those quite different from this type". The study of diathesis is essentially

a human one, because its laws are tentative, its conclusions provisional and its formulations are often only suggestive.

Rigid classification as to the diatheses associated with particular diseases is impossible, just as it is impossible to be consistent in the classification of disease itself. We are dealing, then, with the much and less of qualitative differences between people, and for their description we are looking out for evidence that puts the balance now on endogenous, now on exogenous factors.

Are acquired characters transmitted? In one sense surely nothing else is transmitted, because what we have now, is the closely woven texture of nature with nurture - characters are characters only because they have taken on the semblance of form, its imprint being the stamp of environment. Is the germ-plasm not continuous, then, when new forms are being brought to birth which differ from their antecedents? Yes, the top of the tree is continuous with the root, even though their structure and function differ. But there is something more to be said about this transmissibility of acquired characters, which brings us to the next point.

2). The metaphysical aspects of heredity.

When Weismann formulated the doctrine of the continuity of the germ-plasm he was concerned with the sources of life and it was inevitable, as with most of the early exponents of evolution, that he should be desirous of reducing life in its early beginnings to its simplest forms. We know something about this from psycho-analytic procedures but we shall do well if we do not make the mistake of supposing, as the Freudians often appear to, that because we originate from the female ovum and the male sperm, that that explains everything.

Man has a destiny as well as an origin, and this has something to tell us not only about the future, but also about the past, for just as the analytic technique awakens us to the emotional currents of our life-stream, so looking forward we are aware of synthetic processes also at work, bringing order to chaos, differentiation out of the primordial, and organisation out of the diffuse.

Our indiscretion sometimes serves us well,
 When our deep plots do fail: and that should teach us
 There's a divinity that shapes our ends,
 Rough-hew them how we will.

(Hamlet: Act V.Sc.2)

It is the higher rationality of our own irrationality of which we need reminding: otherwise we see in insanity no meaning, and project on to those different from ourselves, our own unsolved problems. It is true that science has brought us inestimable boons, but what is the purpose of it, if it drives us mad, or

distracts us by helping us to forget our own subjectivity in the diversity of the objective world? If I repress anything of value, I do my whole nature an injustice; but how can I tell what is of value unless I realise the mistakes that are in me, and how can I know the end until I am willing to be carried away by the unwanted means? This is not the place or time to detail all that might be said for the metaphysical in heredity but it is suggested tentatively that we shall never progress in the deeper understanding of the relationship of heredity to disease-potentiality until we realise the following facts:-

(a) That while the post-mortem room tells us of the pathological nature of disease-processes, much more important correlations are awaiting discovery from the psychobiological approach.

(b) There is a wealth of symbolism running through the whole field of organic medicine, which belongs to the realm of metaphysics.

(c) Metaphysics stands in relation to medicine as diathesis does to disease. It is the study of the noumena - the realities - lying behind the phenomena of disease - the appearances.

(d) Besides the continuity of the germ-plasm there is a metaphysical continuity, relating life in one phase to life in other phases. This is involved in the conception of the web of life, but it is involved in the whole problem of sex-linkage, or dominance and recessiveness in heredity, as well as in telegony and regression. These biological concepts have a correlation with psychiatric ones. It is part

of our own schizoid attitude that fails to see a connection between genetic and psychobiological terms. [The exact relationship between these two orders calls for a specific line of enquiry, that will constitute many years of patient observation and record.]

(e) ^{A trait} ~~What is often~~ ^{considered} dismissed as hereditary, ^{is} ~~is~~ frequently ^{in any case the less he is capable of} just the inertia on the part of physician or patient preventing new modes of personal expression and reaction to the changing environment.

Weismann contended that part of the process of evolution involved the possibility of reversion, by which he meant the appearance of characteristics which existed in the more remote ancestors, but were absent in the immediate ancestors. This process should be differentiated from atavism which implies the reappearance of racial qualities that have been superseded. It should also be differentiated from filial regression which is usually held to mean that the offspring are not likely to differ from mediocrity in a given direction so widely as their parents in the same direction.

As an example of this may be cited that given by Karl Pearson (9) who found that in a group of fathers of 72" stature, the mean height of the sons was 70.8", which is a regression to the mean height of the general population, while the sons of a group of fathers of 66" stature, gave a mean of 68.3", which was also nearer the average. This is a process of levelling up and levelling down, therefore.

Reversion is characteristically due to the sudden reassertion of latent ancestral traits in a pure-bred stock, and should further be differentiated from the sort of manifestation that may be brought about by hybridisation. The former is due to a spontaneous germinal change, while the latter is due to the introduction of new germinal elements from cross-breeding.

The diverse results of hybridisation have been clearly summarised by Thomson (10).

"An inheritance is such a complex integrate of items that no one can hope to predict the result of mingling two more or less distinct inheritances. We have two organisms, A and B, which can be crossed and produce offspring: but, before the germ-cells of A and B are ready for union, they have undergone a process of maturation which may definitely affect the burden of hereditary qualities of which each germ-cell is the vehicle; by the process of amphimixis or fertilisation ~~from~~ a new integrate or zygote is formed - the fertilised egg-cell - and in this integration the inheritance may be affected by permutations and combinations, mutual adjustments and new states of equilibrium, victories and defeats of particular items, of all which we have no actual knowledge. In the process of development, if there are several different sets of primary constituents representative of a future structure - an hypothesis from which we can see no escape - when the result may in part depend on the struggles and interactions of these in the course of development, for it does not follow that everything represented in the inheritance finds

expression in development. The process of development implies interaction between the inheritance and an appropriate environment, which is itself variable so that modification by nurture adds to the sum of potentiality in any individual evolution.

The results of hybridisation suggest the following possibilities:→

Hybrids may be an intermediate blend of the parental characters, as in mulattos, which breed true in succeeding generations. $(A \times B) = \frac{AB}{2}$

Hybrids may show particulate inheritance without blending, as in piebald characteristics. $A \times B = \frac{A + B}{2}$

Hybrids may resemble on ancestral form, whose characters have not been recently patent as in crossings of pigeons.

$$A \times B = r (AB)$$

Hybrids may be quite different from either parent, as in the blue Andalusian fowl. $A \times B = C$.

Hybrids may exhibit the dominant characters of one parent, the recessive of the other being latent. $A \times B = A(B)$.

In addition the hybrid shows more of the character of that parent which is phyletically older or more securely established, and of that parent whose gametes were relatively more mature at the time of fertilisation."

Galton (11) formulated the law of Ancestral Inheritance.

The two parents between them contribute on the average $\frac{1}{2}$ of each inherited faculty, each of them $\frac{1}{4}$ of it. The four grandparents contribute between them $\frac{1}{4}$, or each $\frac{1}{16}$ of it, and so on."

The sum of the numbers running indefinitely in ~~arithmetical~~ ^{geometrical} progression $\frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \frac{1}{16} + \frac{1}{32} \dots = 1$.

In other words, the inheritance of an individual may be represented by a square, in which 2 and 3 stand for qualities inherited from the two parents, 4, 5, 6, and 7 from the two grandparents, and so on.

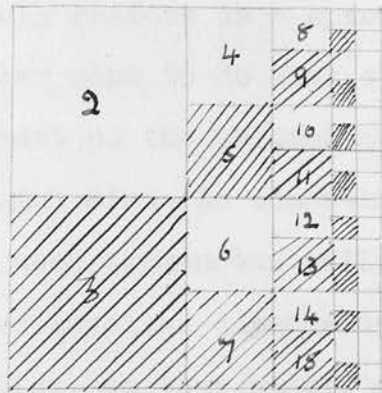


Fig. 1.

The application of Galton's Law must be compared with that of Mendel's. Mendelian formulae apply to the progeny of known crosses or hybrids, while Galtonian formulae apply to intra-racial heredity. The one is a generalisation about the transmission of qualities, the other, a generalisation about the transmission of qualities in the mass.

We must now consider some of the principles underlying Mendel's work.

It has been known for some time that in a very small part of the nucleus of the germ cell - the chromosome - great potentialities for the new individual resided, but more recently

it has been realised that the unit of hereditary transmission is very much more minute than that, for the chromosome is made up of individual genes which are the determining causes of hereditary qualities. Just as the 'unsplittable' atom has been broken up into protons and electrons, so the chromosome has been found to consist of smaller units.

It is now believed that the transmission of various properties probably resides in a specific part of the chromosome - that the particular gene to do with a certain quality rests in a particular part of the chromosome. It is a difficult thing for our clumsy minds to comprehend how such a microscopic entity can wield such tremendous influence, but it is supposed that the mechanism involved depends upon a chemical or chemico-physical interaction, so that bodily differences are probably the result of fairly complex chemical equations, carried out on a most infinitesimal scale!

Although the conception of the gene is comparatively recent, in 1865 Mendel (12) was able to formulate the laws governing their operation. His work was primarily carried out on plants and later on animals, but one can see the immense practical difficulties in studying genetical principles in man, since there is no way of standardising the mating pairs, and of submitting them to experimental conditions. Through the work of Karl Pearson (13) and others, however, in the study of genealogical tables of thousands of human families, Mendel's laws are found to apply to man, even though disease-tendencies may not necessarily become manifest, either through

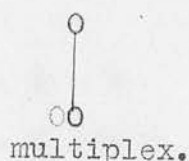
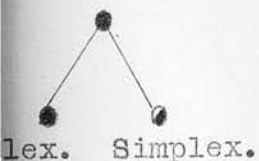
altered habits of life or through premature death.

We may enumerate these laws:-

1. The Law of Uniformity. The immediate offspring (F₁ generation) arising from the union of two dissimilar individuals are similar.

- a. Such offspring may have the characters of one of the parents.
- b. Such offspring may present a mixture of the qualities of the parents.
- c. Such offspring may show quite new characteristics not to be found in the parents.

2. The Law of Splitting. The matings between members of the F₁ generation result in an offspring displaying qualities in a definite proportion. Thus 25% will show the qualities of one grand-parent, 25% those of other grand-parent, and 50% the qualities of the parents. It is evident that among this 50% again the three possibilities are presented, as before, that some of the offspring may have their grand-parents' qualities, some may have a mixture of their qualities, some may show characteristics quite new to the grand-parents. In the three generations therefore, some members will have a characteristic in common, and this is spoken of as a dominant quality, which appears in the offspring under known conditions.



{ ● = affected member. }
 { ◊ = latent quality. }

O = normal member.

$$● + ● = ●$$

$$● + ◊ = ● ◊$$

$$● + O = ◊$$

$$◊ + ◊ = ● ◊ ◊ O$$

$$◊ + O = ◊ O$$

Fig. 1. (after Crew) (14)

The dominant character is found therefore in all the individuals with the simplex or duplex quality, while the non-appearance of such a quality means that either or both of the parents have the simplex quality, or one simplex and the other nulliplex, or else both nulliplex.

This method of transmission is found in a large number of diseases, some of which we shall mention later.

Some characters however are lacking from the second generation but re-appear in the third. These also are known to crop up in the offspring under definite conditions, and are spoken of as recessive qualities. The conditions governing their occurrence may thus be depicted.

● = affected member.

◊ = carrier of the quality, though apparently normal.

O = normal member.

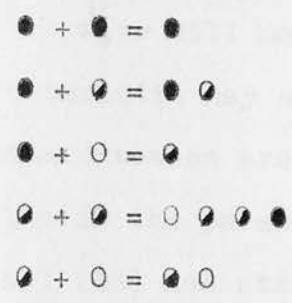


Fig. 3 (after Crew)

The recessive quality therefore is exhibited only if the families of both parents have displayed it, and provided that either both parents are affected, or that one is affected and the other is a carrier, or else that both are carriers.

This mode of transmission we shall see in a number of conditions such as Friedreich's ataxia, albinism, alcaptonuria and other inborn errors of metabolism.

3. The Law of Independence. When there are several pairs of characters in a mating they remain entirely dissociated from each other with regard to the splitting phenomena.

Now in some instances, the carrier quality may only operate in one sex (usually the female), so that the males are either affected or unaffected, while the females may carry the condition without manifesting it. This phenomenon is spoken of as sex-linkage, and may be represented as follows:-

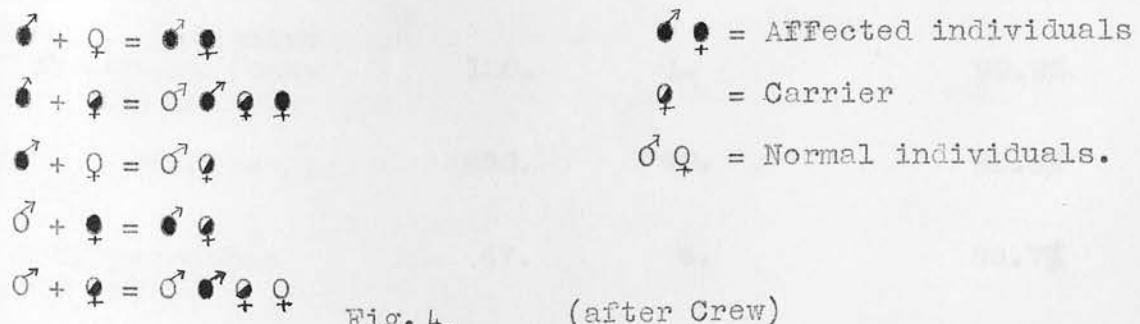


Fig. 4. (after Crew)

Usually the linked character is recessive, but if it is dominant then the carrier will manifest the peculiarity. A sex-linked characteristic may appear in the offspring in either sex, but some diseases are definitely sex-limited, of which haemophilia is the paramount example. After studying 900 cases Julia Bell (15) has stated that no case has yet been described in a female which bore more than a superficial resemblance to the disease as found in the male. It is not improbable that there are physiological reasons inherent in the female sex, which protect it from exhibiting this particular disease, even when all the requirements for the disease are present. Menstruation and more especially the child-bearing function would quickly lead to the extinction of haemophilic women so that stocks in which the female showed a bleeding tendency would soon disappear.

It is usually considered that the disease-tendency is transmitted through the female line, without actually affecting the female members of the family, but Nissé (16) has produced evidence of transmission of the condition through the male. An interesting list of diseases more or less confined to one sex has been compiled by Julia Bell.

	<u>Males.</u>	<u>Females.</u>	<u>Male sex incidence.</u>
Haemophilia	-	-	100%
Congenital stationary night-blindness (sex-limited form only.)	130.	1.	99.2%
Congenital colour-blindness.	380.	99.	89.9%
Pseudo-hypertrophic muscular palsy.	47.	6.	88.7%
Hereditary Optic Atrophy.			
in Europe	863.	155.	84.8%
in Japan.	97.	67.	59.1%

The different distribution of Leber's disease in Europe and Japan is to be noted. In the one country it appears to be much more predominant in the male sex, while in the Japanese series this is not so marked. Bell considers this a difficulty in accepting the condition as sex-limited, but just as cases of hereditary pseudo-hypertrophic muscular paralysis affect males usually, while the other dystrophies have no special sex-distribution, so it is quite probable that hereditary optic atrophy in Japan is conditioned by hereditary laws different from those operating in the European variety.

We have previously discussed whether a diathesis may be acquired, and we concluded that this might be possible, because the form of response was conditioned by the fundamental nature of the cellular tissues with their capacity for showing either of two opposite reactions. Biologists have for some time debated the problem as to whether acquired characteristics may be transmitted, and Guyer's (17) work is of special interest to us because this possibility is indicated. He sensitised fowls to the lens of the rabbit, and then injected the serum of the sensitised fowls into pregnant rabbits, with the result that the offspring had defective lenses, and these defects have been transmitted to the sixth generation with increasing intensity. We are compelled to admit the importance of the environment in modifying the germ plasm before the foetus comes into the outside world, and it would appear that diathesis may be brought into being very early in foetal life from

the influence of external factors, which may not only be in evidence after birth, but which may also be observed in succeeding generations.

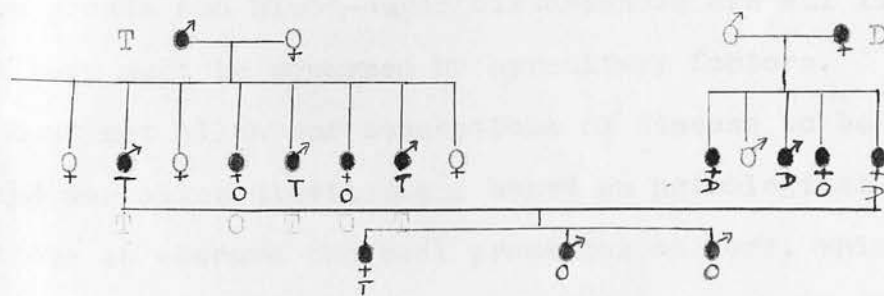
Some disease-tendencies have also been brought about by the successful emergence of the organism from a lower form of life; the liability to the diseases of civilisation in which we may include arterial degeneration, and those conditions which have resulted from the change of posture from horizontal to vertical, such as varicose veins, visceroptosis, various kinds of hernia, and constipation, is not usually held to be due to the transmission of acquired characters, though there is some ground for believing that in common with evolutionary processes in general it may deserve such consideration.

But whether this be definitely accepted or not, geneticists are agreed that mutations give rise to important steps in development. They are variations in the germ-plasm which may be transmitted by subtracting from, or adding to, or altering in some other way the hereditary factors already present.

We shall have to consider later the relationship of bodily stature to disease-potentiality, but the nature of the hereditary transmission of height is probably rather more complex than is sometimes held. Thus Davenport (18 & 19) considers that shortness is due to the presence of certain positive factors which inhibit the growth of various parts, while the factors of tallness are chiefly recessive. This might be supported by observations on the distribution of shortness and tallness in plants, as early recorded in genetic experiments. Davenport

Davenport also suggests that variations in build are not to be accounted for merely by variations in intake and out-go of calories, but also by the endogenous factors that determine the 'economy of nutrition'. He believes that relatively long or short necks, torsos or legs run in families, and he interprets this to mean that genes exist which affect one element of stature independently of another, or more extensively than another. It is much more likely however, that the determining causes are several, most important of which being the endocrine influence, so that instead of tallness and smallness being dependent on one gene for their transmission, it is more probable that these qualities are the result of a number of interactions arising from the general endocrine complex, itself dependent probably on several genes.

This is well illustrated by a family reported by Allison (20) comprising a father, mother, daughter and two sons. The father was a well-proportioned man over six feet high, the mother, aged 44 years had had mild glycosuria of diabetic form since she was 21, and was obese. The following genealogical table shows the familial tendencies:-



T = Tallness.
O = Obesity.
D = Diabetes.

Fig. 5

The daughter, aged 21 gave a history of rapid growth (Ht. 5. 10. Wt. 11. 2.), was easily tired, liable to headaches and nervousness, and did not begin to menstruate till she was 17 or 18. She was generally under-developed and menstruation was scanty.

The elder son began to put on flesh at the age of 10, so that at 18 he weighed 17 stone, while his height was 5ft 10". He was inclined to somnolence during the day time, and his sugar tolerance was slightly increased. The younger son, aged 15, was 5ft.11 $\frac{3}{4}$ " in height with weight 16st.2 $\frac{1}{2}$ lbs. He had frequent headaches, a smooth hairless skin on trunk and limbs with feminine distribution of hair on pubes, deficient genital development, and slightly increased sugar tolerance.

It seems probable that on both sides of the family there is a pituitary failing, and that this is linked up not only with peculiarities of bodily build but also with pathological tendencies.

Similarly Timme (21) writing on the 'so-called unit characters in relation to hereditary disturbances of the nervous system", expresses the opinion that epilepsy, migraine, excessive growth and blood-sugar disturbances are all linked and that they must be governed by hereditary factors.

We must not allow our conceptions of disease to be too hide-bound nor allow distinctions based on pathological observations to obscure the real processes at work, which are largely dependent on the inherited soil. It is of course not denied that some hereditary manifestations are

very special and peculiar, such as the inheritance of closely curled hair, or of small pits in the lobe of the left ear, supposed to be a relic of the very old ancestral custom of wearing earrings, or of the transmission of rabbit asthma through 5 generations as in the following example (22)

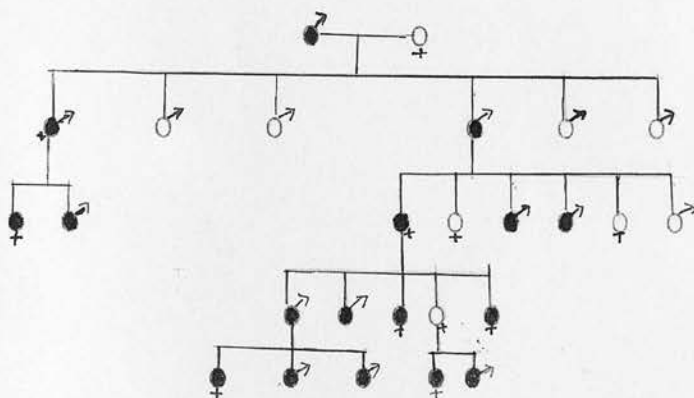


Fig. 6

But in spite of this particularity, study of the diseases running in a whole family give rise to interesting suggestions as to the nature of hereditary tendencies to disease. The genealogical table of the 'Robinsons' (fig. 7) which I submit, is made up of many members who are personally known to me, and comprises 7 generations, some medical history being known of 5 of them, though of course it must be admitted that much information is lacking.

Of the whole family, 22 deaths can be classified:-

1. Heart conditions: fatty heart	3.	}	8
V.D.H.	2.		
Heart failure with dropsy.	1.		
Asthma, bronchitis (and probably myocarditis)	1.		
Coronary thrombosis with congestive failure.	1.		
2. Alcoholism, which should probably be included under 1.	1.		
3. Bright's Disease with dropsy.	1.		
4. Diabetes Mellitus.	3.		
5. Infectious. Diphtheria, including one death from "croup".	2.	}	4
Whooping cough and broncho-pneumonia.	1.		
Tuberculosis.	1.		
6. Suicide.	2.		
6 War			
7. War.	2.		
8. Childbirth.	1.		

Of the ailments of which the various members complained, several distinct family tendencies were noted:-

Of the ailments of which the various members complained, several distinct family tendencies were noted:-

15 were recorded as being stout.

3 others were said to have fatty hearts, probably accounting for 18.

17 were troubled with 'heart weakness', comprising:-

4 with 'fatty hearts'.

1. with bronchitis

1 with coronary thrombosis.

1 with dropsy following cardiac failure.

5 others with high blood pressure (not counting the thrombosis.)

4 with V.D.H.

1 with 'heart trouble'.

4 showed the rheumatic manifestations of childhood.

2 with chorea.

2 with rheumatic fever.

21 showed a psychoneuropathic weakness, not counting such possible neuropathic manifestations as croup, urticaria, hyperthyroidism and asthma.

8 were mentally defective, one of whom had epilepsy, and one of whom committed suicide.

2 were alcoholic.

2 committed suicide (one of whom was included above)

2 had 'depression'.

1 had cyclothymia.

2 had melancholia.

1 had neurasthenia.

2 had chorea.

1 died of ? broken heart.

2 had facial paralysis.

6 were affected with thyroid conditions, of whom one was a woman, with 2 affected daughters, and 2 affected grand-daughters.

4 were diabetics, of whom one was a man with an affected father, uncle and aunt.

4 were affected with gallstones, made up of one who married into the original family with 3 affected children.

6 had allergic manifestations.

3 with asthma.

1 with hay fever.

1 with urticaria.

1 with migraine.

while 3 others had bronchitis.

4 were affected with croup, comprising an aunt, a mother, and a son, and daughter.

8 were troubled with enlarged tonsils.

5 were affected with appendicitis, 2 of whom were brothers and 1 a sister.

The most interesting familial influence was to be seen in the mentally defective group, for the total of 8 in that category including one who committed suicide, and another suicide victim not defective, were the direct offspring of 3 consanguineous marriages, while one grand-daughter of these marriages was melancholic, and a grandson was alcoholic.

The diabetics were the products of one of these consanguineous marriages, while 5 of the 6 thyroid conditions were also found in the same family, often in association with diabetes.

From a glimpse of the complete family tree, one might hazard the opinion that there is a tendency towards heart weakness, sometimes showing itself by rheumatic heart affections, or in later life by degenerative conditions. It is probable that both rheumatic and degenerative tendencies are inherited, but the organ selected for attack depends on other hereditary qualities, thus in the former case there would appear to be a comparative immunity from chronic rheumatic affections of joints, and in the latter case a similar immunity from degenerative affections of cerebral or renal vessels, for

for only one cerebral catastrophe is noted, and no cases of chronic interstitial nephritis.

Another very striking feature is the complete absence of neoplastic conditions and the rarity of pulmonary tuberculosis (one case only) which might offer support of a negative kind for those who contend that tuberculosis and cancer thrive on the same kind of soil.

Four of the younger members of the family are obese, their ages respectively being about 12, 15, 20 and 30. In view of the family tendency to fatty heart disease and other cardiac conditions it would appear important to modify that tendency now by dietetic restrictions and exercise, and by so doing prolong life at the time when it can best be done.

The dangerous results of consanguineous marriages are also brought out, especially in one case where a man married his cousin who bore him a defective child, and then married another cousin who bore him 4 children with psychopathic traits.

No doubt many [of the] pathological trends ^{considered hereditary} in this family ^{may be} are closely related to factors that are more usually classed as environmental. Of these factors, we may note:-

1. The ^{the same occupational} farming interests, ^{in the family} which make for hard manual work putting stress on cardiac functions, ^{or expressing themselves in some other}
2. The tendency to consanguineous marriages is bound up ^{predisposition to pathological weakness.} with the strong emotional fixations involving parent and child, but fundamentally related to a very powerful ancestor sense, preventing members of the family from marrying others whose interests might be thought to be in conflict with the family

traditions. This I believe operates in the production of thyroid disorders, diabetes and gall-stones.

3. ^{zambhal} Obesity arises, partly as an index of the general familial interest in such vegetative functions as appetite, but also as a mark of general infantilism of attitude, associated with the familial tendency to live life at physical levels rather than at more intellectual or cultural ones.

4. Mental defect occurring in a number of members of a family are much more an index of general unwillingness to learn, than representative of any inherent tendency to defectiveness, [and this family illustrates that point at some length, for its chief ^{Such} characteristics are an unwillingness to change, a desire to settle down comfortably comparatively early in life, and a strict limitation of interests to family life and financial success.

5. Associated with this attitude of mind is the 'backward look', in which the past is considered to be preferable to the present, and the future never likely to be any better. Anthony Trollope has described this characteristic well in his "Barchester Towers":-

"In religion, Miss Thorne was a pure Druidess. We would not have it understood by that, that she did actually in these latter days assist at any human sacrifices, or that she was in fact hostile to the Church of Christ. She had adopted the Christian religion as a milder form of the worship of her ancestors, and always appealed to her doing so as evidence that she had no prejudices against reform, when

it could be shown that reform was salutary.....

But she was a Druidess in this that she regretted she knew not what in the usages and practices of her church. She sometimes talked and constantly thought of good things gone by, though she had but the faintest idea of what these good things had been. She imagined that a purity had existed which was now gone; that a piety had adorned our pastors and a simple docility our people, for which it may be feared history gave her but little true warrant."

The study of twins provides excellent material for estimating the relative importance of heredity and environment in disease-production. In the first place, however, there is a 'twinning diathesis' (Hirsch) (23), which is inherited, as may be seen from the table here prepared by one of my patients, in which twins, probably binovular occurred 6 times out of 25 births in 3 generations.

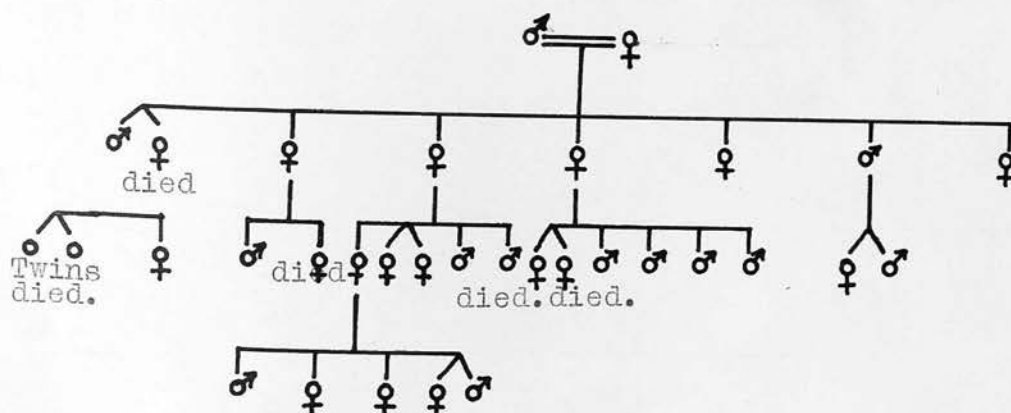


Fig 7.
8

Donforth (24) found that 50 pairs of newborn twins had 171 singly born brothers and sisters, a ratio of 1:18, their mothers had 318 singly born brothers and sisters with 10 pairs of twins, a ratio of 1:32, while their fathers had 219 singly born brothers and sisters with 8 pairs of twins, a ratio of 1:37, as against the normal ratio of 1:93.

Professor Newman (25) has recorded a case which suggests that the twinning diathesis resides in the father. The case was of a man who had quadruplets once and twins ten times with his first wife, and triplets three times and twins ten times with his second wife, out of a complete family of 68 children. It is usually considered that the twinning diathesis is inherited as a recessive factor, while single births are dominant as in the chart given above, so that in this latter case, probably both wives and husband had the twinning propensity. It may also be as some geneticists hold that dominance may give place to recessiveness or vice versa.

Hirsch (26) has carried out an interesting study from 3 aspects:-

1. Dissimilar twins living together.
2. Similar twins living in similar environment.
3. Similar twins living apart.

He suggested that by comparing the data from (1) with (2) it would be possible to assess the influence of heredity; by comparing (2) with (3) it would be possible to assess the influence of environment, while a comparison of (1) with (3) would act as a confirmatory test of the importance

of heredity. He found that when height, weight, head length, head width, cephalic index and intelligence quotient were compared, the similar twins differed much less than the dissimilar. The most marked feature was in the intelligence quotient which indicated a much greater difference between dissimilar twins living together than similar twins living apart. A study of (2) and (3) showed that change in environment was responsible for very little difference in development between the two groups of similar twins, while the third comparison confirmed the previous findings.

	Height. (in)	Weight. (lb)	Head length. (mm)	Head Width.	Cephalic index.	Intelligence Quotient.
Average difference of 1.	1.87.	7.	5.93.	3.5.	2.3	13.8
Average difference of 2.	.4.	2.6.	1.2.	1.6.	.87.	2.3.
Ratio of differences of dissimilars to similars.	1:4.71	1:2.7	1:4.9	1:2.2	1:2.6	1:6
Average difference of 3.	.4	6.	3.2	1.	.75.	3.5
Ratio of 2 to 3 similars together to similars apart)	1:1	1:2.3	1:2.7	1:0.6.	1:0.8	1:1.5.
Ratio of 1 to 3. dissimilars together to similars apart.)	1:4.7.	1:1.17	1:1.87.	1:3.5	1:3.0	1:3.94

Hirsch concludes that heredity is about:-

5
times as important as environment in respect to differences in intelligence Quotient
" " " " " " " " " head length.
" " " " " " " " " height.

times	as	important	as	environment	in	respect	to	difference	in	weight,
"	"	"	"	"	"	"	"	"	"	" cephalic index.
"	"	"	"	"	"	"	"	"	"	" Head width.

We may further discount the difference between similar twins by recalling that just as the two halves of the body present differences the one from the other, so uniovular twins may be expected to show slight variations.

In a case of similar twins which came to my notice, which showed all the usual features of uniovularity, it was interesting to find that their differences in mental outlook were largely determined by subjective and objective interests respectively, thus the one was interested in poetry and the arts, while the other was taking up a scientific career. Of additional interest is the fact that the one came for treatment because of a frog-phobia, and the other because of a snake-phobia.

It is evident, therefore, that the relative value of heredity and environment varies according to the quality in question, thus intelligence is more dependent on heredity than is the head width, but at the same time, as Hirsch is not slow to add, the importance of environment is not made any less by a strongly beneficial hereditary influence, but it increases roughly as we ascend the human scale.

The great similarity between twins in totally dissimilar environments, is brought out by a pair recorded by Müller(27). American born, they were separated a fortnight after birth, and with the exception of one week in early infancy, they did not see or communicate with each other until 18 years of age. B. was brought up by foster-parents engaged in mining and hauling

and spent most of her life out of doors, only receiving 4 years of schooling. At 15 she took up clerical work and led an active career in France during the War and in other places.

The foster-parents of J. were fairly affluent and sent her through the various grades at school to the University. She remained in the West of America, being a school-teacher, married in 1915 at the age of 22 years and had one son.

B. was less vigorous than J. in infancy - probably owing to improper feeding - and had stomach trouble. She also contracted measles, mumps, chickenpox, and typhoid. J. had no special stomach disorder, but contracted whooping cough, measles, mumps and scarlatina. Both suffered from backache due to congenital shortness of the tendon of Achilles: both contracted tuberculosis when about 18 (J. also having pneumonia), and both came near to a severe nervous breakdown a little later. Their physical peculiarities are practically identical. Mentally, both were active, talking at 8 months, learning to read at 6 or 7, and reading a great deal in after life. They were out-of-door children, imaginative, somewhat tempestuous, but on the whole normally good-natured. B. obtained her education by her own forcefulness. J. obtained hers rather by accepting what was offered. They are interested in religion, but their intellect rather than their emotion, rules. They are both normally gregarious and though B. has never married she has had plenty of attention from the male sex.

Here then, are duplicate twins, as Müller demonstrates

mathematically, fed, housed and educated in wholly different manners, who are yet so similar that they are mistaken for each other, who have developed mentally in a similar manner, have experienced almost identical physical ills, and who show a strong community of interests. Given the Army intelligence tests and the Otis advanced intelligence test, they scored 156 and 153 respectively in the former, and 64 and 62 in the latter. Their scores are so high that unless these tests have genetic significance, the chances are over 300 to 1 against there being such a coincidence in scores."

This record does indeed seem to bear out Galton's (28) opinion of almost 50 years ago, when he said "They continue their lives, keeping time like two watches, hardly to be thrown out of accord, except by some physical jar."

Many other cases have been reported which illustrate that apt analogy. Cockayne and Sheldon (29) recorded the case of male twins with congenital pylorus stenosis, Trousseau (30) told of twin brothers who both suffered from asthma, and who were simultaneously attacked with "rheumatic ophthalmia", in Paris and Vienna respectively each knowing that the other would be similarly affected, and Curtis (31) has written up a series of 13 pairs of twins who suffered from diabetes. They comprised 10 uniovular and 3 binovular twins. Twin brothers of 59 died of the disease within two months of each other, another pair at 60 within a few weeks, while a third pair at 27 died within 4 months of each other.

Bauer (32) has records of cases of Fröhlich's syndrome, calcaruria, renal tuberculosis, amyotonia congenita, and spastic paraplegia which have developed in twins. Bradley (33) had told of twin sisters, of strikingly similar physical constitution, who developed manic-depressive psychoses with like characteristics.

Newman, Freeman and Holzinger (34) conclude their investigation on twins as follows:-

1. Genetic constitution is a large factor in physical dimensions as well as appearance and qualitative differences, mental ability and educational achievement.

2. Physical characteristics are least affected by the environment, intelligence more, educational achievement still more and personality or temperament most.

3. Separated identical twins are more alike in height and head measurements than fraternal twins, and as much alike as are unseparated identical twins.

4. In weight, intelligence, and educational achievement separated identical twins are as different on the whole as fraternal twins.

Their general conclusion is that environment can do all that heredity does. We need to ask ourselves the further question. Is there any way in which hereditary trends towards disease may be overcome? The answer to that question depends upon another one. Are the individual members of a diseased stock willing to pay the price of overcoming all those strong family ties which prevent them from rising to a

higher cultural level than that of their predecessors?
If that question is answered affirmatively, the first
question may also be so answered.

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Chapter. 4

The Nature of the Environment.

Not in entire forgetfulness
And not in utter nakedness,
But trailing clouds of glory do we come
From God, who is our home:
Heaven lies about us in our infancy!
Shades of the prison-house begin to close
Upon the growing Boy,
But He beholds the light, and whence it flows,
He sees it in his joy;
The Youth, who daily farther from the east
Must travel, still is Nature's Priest,
And by the vision splendid
Is on his way attended;
At length the Man perceives it die away,
And fade into the light of common day.

W. Wordsworth. "Intimations of Immortality!"

Synopsis.

The environment is both the internal and external milieu. It begins in utero, and comprises chemical and physical influences, which in adult life are mediated through the ^{central nervous system, the} diencephalic-pituitary mechanism, the autonomic nervous and general endocrine system.

The homeostatic functions of the body are noted.

The importance of the mineral environment is indicated, as well as that of:-

Food: carbohydrates, proteins, fats and vitamins.

Salts and water.

Other important factors are education, occupation, the law, climate and altitude, air, light, radiations of different kinds, and the ether.

Repression is defined as the link through the autonomic nervous system, between unassimilated experience and its somatic registration.

The integral functions of the soul-body organism are provided in the environment, with their growing sense of the subject-object relationship, some account of which is given. Philosophically this involves 1) Reality and 2) our sense of it. The nature of the environment is metaphysical and physical, but our growing awareness of it involves experience before we can either interpret it to ourselves, or express the sense of it to others.

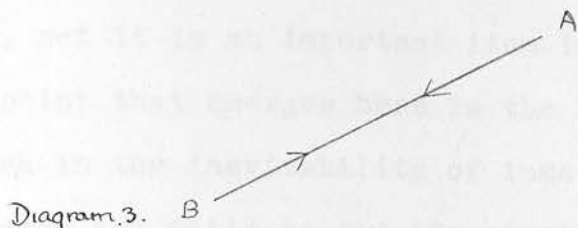


Diagram 3.

4). The problem of epistemology. i.e. how we come to know things. (i.e. the relationship between A B and C as a whole.)

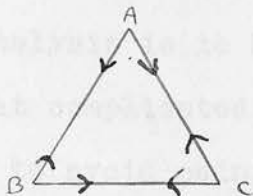


Diagram 4.

But I am not able to stay there, as on reflection I am able to indicate that though I may doubt everything that I experience, yet there is some validity in the appearances of things, even though these may be very different from their underlying reality.

What therefore are the kinds of knowledge that are available for the apprehension of 'apparent' reality? What does reality look like?

Here again, in two questions that look alike, are implicit the distinctions between the appearance of things and the ways in which that appearance is made manifest. In other words reality subjectively is bound up with:-

- 1). The physiology of sensation, and objectively, with
- 2). The nature of the world of which sensation tells us.

But we must also remember that though we may leave out the nature of the ether, through which sensation is

mediated, yet it is an important item in the whole. A further point that emerges here is the limitation of the self which in the inevitability of immaturity both falsifies the evidence and fails to see its significance for the whole.

The antithesis between heredity and environment is the antithesis between subjectivity and objectivity, and the place of psycho-analysis is to help the ego to find its orientation in that complicated relationship, when subjectively it tends to avoid pain, and only desire pleasure, or on the other hand, to cut out desire, and only live by the stern code of duty, and objectively, it seeks distraction in occupation, rather than learn the discipline of waiting on time for insight and illumination. Although I have suggested that heredity and environment may be paralleled by subjectivity and objectivity, it is well at this stage to note the following paradoxes inherent in the parallel.

1. That there is a sense in which our environment is inherited.
2. What is customarily spoken of as hereditary influence, is very often emotional linkage between parent and child.
3. The foetus in utero is subject to the maternal environment, when one might attribute this influence to the force of heredity.
4. Though the internal milieu is part of the environment, its nature is subjective.

5. The force of heredity is partly operative through previous environmental influence on the germ-plasm.
6. Heredity becomes environment, in the sense that what is inherited in a previous generation, forms an environment for the next.

In further elaboration of these points it is helpful to begin with Claude Bernard's (1) dictum that ^{the} environment consisted of an internal as well as an external milieu', so that in utero the internal milieu of the foetus is its own blood, and its external milieu on the chemical side, is the maternal blood, and on the physical side, the amniotic fluid. In addition to this it is possible that we ought to add psychic influences, for as we have already seen in Chapter 19, these appear to be capable of registering themselves through neuro-hormonic mechanisms on a growing embryo. It may be that just as in the case of hysteria suggestion operates apart from usual anatomical and physiological principles, so these psychic influences are capable of such general registration. As a cloak to our ignorance, we may call these metaphysical influences, without trying to define their exact method of transmission.

As to the other influences of the environment, we may note the importance of the mediating influence of the hypothalamic region, which, through its temperature regulating centre, and the adjacent centres for respiration, control of blood sugar level, water metabolism, and such rhythmic functions as sleep, menstruation and pregnancy,

as well as through all the different tropic hormones distributed from the anterior part of the pituitary body, makes adjustment possible.

Cannon (2) in 1929 schematised the depressing and stimulating effects of these different environmental influences in the following manner:-

<u>Environment</u>	<u>Deficient</u>	<u>Excessive</u>	
Temperature	Inertia	Delirium	
Oxygen	Unconsciousness	-	
CH	Headache	Coma	
Glucose	Nervousness	}	
	Feeling of		
	"gone-ness"		
	Hunger		
Water	(Weakness, Asher)	}	
			Headache
			Nausea
			Dizziness
			Asthenia
		Incoordination	
Sodium	Fever	}	
			Reflex irritability
			Weakness
		Paresis	
Calcium	Nervous	}	
	twitchings		
	Convulsions		
			Apathy
		}	
			Drowsiness verging
		on coma	
		General atonia	

J. Barcroft (3), commenting on this scheme, has suggested that the stimulatory phases are more capable of explanation, by assuming them to be inhibition of higher levels, in order that lower levels may be facilitated, but as in all biphasic processes, action and reaction are not capable of such strict delimitation. Barcroft indicates that the fixity of the internal environment is controlled by the upper part of the central nervous system, which as a general rule suffers if the environment alters beyond physiological limits. In short, the fixity of the internal environment is the condition of mental activity. (4).

Cannon (5) has shown, how in the wisdom of the body, the internal milieu is capable of fine adjustments to such fluctuations in the environment as spring from such noxious influences as:- (1) Danger, through the sympathetic nervous system and the liberation of adrenalin, which mobilises glucose from the glycogen of the liver, increases the coagulability of the blood, and in general, prepares the body for attack. (2) Changes in water metabolism, so that excessive supplies are reserved in the connective tissue spaces or excreted through the kidneys, so that the blood is not thereby diluted, or, on the other hand, ensuring that through excessive perspiration or other water loss, the blood does not thereby become concentrated. (3) Through a similar mechanism the salt content of the blood is stabilised and in cases of deficit, compensation is effected by outflow from storage stations and by reduction

in the urine. (4) The blood sugar level is usually subject to a certain amount of fluctuation, being elevated by the sympathetic-adrenal apparatus, and depressed by the insulin-vagus apparatus. (5) Similar homeostatic mechanisms obtain for regulation of blood protein, blood fat, blood calcium, oxygenation, acid-base equilibrium, temperature, climate, altitude and resistance to infections, through the capacity for antibody formation.

Goldzieher (6) has indicated the importance of the adrenal glands in resistance to infections, poisons and toxins, and states ^{that} after adrenalectomy in rats, the natural resistance is depressed. Cortical extracts protect against pyogenic infections, experimental infection with tuberculosis, and anaphylactic shock. Adaptation to histamine shock requires the activity of the adrenal medulla. Hypophysectomy produces secondary adrenal deficiency, but the pituitary itself appears to have a direct effect on resistance. The effect of thyroid on the homeostatic functions of the body are to increase the consumption of oxygen and the basal metabolic rate, to make the capillaries more permeable and therefore, to decrease the amount of blood plasma so that the concentration of the proteins in the blood and the cerebro-spinal fluid is increased, to deflect the acid-base equilibrium towards the acid side, to demineralise the skeleton and thereby increase the blood calcium, to increase the excretion of nitrogen, to diminish sugar tolerance, to increase the blood fat and lastly to

p. 528

produce loss of weight.

J.A.Thomson (7) describes ^{the} environment as the activating agent for what is in potentia becoming in actu. The environment, in his view, is continually limiting man's potentialities, so that peculiarities due to nurture are continually being superimposed on hereditary qualities. The effect of this is to produce deviation out of man's natural tendencies to inertia, to provoke change when he would persist in his former ways of living, to bring novelty out of continuity and difference out of resemblance.

The psychological conception of repression may be conceived as very largely due to man's natural unwillingness to act and react with the changing environment, and Jule Eisenbud (8) has suggested that the function of repression varies directly with the excitement of the parasympathetic nerves of the autonomic nervous system. This was confirmed by experiments in which gastric motility and parotid gland secretion were used as indices of autonomic nervous supply function.

MacNair Wilson (9) in an analysis of the mechanism induced in "starting", as from fright, indicated how states of anxiety or so-called functional conditions, in course of time could produce organic changes in the cardio-vascular system. He postulates that in such conditions the normal rhythmical phase of rest and activity gives rise to a state of violent stimulation which is followed by a state of profound depression. A stage of pituitary stimulation

(vagus) as shown by the slowing of the heart, lowering of the blood pressure, increased peristalsis, flushing of the kidneys, and constriction of the bronchioles, denotes the stage of rest, which after the "starting" reaction gives place to adrenal (sympathetic) stimulation, with tachycardia, increased blood pressure, inhibition of peristalsis, contraction of kidneys, and dilatation of bronchioles.

The importance of mineral metabolism in relation to the endocrine system and racial development has been indicated by Marett (10), and J.H. Sheldon (11) has shown how, that as well as being essential for thyroid metabolism, iodine appears to be closely bound up with the functions of the hypothalamus, as its concentration in the tuber cinereum is twice as great as it is in the brain and three times as great as that in the cerebellum. Similarly, the bromine concentration in the ante-pituitary body, is seven to ten times as great as that found in other organs. Its concentration in the blood is diminished in cyclothymia.

Though not of general importance, silicon forms a constituent of the aqueous humour of the eye. We have already mentioned the mechanisms for the regulation of salts in the body, but the importance of sodium deserves special note because of its relation to the functions of adrenal cortex. The association of the parathyroids and to calcium, phosphorous is well known, but the antagonism between calcium and magnesium is not so well known. Calcium, iron, and copper act synergically in the liver.

Helen Mackay (12) and Davidson (13) have indicated the importance of iron deficiency in the diets of people in London and Aberdeen respectively.

The nutrition requirements of the body in the form of carbohydrates, fat, and protein is indicated by McLester (14) as well as appropriate accessory food factors (vitamins).

Apart from deficiencies in the environment due to inadequacy of factors above-mentioned, we must not forget the threat to well-being that is conditioned by occupation. Donald Hunter (15) has reviewed these noxious influences in some detail, but one important practical point that tends to be overlooked in all these occupational diseases, as well as in what might be termed the occupational allergies, is the supreme necessity for change of occupation. So often is the economic need stressed, whereby the man who has served his time to one particular trade insists that he cannot now find other means of employment, that that simple imperative necessity is waived, in favour of all kinds of other protective devices that both give a false sense of security to the patient, and also prevent him from finding a niche in life, more adequate to all his potentialities .

This was exemplified by the case of a man who worked in the hot humid atmosphere of a paper-mill, who developed paroxysmal haemoglobinuria, and for which he was submitted to all sorts of treatments including splenectomy, but who only regained health when for himself he decided to try

another occupation.

Apart from the nocuous effects of industry, one ought to mention the beneficial effects along with all their opportunities for making contact with the rest of mankind, and providing sources of interest of an educative nature.

One of the most potent forces of the environment, both for good and ill, is the law and the authority of state, church or other social group, with its super-ego reinforcement and id-frustration effects.

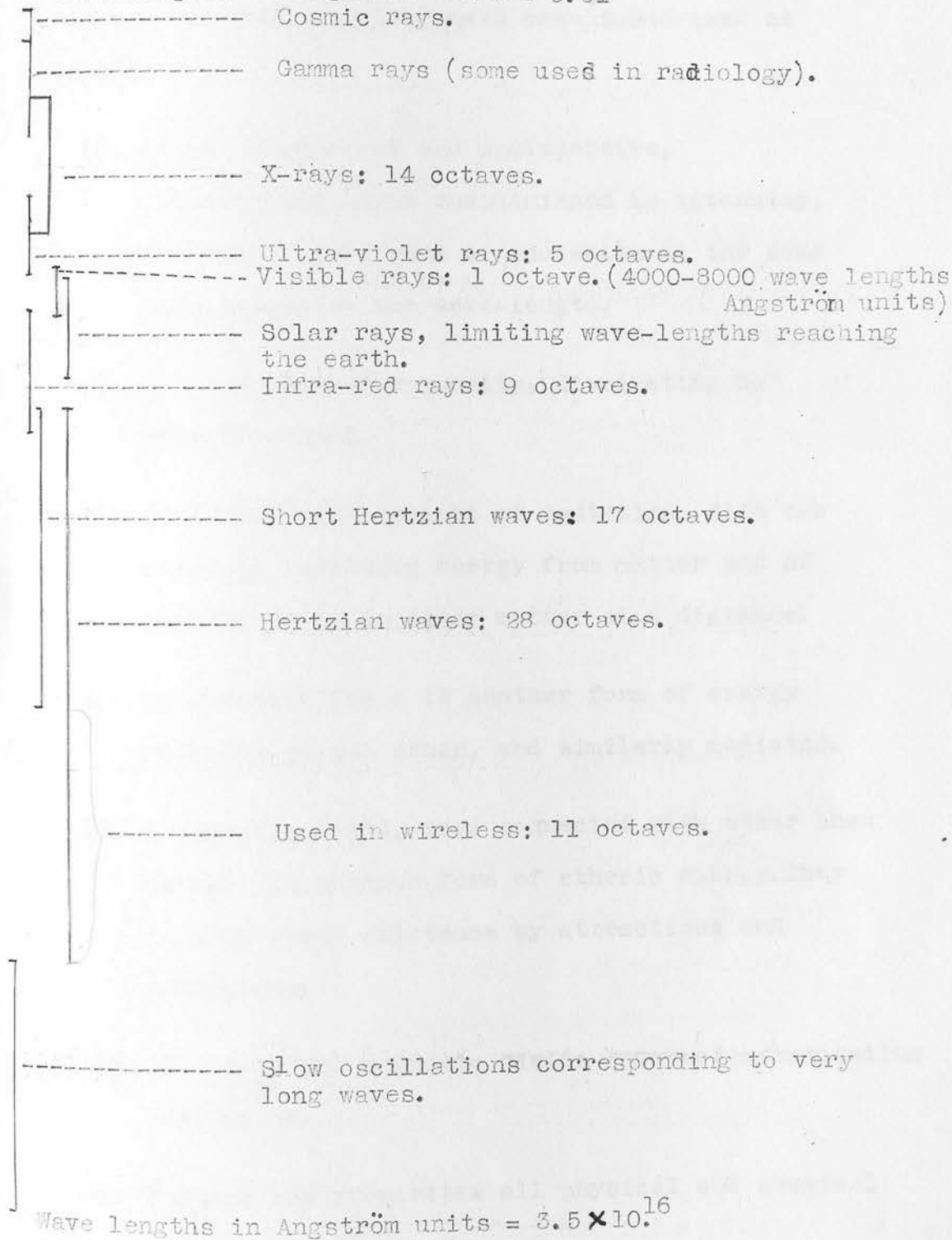
An important part of the invisible environment is comprised in air, light and ether.

Electro-magnetic waves comprising over 60 octaves (an octave representing a band of vibrations extending from a given frequency to double that frequency), are described, of which only one octave is visible vibration.

Waves of frequency as low, that is, of wave-length as great, as may be desired, can be generated by rotating a coil in a magnetic field, while at the short wave-length end of the range are the penetrating cosmic radiations.

In Angström units ($= 10^{-8}$ cm) we may set forth the different radiations in the following diagram:-

Wave-lengths in Angström units = 0.01



E. N. da Costa Andrade (16).

The properties of ^{the} ether have been summarised as

FOLLOWS:-

- 1). It is transparent and undispersive, transmitting light undiminished in intensity, and every other kind of radiation at the same pace, whatever the wave-length.
- 2). It is devoid of viscosity, dissipating no energy or heat.
- 3). It is the sole vehicle of radiation, with the power of receiving energy from matter and of delivering it to other matter at a distance.
- 4). An electric field is another form of energy existing in the ether, and similarly mediated.
- 5). A magnetic field, more connected with ether than matter, is another form of etheric energy. They display their existence by attractions and repulsions.
- 6). Electric and magnetic fields interact, constituting radiation.
- 7). Through its properties all physical and chemical

activity, such as cohesion, gravitation and barometric pressure is mediated.

Oliver Lodge. (17)

The factor of repression provides the link through the autonomic nervous system between unassimilated experience and its somatic registration. In addition to all the other factors of the environment we have mentioned, we must add, a) the emotional links between the individual and those around him, b) the past either by way of heredity or environment, c) the present and the future, d) the sense of the metaphysical, which makes all the difference to belief in a closed or an open universe, and makes possible integration out of the seemingly irrelevant sequence of life. The somatic effects of these aspects of the environment depend upon the degree of acceptance both to the "all or none" principle, and to the polarity principle which leads to the acceptance of both positive and negative phases of experience. The correction of repression is not, as might be supposed, the mere change of attitude from a negative to a positive one, but the complete acceptance of both positive and negative phases.

Let us summarise the conceptions we have enumerated. Man's environment is a growing relationship between the internal and external milieus, the focus of which is consciousness. Its nature is chemical, electro-physical, emotional and metaphysical, but these are only partial aspects of it, for the destiny of the growing organism

is to know reality in its wholeness which brings us to the philosophical nature of subjectivity and objectivity.

One part of the subject-object relationship lies in the recognition of the fact that we are the experiencers. But the experiencers themselves are to others part of their objectivity. Our responsibility is to interpret events as objective experience, but also as having significance subjectively.

Reality, in the philosophical sense, may be defined, on the subjective side, as the sum total of all experience: on the objective side, it may be regarded as all that is non-ego. But there is a relationship between the ego and the non-ego, which gives some sort of meaning, or better, continuity, to the experiencer and the experience. In other words, there is between the objects of sense experience, and my sensations, an intermediate world of ether vibrations, modified by atmospheric changes, differences brought about by variations in heat, light or meteorological conditions.

But you may say that, by definition, ^{that} belongs to the non-ego; and though for a moment I am willing to allow it to be so, I am desirous of finding some sort of objective counterpart to that subjective sort of experience we call hallucination. In other words, there is that in me which responds to invisible cosmic rays, and though it may only express itself in my sensitiveness to the east wind, by the change in my rheumatics, or my

asthma, that kind of experience is of the same order as the more definitely psychotic hallucinatory phenomena.

So long as my awareness of reality is restricted to sensation and thoughts, I am likely to be confusedly aware of that intermediate region of experience which unites subjective with objective, which through any refusal to make contact with deeper emotional levels in myself, may predispose me to that kind of confusional experience which may be experienced in delirium or other hallucinatory states.

The prime symptom in such states is that of dissociation and though it is typically found in the peripheral analgesia of the confusional syndrome, it is not radically different, in my opinion, from the similar condition found in hysteria, and the glove and stocking forms in ^{early} subacute combined degeneration of the cord and epilepsy.

Now in the clinical conditions I have just mentioned, we are unable to account for the symptoms in terms of neurological localisation. It is helpful to speculate, however, on the possible nature of this dissociation. The integrity of the pathways of sensation are due peripherally to the intactness of actual nerve fibres, and in the states I have mentioned, there is no reason to doubt this intactness, but there are other sources of dissociation as we know from various other forms of clinical experience such as the anaesthesias from cocaine injection, frostbite or suggestion. The mere intactness of nerve pathway,

therefore, is not in itself a guarantee of perfect function, but is capable of modification by vascular conditions, electrolytic dissociations or even by the "mass" action of suggestion. It is customary to associate in our minds the peripheral analgesia of hysteria, with that which is produced by suggestion, and though it may be that the hysteric is more open to the influence of suggestion than some other types, I am not at all sure that there is not a more "organic" explanation for it. We know that the thalamus is a centre for afferent impulses, and that its connections with the diencephalon puts it into some sort of functional relationship with the pituitary, but as yet we do not know what the outcome of that relationship actually is. From my observations on the hysteric and in some typical cases of hypopituitarism-hyperovarism that I have seen with this sort of syndrome, I am inclined to the belief that there is a hormonal relationship between pituitary-gonad activity and normal sensation. That this should be so on a priori grounds I cannot doubt. The urge to grow is not merely endogenous, but it is capable of modification by exogenous stimuli. The mere use of muscles stimulates their growth, which in itself suggests some pituitary response to an external stimulus. The mere fact of sensation is a stimulus to growth.

The structure of the self is closely related to the metaphysical nature of Reality. Man is made in the image

of God, so that what is in man is a reflection of what is in God. Therefore what is, depends on the nature of God, but what I know about what is, depends on what is, both objectively and subjectively. In other words, my conception of a tree depends on all that my senses tell me about it, all that others tell me about it, and all that my feelings and intuitions tell me about it. From this data I may infer other things both about the tree, about my relation to the tree, and about the universe upon which the tree is in some sense dependent, and upon which in a lesser degree the universe is dependent.

We may codify this and say:-

- 1). That my awareness of a tree depends on:-
 - sensation,
 - intelligence,
 - feeling,
 - intuition.
- 2). That the tree has a life of its own quite distinct from mine.
- 3). That there is a relationship between the tree and me because we both have our existence in God.
(cf. Berkeley) (18)
- 4). That my awareness of a tree may depend indirectly through other people's sensation, intelligence, feeling and intuition, because of what they are able to tell me about it.

In terms of the subject-object relationship therefore

we may say that my awareness of the tree will be different according to my particular interests in life. I may be content with mere observation and say 'Oh, there is a tree over there,' or I may be interested in it like a child learning to talk and to give names to things, and say 'Oh, that is a tree,' in contradistinction to an animal, or my interest may be more closely related to my feelings and I say 'I like that tree,' or I may go a step further and say 'The thing that I see over there and call a tree and like, is a parable of the life of God or the spirit that is in me.'

But my interests may be more developed than that, and the tree is a different thing according to whether I am a naturalist, a timber-merchant, a botanist, a herbalist or pharmacist, a painter or philosopher, and in each case sensation, thought, feeling and intuition all add up to something different, something peculiar to the subject who is looking at the object.

But the object has its own existence, it has its shape, mass, qualities in extension of hardness, durability and such physical attributes as colour, viscosity, habits of life such as the exhalation of oxygen and inhalation of carbon dioxide and reactions to temperature and climate. Further it has its own identity as a tree, and according to Sir J.C. Bose has its own kind of feeling, with a life of its own which it derives from God Himself.

"In all life , Thou livest, the true life of all"

So much for the subject and the object. But there is a further relationship which connects the two. I am dependent on the tree for my sensations, my thoughts, my feelings and my intuitions about it; it gives me the oxygen that I need, it is moved by the same wind which blows on me, it lives in the same ether which mediates the sense of its existence to me, it breathes in the same air, and its roots have their origin with the same ground which gives me standing room. But the tree is also dependent on me for my carbon dioxide, it is matured by the same rain, and is subject to a similar principle of growth to that which activates my growth. It is partly dependent on me for its existence in the sense that if I decide it is a nuisance, I may decide that it shall be cut down. It is also true that my existence is also bound up with it, as it might obliterate me if it chanced to crash in a storm.

But that is not all, for who knows what lies in the tree for future discovery, and who can say what influence has passed between us during the years that are passed. Its electro-physical nature is similar to my electro-physical nature, in its neutrons and protons, so that the things that appear stationary are in reality in constant change, and all kinds of new knowledge are bound up with our existence, that are as yet indefinable, and what I know now about the tree is just as much a revelation of me as it is of the tree, for the whole of my knowledge

about it is related by chains of ideas - by association to countless other things and people, to ideas and feelings, to hopes and fancies, to poetry and rhyme, to music and parable, to birds and beasts, to man and God.

Let us try again to codify the kind of data that are involved in this relationship between sense and sensor. Reality is a very complex affair, it depends primarily on awareness, our interpretation of what we are aware of, our emotional reaction to both the object and our interpretation of it, and yet it is something of which we are only parts. We cannot know everything in its intensity and its extensity, but we are called upon to live life in our own partiality, to make judgements about, it out of our own partial knowledge, and to feel about it out of the partiality of our likes and dislikes, when all the time we ourselves and the things around us are changing, and where past and future are in some sort of sequential relationship with the present.

And so we come to the Reality in which all things have their being and our awareness of it - God, and we must say of this that our judgements must inevitably be partial, because we are as a drop in a bucket, the microcosm in the macrocosm, yet just because there is a relationship between these two orders, because God has made us in His own image, we are able to discern something of His nature, but it is important to realise that our judgements are subject to many failures:-

- 1). That the appearance is not reality.
- 2). That knowledge in itself as a rational process is bound to falsify the evidence.
- 3). That emotion itself is so labile and changing that the reality I am aware of appears to be changing, when it is really my attitude or my angle of perception that is changing.
- 4). That to lose myself in the Totality of God may involve a breaking away from the reality of this present world, which means inability to express just now what I feel in terms of this present world.
- 5). That my judgements must inevitably be a reflection qualified by my own unsolved problems.
- 6). That to be able to express myself in this present space-time continuum must inevitably involve a diminution in the intensity of the sense of relationship with God as Totality.

How, then, can we manage to live in this world at all, when Reality is so complex and we are so ill-fitted by experience and knowledge? The only reasonable answer is by faith - not by sense or reason, but by the attitude which takes each event of life in its sequence, in trust that somehow "all things work together for good to them that love God," even though things appear impossible and intolerable. God is Reality - the reality that is now - the experience that is now, even though experience is all

against it either looking or being good, in the confidence that good is somehow the ultimate goal of ill:

[Judge not the Lord by feeble sense,
But trust Him for His grace;
Behind a frowning providence
He hides a smiling face.]

What are the mistakes we are most likely to make in the interpretation of our experience ?

1). To account for it too easily, as, for instance, by attributing dreams to indigestion, illness to chills, and constipation to a sluggish liver. These almost always represent a too facile explanation of our experience.

2). To rationalise our experience instead of first accepting it: to argue about it before we have felt it.

3). To attribute to accident and coincidence, events which have much deeper explanation, either in ourselves or in the cosmos.

4). To confuse what is objective with superficial inferences from our own lack of experiences - or to project on to events, distortions arising from our own unsolved emotional problems.

5). To fail to realise the links between the ego and the ego's experience - either by introjection, that is by being too detached from objectivity so that we feel too keenly what should be given more objective significance, or by taking too literally the hallucinatory experience that frequently accompanies introversion.

17). - [Faint text]

6). To fail in either taking too little responsibility for the events that make up our life, or too much, and to realise too little of the significance of events. To avoid these mistakes we need to be much more aware of the complexity of life, but at the same time to be much more simple in the acceptance of our experience.

18). - [Faint text]

19). - [Faint text]

20). - [Faint text]

21). - [Faint text]

22). - [Faint text]

23). - [Faint text]

24). - [Faint text]

25). - [Faint text]

26). - [Faint text]

27). - [Faint text]

28). - [Faint text]

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30). - [Faint text]

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33). - [Faint text]

34). - [Faint text]

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... it shows and says that cause determines its effect, that like conditions like, that all is dependent on that all is given. They are right; so believe in the absolute reality of the person and in his individual nature; but science is there and shows the interdependence of conscious life and cerebral activity. Right to attribute to man a privileged place in nature, to hold that the distance is infinite between animal and man; but the history of life is there, and makes us witness the process of passage by gradual transformation and makes them to recognize man in animality. When a strong instinct makes the probability of personal survival, they are not to close their ears to its voice, but if they find souls capable of independent life, whence do they come? Then, how and why do they enter into this body which we see arise, quite naturally, from a mixed cell derived from the bodies of the two parents? All these questions remain unanswered; a philosophy of intuition that will be a negation of science will sooner or later be swept away by science if it does not resolve to use the line of the body just where it really is, as the road that leads to the life of the spirit. But it will then at least have to do with definite living beings. Life and death, from the initial impulsion that thrusts it into the world will appear as a wave which rises and which is depressed by the descending movement of matter. On the greater part of its surface at different heights the current is diverted by matter into a vortex. At one point alone it passes freely, dragging with it the obstacle which will sink on its progress but will not stop it. At this point is animality; it is our privileged situation. On the other hand, this rising wave is continuous and it includes individualities which number which interpenetrate and in which consequently neither the category of unity nor that of individuality is appropriate, made as they both are for that matter. The matter that it bears along with it, and in the interstices of which it inserts itself, alone divides it into distinct individualities. On flows the current, passing through human generations, subdividing itself into individuals. These souls are continually being created, which, nevertheless, in a certain sense pre-existed. They are nothing else than the little rivulets into which the great river of life divides itself, flowing through the body

CHAPTER 5.

NATURE OF THE SOUL.

"Philosophy introduces us into the spiritual life, and shows us the relation of the life of the spirit to that of the body. The great error of doctrines on the spirit has been the idea that by isolating the spiritual life, by suspending it in space above the earth, they were placing it beyond attack, as if they were not thereby exposing it to be taken as an effect of mirage. They are right to listen to conscience when it affirms human freedom, but intellect is there and says that cause determines its effect, that like conditions like, that all is repeated and that all is given. They are right to believe in the absolute reality of the person and in his independence toward matter; but science is there and shows the interdependence of conscious life and cerebral activity... Right to attribute to man a privileged place in nature, to hold that the distance is infinite between animal and man; but the history of life is there, and makes us witness the genesis of species by gradual transformation and seems thus to reintegrate man in animality. When a strong instinct assures the probability of personal survival, they are right not to close their ears to its voice, but if there exist 'souls' capable of independent life, whence do they come? When, how and why do they enter into this body which we see arise, quite naturally, from a mixed cell derived from the bodies of its two parents? All these questions remain unanswered; a philosophy of intuition which will be a negation of science will sooner or later be swept away by science if it does not resolve to see the life of the body just where it really is, on the road that leads to the life of the spirit. But it will then no longer have to do with definite living beings. Life as a whole, from the initial impulsion that thrust it into the world will appear as a wave which rises and which is opposed by the descending movement of matter. On the greater part of its surface at different heights the current is converted by matter into a vortex. At one point alone it passes freely, dragging with it the obstacle which will weigh on its progress but will not stop it. At this point is humanity; it is our privileged situation. On the other hand, this rising wave is consciousness and it includes potentialities without number which interpenetrate and to which consequently neither the category of unity nor that of multiplicity is appropriate, made as they both are for inert matter. The matter that it bears along with it, and in the interstices of which it inserts itself, alone can divide it into distinct individualities. On flows the current, running through human generations, subdividing itself into individuals. Thus souls are continually being created, which, nevertheless, in a certain sense pre-existed. They are nothing else than the little rills into which the great river of life divides itself, flowing through the body

of humanity. The movement of the stream is distinct from the river bed, although it must adopt its winding course. Consciousness is distinct from the organism it animates, although it must undergo its vicissitudes.....

Finally consciousness is essentially free; it is freedom itself; but it cannot pass through matter without settling on it, without adapting itself to it."

H. Bergson. "Creative Evolution".

Synopsis.

The soul represents the metaphysical aspect of the constitution.

The science of the soul must reconcile the relative with the absolute, the part with the whole, science with art, practice with theory, and the sense of reality with health.

Instead of a dualistic interpretation of mind and body, a trialistic view as to the nature of the soul is needed to cover all the facts.

Consciousness has a physiological basis, as well as a metaphysical one.

The pathological aspects of consciousness are noted, as well as some of its requisites.

As one of the essential functions of the soul is that of maintaining its rhythmical activities, some of the features underlying consciousness and unconsciousness, elation and depression, sympatheticotonia and parasympatheticotonia and the acid-base equilibrium are noted.

Some of the theories concerned with the relation of the soul to the body are mentioned, and their limitations suggested.

We have already defined the constitution as 'the morphological, the physiological and psychological resultant of the properties of all the cellular and humeral elements of the body', but so far, have not noted in it anything that may include the metaphysical.

Until psychology really becomes 'the science of the soul' it will continue to be the centre of conflicting theories, each having its partial validity because it is the product of one soul, each also capable of being contradicted and severely criticised, just because any one theory cannot claim to be universal truth.

It is scarcely likely that psychology will ever be capable of expression as a universal truth, just as medicine itself can never say 'this must always be the last word about this particular disease'. It seems to be an oft forgotten fact that there is no final truth about anything so far as man himself is concerned. It is always relative to the limitations of personality. As doctors we know far more about pernicious anaemia, and the last fifteen years have meant a tremendous advance in knowledge about blood formation in health, just because a great impetus to the study was given by the discovery of the curative properties of liver. This simple fact might appear to contain the absolute truth about the cure of pernicious anaemia, but this important discovery is only one door giving access to vast avenues of truth concerning the whole question of blood formation, destruction and regeneration, and in the multiplicity of facts there is no finality.

Psychology as a science - that is as an objective pursuit - must realise certain limitations:- 1) That its findings are never absolute, but always relative. 2) That it must inevitably pass through a phase of being rather vague, because as yet we cannot see how opposing views may be reconciled. 3) That ultimately it must be able to measure the object of its study. This involved the faith that even infinity is measureable, and that there are degrees of infinity. 4) That psychology as an art is completely different from psychology as a science. There is a whole world of difference between clinical medicine and scientific medicine, though there is some point of correspondence between the two; but speaking generally, the general practitioner who is far too busy to keep up with every discovery in scientific medicine, is able to practice the art of healing without serious handicap, even though he is not a close follower of medical fashions. On the other hand, the scientific doctor complete with laboratory facilities has at his command resources that enable him to do things that the busy practitioner is unable to do. What is the relationship, then, between the busy doctor who practises on a wider scale than the scientific doctor is able to do? There are large spheres of medical practice where human sympathy and empiricism will accomplish much, but there are restricted fields in that practice where only patient enquiry, diligent observation and insight will be able to give the key to cure, though what the scientist finds out may eventually become available as fairly compact and

ready to hand knowledge that the general practitioner may be able to apply empirically. Now this same broad principle applies in psycho-therapy. Many of those practising the art are apt to think it is a science because such and such a procedure appears to be effective and it thereby becomes invested with a finality which is at once untrue to the spirit of science, and, worse still, is untrue to the spirit of the art that they are practising.

Let us get clear in our minds these two aspects of psychology, that which is empirically effective and that which is scientifically accurate. The one is practical, the other theoretical: the one may or may not have sprung from the other, but its efficacy lies primarily not in its scientific validity but in the relationship between the patient and the doctor.

The next step awaiting medical psychology is in the generalisation of hypotheses from particular cases of the principles that govern its efficacy. An illustration from the field of general medicine may be instructive here. Digitalis was known to be effective in heart disease before Withering used it, and Mackenzie laid down the principles of its action. The empirical fact was elaborated scientifically, but the scientific fact lead to a new general and empirical usage of the drug. This is an illustration of the philosophical principles that our reasoning is circular: it starts from particular cases, becomes scientifically generalised and is then re-applied to other particular cases.

It is important, therefore, to realise that as far as the art of psychotherapy is concerned nothing is of so much importance as the sense of vocation. We do what we are called to do and we can do neither more, nor less than this, though this is not to say that training and other secondary qualities are not important, the chief of which is getting to know more about the sense from which the vocation springs, which is where in lies the place of personal analysis.

It is a great mistake, though, to think that the analysis is more important than the sense of vocation. Let us have both cart and horse, but let us feel that the horse is leading the cart, and more important still that the driver of the horse really knows where he is going and what he is trying to do.

What is he doing?

In philosophical language, he is seeking to bring the patient into closer contact with reality: in scientific language, he is finding out the causes that have lead to the patient's disease, but empirically and from the patient's point of view the most important, he is trying to relieve him of his symptoms.

What is the relationship between these three different things? There is implied a relationship between reality, knowledge and healing. Why should a knowledge of what is bring with it any sort of symptomatic relief? The answer is that we are a complete organism of body, mind and spirit, and that what is an experience preeminently of one aspect of the individual has to be assimilated in its appropriate form by the other aspects.

During the last thirty years medicine has witnessed a great revival of interest in those problems of disease raised by the hypothesis of the psycho-somatic relationship. That theory presupposes that the functions of mind are different from the functions of body, and that their structures also are different. It is well for us to consider how true this is, because this is a problem that affects our whole viewpoint, and also affects our idea of the treatment of disease throughout its whole range. The most important point to make at this juncture is concerned with definitions. What do we mean by body, mind, function and structure? Shall we say that body is that aspect of the personality which is material, chemical and visible, and that is that aspect which may only be inferred, which is immaterial, metaphysical and invisible? If so, how can such opposite qualities ever be reconciled to each other? By function we mean use, and by structure, constitution. Function and structure are thus two faces of the soul-body unity, which may be expressed in terms of each other - the body functions as an instrument of mind - the mind functions as an instrument of body. There is no point in saying that only one or other of these views is right, for both are true.

But what of their individual structure? This is conveyed by the definitions that the body is material, chemical and visible, while the mind is immaterial, metaphysical and invisible.

Returning to the question of function in terms separate from each other: the body is primarily the vehicle of sensation, the mind of thought, feeling or emotion and

intuition. Now that is in short the usual way of regarding the nature of the mind-body relationship, but it overlooks a number of very important facts:- 1. That although it assumes the unity of that relationship, it omits any sort of reference to the mediating principles on which the unity rests. 2. That body is considered as an entity distinct in function and form from mind. 3. And that no functional separation is possible without doing violence to the facts, because mind is dependent on body, and body on mind.

In the separation of disease into organic and functional, or somatic and psychological there is a schizophrenic fallacy which is not so easy to condone in the doctor as in the patient. It is worth emphasising that most chronic sufferers are hysterical and most psychological disorders are productive of somatic changes. This is why it is so foolish to assume that an extensor plantar response ipso facto excludes an emotional factor as being of prime etiological significance. In this connection let us note the relationship between the confusional syndrome and fever. Here is the supreme example of the inter-relationship of mind and body, where one is so distinctly dependent on the other. In treatment one usually accepts the traditionally objective point of view and seeks to relieve the fever, but if we are wise we will not forget that an additional responsibility is ours, and that is to seek to understand the content of the psychosis. Diseases are not things in themselves - they are not entities in their own right so to speak, only convenient abstractions. It is our easy acceptance of the finality of the nominalistic attitude that makes us think too superficially about disease,

without realising that its origin is from the depths of personality, which brings us to the questions what is man and what is soul? And so we come to the incomprehensible, and to the realisation that disease in itself must always be some sort of mystery, though we may define it, and describe it and try to account for it, in terms of pathology or psychology. We can give reasons for the faith that is in us, but they are not the faith - that is a more fundamental quality than reason. We can attempt to explain why pernicious anaemia arises, but our attempts are never final because man is not capable of final definition. It is because one sees in medicine in general, attempts at too facile explanation for clinical syndromes that one has tried to break away from conventional descriptions, in order that medicine may be made more intelligible because it is less intellectualised, and in order that we may realise the fact that medicine is primarily an art, though there is room for scientific attitude within it, so long as that attitude is not eccentric nor paranoid. I

It is difficult to know sometimes how much explanation to give, especially when this may confuse. This is to be seen in the description of acidosis. This is a very important aspect of medicine and one that needs for its understanding most work in the laboratory. Where laboratory considerations have seemed of more importance than clinical ones, these have been waived, not because they are unimportant, but because this is not thought to be the place for their interpretation. How valid will be the medicine where these considerations are relegated to a place of secondary importance

remains to be seen, but unless doctors can see diseases in perspective, as the manifestations of a disordered personality their laboratory equipment will prove confusing. Physical changes in disease are of great importance and their effect and counter-effect are beyond calculation. The same is true of our treatment. We can never merely neutralise the effect of a disease-process, because all the time we are dealing with an individual whose reactions are diverse and rhythmical. Every action has its reaction, and this implies that there is a continuity between disease and cure quite apart from that induced by the remedies we give to the patient. The homeopaths more than the allopaths are alive to the reality of disease as a process arising from within the patient, and as a phase in the patient's own evolution. Biochemistry has confirmed our belief in latent disease, but the homeopaths knew this long before biochemistry taught it to us, and modern psychology is indicating that even more important than the shift of the acid-base equilibrium is its meaning.

Instead of accepting the dual relationship of mind-body, it seems as though we shall be led to accept a triadistic view, more in keeping with orthodox religious beliefs, though rather out of keeping with the general practice of the church to-day. Such triadistic view would hold to the reality of body, mind and spirit, but in such a way that it emphasised the important basic factor of body. I see no priority in metaphysical ways of treatment when conventional physical methods have proved their validity, though that is not to

say that there is not a much larger place awaiting methods of interpretation than as yet has been the custom.

If we envisage the personality as a unity of body, mind and spirit, its disorders can only be adequately treated if four conditions are met:- 1) That we regard 'cure' as incidental to further development and growth, rather than as a final state. 2) That we try to regard the 'cure' of disease as meeting one or more of four needs:- (a) that of the body - the material, biochemical aspect, (b) that of the mind - the aspect seeking for interpretation as to the meaning of any event in terms of intimate personal experience and responsibility: (c) that of the spirit - the conative dynamic aspect of the personality which, seeing in the events of personal experience, a meaning, responds to its challenge by a new personal ~~experience, a meaning responds to its~~ challenge by a new personal orientation to both internal and external milieu: (d) that of the whole personality - which in unity with itself is able to meet new or old conditions with greater acceptance of the whole. 3) That ^{merely} no curious scientific interest be allowed priority in treatment. 4) That a supremely patient attitude on the part of the therapist in which the real significance of time and space is given important place, be in control.

The metaphysical basis of consciousness rests primarily on the immanence and transcendence of God. The one is a subjective aspect of the soul's awareness, and the other a more objective. From the psychiatric point of view

however, the one is made conscious by the mechanism of introjection, the other by that of projection. We cannot possibly eliminate these mechanisms from our thought processes, for they are part of the warp and woof of our development, but we must safeguard the distortions to which they may give rise by acquiring insight into those centripetal and centrifugal tendencies. A similar polarity of mechanism is to be found in the individual and social claims of the ego. Part of our difficulty lies in our inability to reconcile the full claims of society with the full claims of the individual, and yet paradoxically enough, we cannot learn how to live properly, we cannot really satisfy the claims of the one, unless we have satisfied the claims of the other.

It is necessary, therefore, to say to some people, you need to be more selfish, for your altruism is founded on a completely wrong sense of values. For the others, the unspoken word may be more potent than the blatant condemnation of meanness and egocentricity.

For the sake of clarity, let us try to codify the assumptions underlying the metaphysical basis of consciousness.

1. The conception of libido assumes a basic life force, contact with which gives energy, and motive to conduct.

2. The breaks in the continuity of that force are normally biphasic, as expressed in waking life and sleep.

3. Its direction is normally both centripetal and centrifugal, introvert and extravert, introjecting and projecting, personal and racial, analytical and synthetic, differentiating and integrating, homosexual and heterosexual, amorphous and polymorphous, constant and variable, static

and dynamic, cosmic and definitive, entire yet broken, free but restricted, and finally, eternal, yet finite.

What then are the ways in which the libido finds wrong forms of expression?

1. By the mechanism of repression which is by the undue exercise of the active will.

2. By the mechanism of dissociation, which is due to the unwillingness of the individual to accept the biphasic nature of all experience.

3. By the mechanism of distortion, which falsifies the evidence that experience brings.

4. By the mechanism of displacement, whereby emotion belonging to one series of complexes becomes attached to another, less liable to disturb consciousness.

5. By the inability to separate the literal from the symbolic.

6. By the inability to accept the frustrations of the 'sieves of life'.

7. By the inability to reconcile the irrationality of compulsion with the rationality of obsession.

8. By the inability to accept the underlying conflict between the appearance and reality, which involves the antithesis between the ideal and the base, perfection and entelechy, the 'conscious' and the 'unconscious', the sanity of waking life with the insanity of dream life.

What then are the ways in which the self may become reconciled to the aberrant tendencies of its libido?

1. It must seek to become more alive to the meaning of symbols.
2. It must learn to reconcile the immediate urge with the necessity for waiting.
3. It must become detached from its own interestedness, and become more identified with the claims of the non-ego.
4. It must learn to find itself by losing itself.

What is the relationship between consciousness and physiological processes, for 'a priori' considerations alone must commit us to a schizoid outlook that is to be avoided.

We will begin with the pathology of 'unconscious' states as we find them clinically and group the various etiological considerations as follows:-

I. Toxic Factors:

Narcotic Poisoning as from alcohol, anaesthetics, such sedatives as bromide, chloral, veronal, luminal, cocaine, paraldehyde and morphia.

Poisoning from the organic arsenical compounds
(e.g. 606).

Anoxaemia from carbon monoxide poisoning, asphyxia by inadequate aeration.

Uraemia, cholaemia, diabetic coma.

Lead poisoning.

Acidosis or alkalosis.

- II. Mechanical factors causing cerebral anaemia, such as pressure on the carotid arteries, congestion of vessels in the splanchnic area, causing relative anaemia in the brain.

- III. Hyperpyrexia caused by any of the specific fevers such as malaria, pneumonia, encephalitis or meningitis.
- Heat-stroke.
- IV. Syncope from haemorrhage, excessive vaso-constriction as from intense cold, vaso-motor instability after convalescence, conditions of shock whether brought on by lesions of the carotid sinus, injury (e.g. lumbar or pleural puncture), disagreeable sights or mental traumata of an associative nature (i.e. trigger episodes firing a train of emotionally charged autonomous complexes), excessive stimulation of the sympathetic nervous system, or vaso-vagal attacks.
- Disorders of cardiac rhythm, such as heart-block, auricular flutter or fibrillation, paroxysmal tachycardia.
- V. Hypoglycaemia.
- VI. 'Coma vigil' as found in the terminal ~~terminal~~ phases of febrile illness.
- VII. Cerebral lesions such as injuries as in concussion, irritation or compression, thrombosis, tumours, general paralysis of the insane, or internal hydrocephalus.
- VIII. Psychiatric conditions, such as hysteria, somnambulism, narcolepsy, trance states, fugues, stupor, epilepsy, and some phases of delirium.

From a consideration of these pathological states therefore we may derive the following requisites for normal consciousness.

- I. A certain level of mental development.
- II. Glandular balance and cerebral co-ordination, especially of thyroid, and pituitary, but also of pancreas, parathyroid, adrenal secretion and gonad.
- III. Stability of the acid-base equilibrium.
- IV. Cardio-vascular equilibrium.
- V. The cerebral requisites for consciousness.
- VI. Such relatively stable environmental conditions as moderate temperature, ventilation, and absence of 'shocking' episodes.
- VII. Autonomic balance.
- VIII. Relative freedom from endogenous and exogenous toxics.
- IX. Free 'association' paths: i.e. lack of marked dissociation.
- X. Chemical equilibrium.

It seems likely that, while psychologists have done humanity a great service by calling attention to the unconscious aspects of life, their chief role should be to widen the sphere of consciousness. In fact, their emphasis on unconsciousness is to make us more conscious of many things that we are in danger of forgetting. They themselves stand in danger, I believe, of forgetting that the conscious aspects of personality still constitute the focus of living and of individuation. Philosophically, this means that while we must inevitably come to a knowledge of ourselves, we cannot really find the

sanity of maturity until we leave behind us that whole world of the 'unconscious', involved in fear, dread, introspection, depression, exaltation and phantasy; until in other words we come into that relationship with objectivity which is concerned with detailed observation and is scientifically detached, even though it feels and knows the subjective end of experience.

The essential functions of the soul are concerned with the maintenance of all rhythmic activities, but for our present purpose we may choose to say something more about:-

- 1. That of consciousness and unconsciousness.
- 2. That of elation and depression.
- 3. Acid-base equilibrium.

In connection with these rhythmic functions we are to note their relative nature, in that consciousness is usually a focalising of attention, thereby limiting the stream of consciousness, while such usual unconscious states as sleep are denoted by the dim sort of consciousness that accompanies dreaming and is characterised by a relaxation of attention. It is important to note that the psychologists use of the words 'conscious' and 'unconscious' is not quite in keeping with the usual sense, for his concern for the 'unconscious' springs largely from his desire for increasing the scope of consciousness. We shall have occasion later to define the implications underlying his contrast of 'conscious' and 'unconscious' attitudes but here we may note some of the factors involved in consciousness:-

1. The faculty of awareness, through sensation, thinking, feeling and intuition.
2. The faculty of memory, giving a sense of coherence through association with past, present and future events, and involving the ability to register, retain and recall the data of experience.
3. Sense of personal identity.
4. Orientation of the self in space-time.

We are to note also their partiality, in the sense that there are degrees of intensity of wakefulness, dependent on the intensity of elevation or depression, the one being typical of heightened sympathetic activity, the other of parasympathetic. It seems likely that the H ion concentration of the blood is related to this faculty of elevation or depression, as is indicated by the work of Mann, Morris & Rowe (1), and that of Golla, Mann & Marsh (2). These workers found that the normal morning alkaline tide was absent in rather more than 50% of schizophrenics, and in the same proportion of melancholics.

During the day, they tended to stay in the state of an acid shift established in the normal, but promptly reversed on waking. Furthermore, the normal alkaline tide following food was absent in 70% of the psychotic cases examined. These workers attributed this disturbance of equilibrium to a failure of the respiratory mechanism, which was confirmed by Marsh (3) who found that 88% of patients studied at Claybury showed a depression of excitability of the respiratory centre.

In the normal the respiratory system attempts to regulate the acid-base equilibrium by reacting to additional alkali,

by heaping up CO₂ , while the kidneys secrete alkali; i.e. ventilation is diminished and excretion of bicarbonate by the urine increased.

The psychotic, however, reacts normally to increased alkali ingestion, while it is inexcitable to acid. In the normal after two hours, the hypo-ventilation is followed by hyper-ventilation; i.e. the kidneys have eliminated the excess alkali, (correcting the alkaline phase) and the lungs now eliminate the excess of CO₂ ,(correcting the acid phase). In the psychotic, however, the renal mechanism is intact, but owing to the depression of his respiratory centre he is unable to eliminate the superfluous CO₂ by increased ventilation. Thus the addition of alkali to make a psychotic swing away from the acid side only serves to make him more acid. This state of affairs may be paralleled by the normal individual in sleep, whose alveolar CO₂ increases due to diminished excitability of the sleeping respiratory centres, with increasing acidity of urine to compensate it. Thus Devine (4) quotes Jung as saying that the schizophrenic speaks as if in dreams - as though he were a dreamer awake. It also links up with Pavlov's theory of sleep as internal inhibition, for it is evident that the depressive states of psychotics represent conditions of inhibition in which phases of activity at lower neurological levels may be facilitated by inhibitory phases at higher ones (Hughlings Jackson).

Our maturity consists essentially in what we know of life, and it begins by knowing that we know nothing, but our

physical maturity comes first and in its development, through sense experience, and factual learning at school or through reading, the world of objectivity is supremely necessary for it.

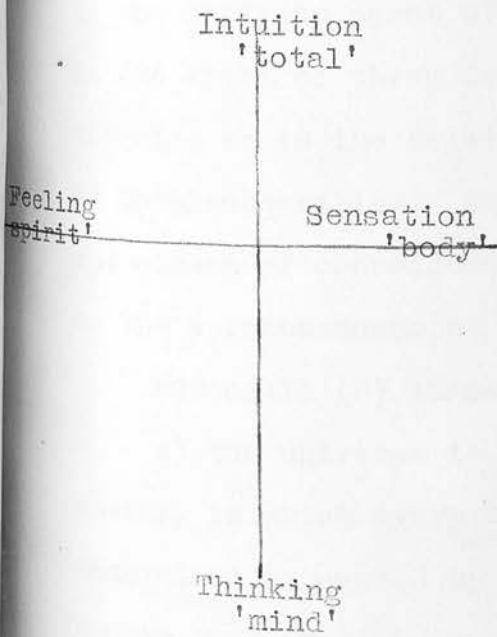
But the emotional basis of our life is closely bound up with our factual and physical awareness, through the supremely important link of emotional interest. It is this which gives direction to our living, whether it be introvert or extravert, and by a complicated series of events helps to build up the whole fabric of physical and mental structure.

The force of this emotional link is so strong that attempts at re-directing it in late middle life must of necessity be fraught with cyclothymic episodes that may prove to be very disturbing to the patient and those around him, but fixation spells dementia, so that it is better to be guided through the maelstrom of one's own uncharted emotional seas, than to be allowed to drift into ~~it~~^{them}, with neither guide, nor compass.

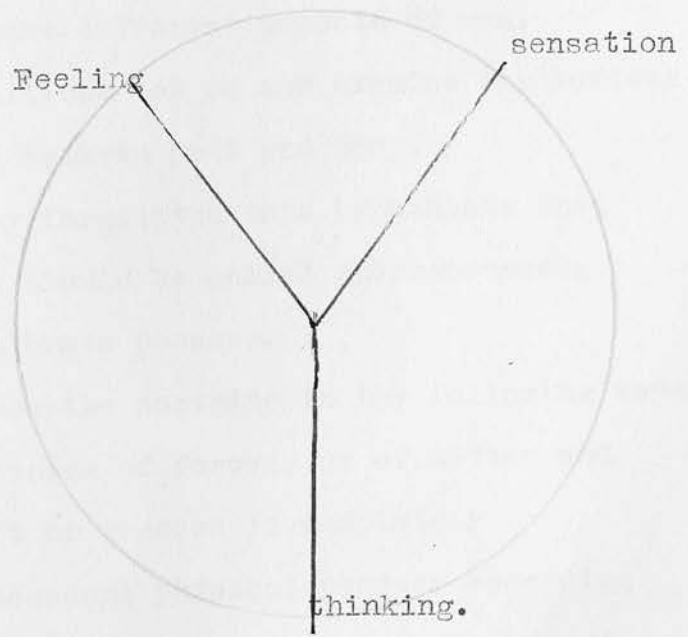
The question of the relation of soul to body is beset by very many initial difficulties, largely connected with definition, but if at the outset we try to adhere to certain more or less accepted beliefs we shall avoid many of the pitfalls, into which, down through the centuries, philosophers have fallen. Let us for the present purpose put on one side all question as to the soul's immortality in any orthodox Christian sense and merely concern ourselves with the kind of immortality that is assumed by the agnostic: viz, that implied in the continuity of the germ plasm. We may con-

veniently therefore restrict the use of the word soul to Aristotle's conception of it as 'potentiality'. We may add to it certain other attributes, putting on one side the whole body of belief in the ghost-soul, and restrict it to all that is inherent in a growing organism but at the same time regard it as that metaphysical aspect of personality, which somehow transcends experience, though it is closely bound up with it, that is dependent on physical channels of perception, and yet is non-material, that is aware of the reality of things though it is itself nothing. From it springs the 'vis medicatrix naturae', the force making possible the healing art, but its ground is reality, and the main principles of its operation, the faculty of mediation through others; from it also springs the urge to sanity through association, by which it links event with meaning, and sees in time the weaving of a consistent pattern, and realises its present destiny to be complete conformity to the environment within and without.

Reality



Diag. 5.



Diag. 6.

The above diagrams convey 1) its dependence on the sum of impressions mediated through body, mind, spirit and the whole, 2) the antithetical principles of sensation and feeling, thought and intuition 3) that the wholeness of the soul is both the sum of the parts, and their separate functions; in other words, that the totality of body, mind and spirit, gives rise to the fourth faculty of awareness, intuition, which together with sensation, thought, and feeling comprise the whole. Out of the whole, comes a part, but the Whole is the parts + the whole.

How then does the definition above differ from the conception of 'spirit', whether used in the sense of 'élan vital' or in the metaphysical sense of essence? We must restrict further our use of the word 'spirit' to the electro-physical nature of the body. We are limiting the word therefore to the ionic nature of the body. What then is the difference between soul, spirit and mind? 'Soul' is 'potentiality', 'spirit' is 'ionic nature', and 'mind' is 'idea'. 'Body' is the unifying agent of these different aspects of man. In the light of these definitions let us now examine the various theories as to the relation between soul and body.

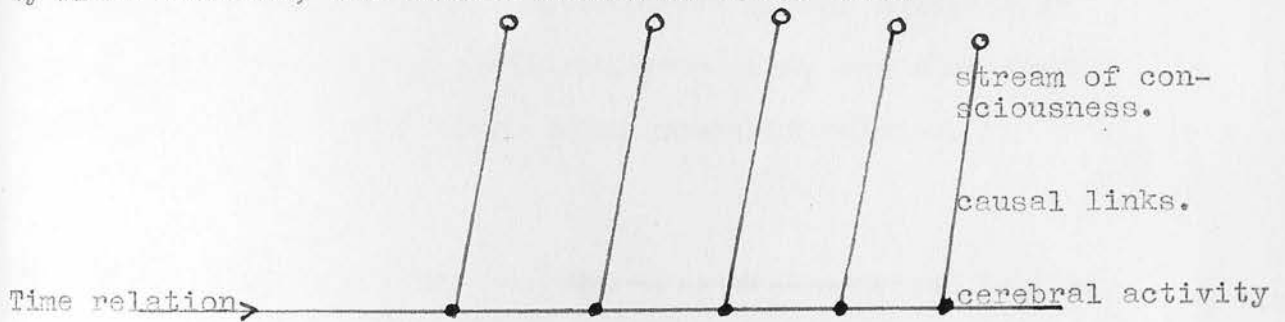
1) Epiphenomenalism. Huxley formulated this hypothesis that the stream of consciousness should be called epiphenomenal, or the epiphenomenon of the brain process.

McDougall (5) summarises the doctrine in the following terms:-

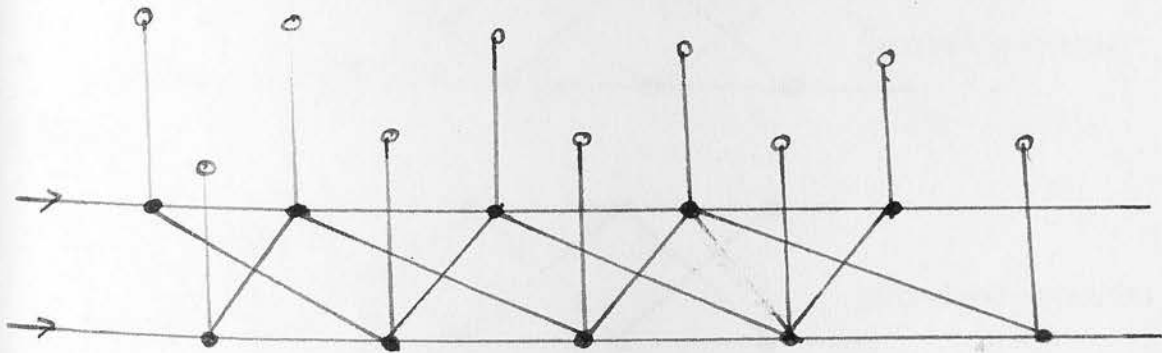
a) The universe is a system of forces, or of matter and energy, in which every event or process is completely determined or caused by antecedent physical process according to the laws of mechanism (the bodies and brains of all organisms, those of men not excepted).

b) Certain complex physio-chemical processes, taking place in those very highly specialised collocations of matter which we call brains, produce or cause (in their own right, as it were) all that we call consciousness, all sensation and imagery, all feeling, emotion, thought and sense of effort, or other mode of consciousness.

The doctrine has been symbolised by the following diagrams where cerebral physical processes are represented by black circles, and mental events by white ones:-



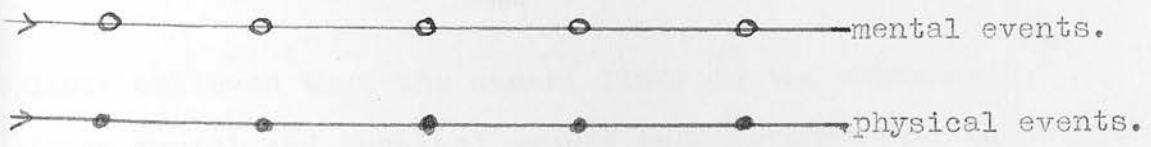
Diag. 7.



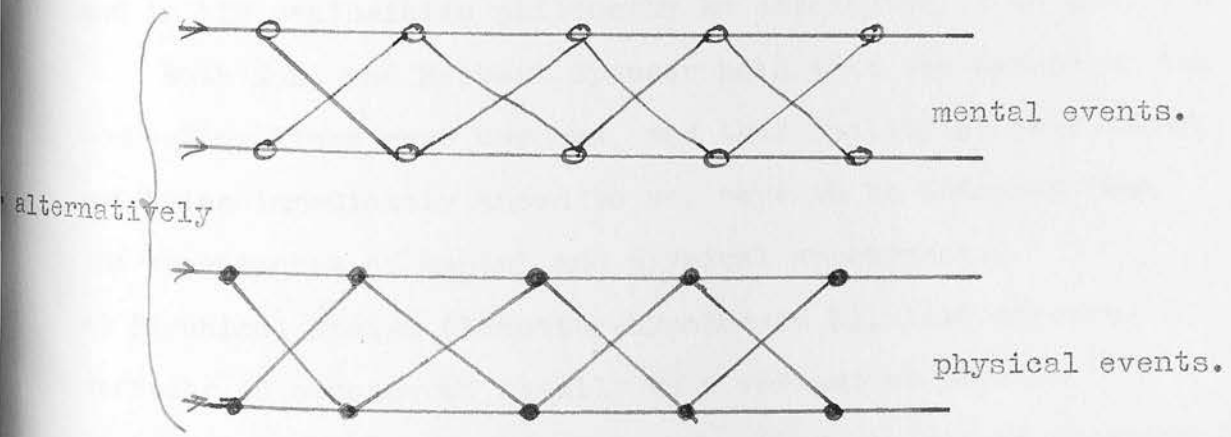
Diag. 8.

According to our definitions therefore, the relation between soul, spirit, mind and body as implied by this theory is that ideas are derived from physical processes. It leaves out all recognition of the soul as the reservoir of latent activity, and finds no place for the electro-physical activities we have denoted by the term 'spirit', though Ostwald (1902) has tried to overcome this defect by equating mental processes with energy, which, according to him is the only enduring reality.

2) Psycho-physical parallelism believes in the equality in reality of physical and psychical processes, and that they accompany each other without being causally related.



Diag. 9



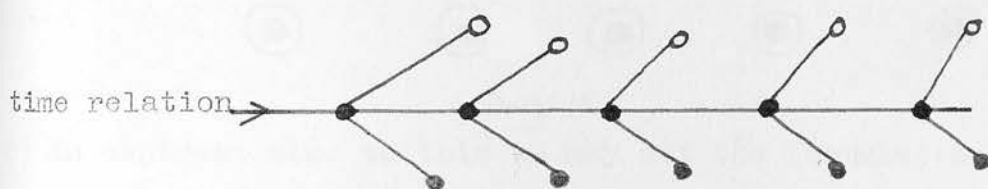
Diag. 10

(i) In restricted psycho-physical parallelism, brain processes alone of all physical processes are supposed to be accompanied by physical events corresponding to them point for point in this mysterious fashion.

(ii) In universal parallelism it is assumed that all physical processes have psychical concomitants, and was originally advanced by Leibnitz as a working hypothesis.

While on the face of it such theories appear schizoid, the idea of concomitance of the two processes in time gives it some degree of coherence, though how adequate it is we may leave for the present.

3) Phenomenalistic parallelism (Identity Hypothesis A), covers the conceptions of Spinoza and Kant, who conceived mind and body as two aspects of one reality.

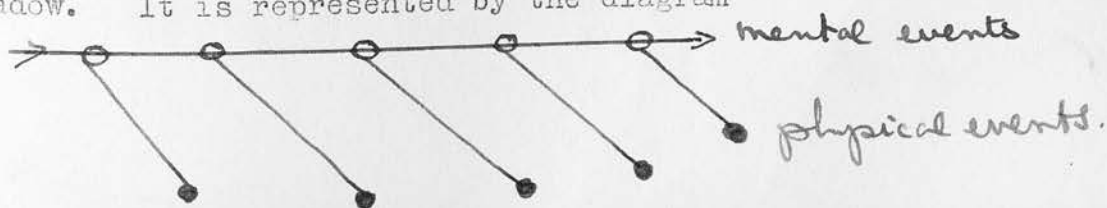


Diag. 11.

Spinoza believed that the causal links in the sequence between mental and physical events were metaphysical in nature and in his pantheistic philosophy he attributed it to God.

Both Kant and Herbert Spencer held that the nature of the connecting links were unknown, and that reality or real being, not being immediately known to us, were to be inferred from the appearances of mental and physical appearances.

4) Psychological Monism (Identity-Hypothesis B), like its predecessor is considered usually as a variant of psychophysical parallelism. This theory stands in direct contrast to that of epiphenomenalism in that while the latter postulated the priority of physical events, the former postulates the priority of consciousness, of which physical events are merely a shadow. It is represented by the diagram



Diag. 12.

Though described as idealistic Monism, it is better described as realistic or objective psychical Monism in contrast to that known as:-

5) Subjective Idealism or Solipsism, which contends that the only reality is my thought alone. A more schizoid doctrine it would be difficult to conceive, dispensing with the need for causality and best represented by the diagram.



Diag. 13.

6) In contrast also to this we may set the formulation of crude materialism, to which behaviourism is the modern equivalent.



Diag. 14.

It contends that consciousness is matter or the movement ^{of mind} is of matter.

7) To these we must add McDougall's (6) animistic conception, in support of which he adduces the names of Lotze, Bergson, James Ward, William James, Henry Sidgwick, F.H. Bradley and A.E. Taylor. He describes the soul as a being that possesses or is the sum of definite capacities for psychical activity and psycho-physical interaction, of which the most fundamental are:-

(a) the capacity of producing, in response to certain physical stimuli (the sensory processes of the brain), the whole range of sensation qualities in their whole range of intensities:

(b) the capacity of responding to certain sensation-complexes with the production of meanings, as, for example, spatial meanings:

(c) the capacity of responding to these sensations and these meanings with feelings and conation or effort, under the spur of which further meanings may be brought to consciousness in accordance with the laws of reproduction of similars and of reasoning:

(d) the capacity of reacting upon the brain processes to modify their course in a way which we cannot clearly define, but which we may provisionally conceive as a process of guidance by which streams of nervous energy may be concentrated in a way that antagonises the tendency of all physical energy to dissipation and degradation.

Although McDougall's theory may from a psychological point of view be more adequate than the others mentioned, it lacks adequate account of physiological factors and as these must form the starting-point of any adequate philosophical exposition of the soul-body relationship we must consider in greater detail.

What facts must be accounted for in the elaboration of any theory? It must take into account the following:-

1. The facts of physiology, psychology and religion, as spheres representative of activities of body, mind and spirit, and as the body of knowledge that relates each of these to the other, philosophy.

2. The principles that govern the health of the body,
the mind, the spirit and the whole as well as the
health of the body politic.
3. The sense of the metaphysical.

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CHAPTER 6

The Nature of Disease and Diathesis

If we are to speak of 'entities' in disease, these must not be the names, nor even our concepts, but the things - the thing Thompson, and the thing Wilkinson in certain phases of their being.

Sir T. C. Allbutt.

SYNOPSIS:

Disease is not something added to the body, an external agent, a germ, nor a deficiency, but in general is the result of a failure of the internal functions of the body to react with the environment.

The failure of the internal functions may show itself in congenital structural defects, inborn errors of metabolism, or in the faulty reactions seen in ordinary disease-processes.

That people differ in their response to the same stimulus is well exemplified by certain races, e.g. the Jews.

Health and disease are relative:

cf. endocrine physiology and pathology, genius and insanity and achlorhydria.

Theories of the constitution: Summation or Predominance?

Diathesis. Idiosyncrasy. Temperament.

Diathesis. In some diatheses heredity seems all important, in others, environment.

Can a diathesis be acquired?

Diatheses are innumerable and incapable of strict limitation.

Diathesis and Predestination.

What is Disease?

The mind of man seems peculiarly liable to blame the environment for all the accidents and tragedies of this mortal life, instead of seeking for some of the cause at any rate within himself. No matter whether we consider primitive man with his beliefs in animism and devil possession or we turn our attention to civilised man, we find this tendency universal. Popularly we speak of 'catching a chill', 'getting lumbago', 'picking up a germ', 'being left with eczema', a 'dose of the flu', of people who have 'got gallstones' or anaemia, or have been 'overtaken by illness', or of 'being poisoned by fish', as though disease were like a wandering lion seeking whom it may devour, a visitation, or a something added to the body. A more scientific view is that of MacDonagh (1) who writes "In my opinion there is only one disease and this is the result of the worsting of the host's protective mechanism by the invader. The host's main protective mechanism is the protein in the plasma, which is in the form of colloid particles all negatively charged. Disease is the result of the altered chemico - physical changes to which these protein particles are subjected by the invader. The action of the invader is the same, be it a physical agent, a chemical agent or a micro-organism. Hence there is only one disease.

The late Professor Dixon, (2) speaking of drug addiction, said "All this means that the drug habit is not a disease but rather a sign of pre-existing mental condition. Were it a disease, an accidental condition added to a normal person

then it should be readily curable, especially in the earlier stages". But surely, that is just what a disease is not. It is a reaction by the whole organism to endogenous and exogenous stress, and though drug addiction may not be just as much a disease as cancer, or influenza in the pathological sense, it is an unhealthy reaction of the organism to stress, just as are pathological states.

The latest advances in the theory of vitamins have led to a slight alteration of this idea, and have tended to make us believe that disease may be due more to a deficiency of external agents, rather than to an addition of noxious substances. But it is not sufficiently realised that the effects of avitaminosis are variable and that there is no absolute law which can postulate that a certain amount of deficiency may lead to a certain amount of disease. This could be illustrated by many examples, but McCarrison (3) has clearly demonstrated this. He showed that faulty diet could lead to urinary stone formation, so that out of 120 rats, 21 developed the disease. However important the diet factor is, it is not the only factor to be considered. If it were, the defective diet would lead to pathological states in 100% of cases, whereas the lesion only occurred in 17.5%. McCarrison (4) noted further, that not all the animals reacted in the same way. Some developed stone, others encrusted cystitis or pyonephrosis without stone. No explanation was offered for this discrepancy, though elsewhere the existence of individual predispositions to deficiency disease was admitted. "The quantities of vitamins necessary for the harmonious regulation of the metabolic processes vary

with the individual and his rate of metabolism." (5)

McCarrison (6) found that of 100 pigeons exposed to the same kinds of vitamin starvation, 25% flourished, 50% remained at the maintenance level, 25% went steadily downhill. (7 & 8)

A disease, therefore, is not just an accidental condition added to a normal person, nor a deficiency of some external agent, but it is a process of reaction to stress. Sir Humphry Rolleston (9) has said "A disease is not a poison, a parasite, an ulcer or a tumour, for these are causes; it is not a symptom such as pain; but it is the mental picture of the manifest reactions of a living organism in response to harmful factors, whether derived from outside the body or arising internally"; but to equate disease with a mental picture or an idea or concept is too subjective, reminding one of the Berkley^an dilemma or the paradox of Christian Science, that to exist, a thing must be perceived. Without going into detail to controvert this, we must believe in the validity of the objective approach to reality which is the foundation of the scientific method^{and} assumes rightly or wrongly that facts have an existence in their own right. That is not to deny, however, that the scientist often assumes too much, just because he is apt to forget that what he observes has some sort of subjective basis, and that his very intensity may falsify his findings, because it prevents him from seeing other relevant data. This is exemplified by a statistical study on the part played by spontaneous suggestion in the treatment of chronic pulmonary tuberculosis carried out by Louis Rénon (10). He concluded that whatever the treatment, there is the same percentage of improvement, the same percentage of cures, the same percentage of arrests, the same percentage of cases in

which the patient grows worse. He concludes "the most renowned phthisiotherapeutists are those who have great personal influence over their patients; those who have thoroughly entered into the patient's mind and feelings, those who as it were hold the patient in the hollow of their hand; those who guide the patient in accordance with the latest principles of the struggle against tuberculosis, and have grasped all the resources available for that struggle; those who can reinforce their medication with a strong dose of suggestion."

We are on safer ground if we do not divorce the word "disease" too much from current scientific usage. It is much more in accordance with our use of the word to say that it is "the manifest reactions of a living organism in response to harmful factors, whether derived from outside the body or arising internally." The basis of a study of diathesis must be in the interaction of internal processes with environmental stress. The workings of such processes are found in congenital structural defects, such as cleft palate, certain kinds of congenital heart disease, and other developmental abnormalities, "inborn errors of metabolism" and in all sorts of other general conditions to be considered later.

Individuals differ in the way they react to the same stimulus. A violent explosion may cause syncope in one person, shell shock or hysteria in another, or exophthalmic goitre in another. This differing reaction to pathogenic stimuli is admirably illustrated by the peculiar race-susceptibility of the Jews to various diseases. It is well known that the Jews are liable to diabetes mellitus, to such disturbances of fat mell

metabolism as Gaucher's and Niemann's diseases, to retinitis pigmentosa, thrombo-anglitis obliterans and amaurotic family idiocy. When these diseases do occur in Gentiles the manifestations are less severe, and do not come on so early in life, indicating that the inborn tendency is more powerful in the Hebrew race. A. Sourasky (11) has pointed out how much more liable are the Jews than non-Jews to visual defects, giving a ratio of 43.2 % to 21.7%. Racial characteristics are here associated with special disease-predispositions.

Keith (12) contends that the human races have evolved according to the predominance of one or other of the endocrine glands, and that the European Jew, and Caucasian owe many of their characteristics to pituitary preponderance. We see the effect of such preponderance in the Jewish race especially, with the massive jaws, and face and long prominent nose and well defined elongated chin. But not only is that true, but the Jew is also said to be more liable to acromegaly than members of other races. It is probable therefore that here the anterior pituitary is well developed and that this is responsible for many of the racial peculiarities of build and also of disease-liability, so that what are considered normal characteristics may have a trend disease-wards.

We can illustrate that by the individual peculiarities of mind. Kretschmer (13) has indicated that the outstanding psychological traits of the insane are just exaggerations of normal processes and that in genius these same qualities take a special turn which allow the individual to achieve greatness, although not infrequently they may develop into the pathological.

Galton (14) and Lombroso (15) also showed that genius is often associated with the pathological states of criminality, insanity, extreme sexual vice and other morbid conditions.

Charlotte Bronte's brother, Patrick, went altogether astray and became a grief to the family, although he was perhaps the greatest natural genius of them all. The sister of Charles Lamb murdered her mother in a fit of insanity, but was later described as strong in intellect, and joint authoress of many pieces with her brother, while Cowper the poet had "a morbid constitutional timidity in youth, and insanity with religious terrors hung over his later life. It almost seems as though health might be a form of mediocrity while disease and genius represent biphasic deviations from this, but that is only relevant to certain phases of development. It is true that exceptional talent is liable to be associated with unusual forms of conduct, but that is more because the individual is unable to assimilate the events that make up his intrapsychic life, than because of any direct relationship between genius and madness. Many of the phenomena of insanity are due either to the extraversion of what should be introverted, or the inability to extravert what is introverted, and the brilliance of genius springs from introversion.

Health therefore is not a stationary condition, but a process of flux, not static but dynamic. It is a relative state, defined by Allbutt (16) as an oscillation about an ideal axis, while disease would seem to be marked disequilibrium. The delimitation of health and disease is therefore not definite. Some people would term mild deflections from the ideal as

inconsistent with health, while others would hold that such a view implies that none of us have health because not one of us is perfect or ideal. For example, Bennett and Ryle (17) speak of 4% of normal individuals as having an achylia gastrica, and as these were symptomless, the commonly accepted use of the word "normal" would seem justified. Davidson and Gulland (18)

however, challenge this, because the achlorhydria renders such individuals liable to more definite disease in the future. Parkes Weber (19) defines ^{disease} it as "any deviation, whether obvious or latent, from what is believed to be the normal average condition in appearance, structure or function, of sufficient degree to cause considerable pain or trouble or hindrance in pursuing the ordinary objects of life. Disease therefore is a matter of degree: the boundary line is to be arbitrarily decided by man" "In appearance" includes albinos, leucoderma, ^{and} vitiligo because it is a hindrance to sexual selection. That disease is due to lack of poise or to a maladjustment is well brought ^{out} by Draper (20), who defines it as the "expression of the reaction between a complex set of external agents and an equally complex organism striving to survive in the midst of them. The capacity of an individual to react with, or not to react with, a particular external agent or menace is a constitutional quality (modified, it is true, to a varying extent by environmental influence), which is just as specific a quality as body size and conformation, function or gesture or psychic pattern."

Among workers studying these internal factors which so profoundly affect the "face of disease," the word "constitution" is frequently occurring. Draper means by it "that aggregate of hereditary characters, influenced more or less by environment, which determines the individual's reaction, successful or

unsuccessful, to the stress of environment." We begin life (a) with certain inherited characteristics - the result of the past, the genotypic or idiotypic influences - and are assailed by (b) various environmental or paratypic influences, such as bacteria, overeating, unbalanced diet, malnutrition, alcohol, nicotine, adverse climatic conditions, and events giving rise to fear and worry, the effect of the present, which react with one another to make us both what we are now (c) the Phenotype, and what we are going to be, though we may be able to modify our environment and its effects, by the conscious exercise of our minds and wills. The phenotype may be considered from the fourfold aspect of (a) morphology (b) physiology (c) psychology and (d) immunity.

In Draper's mind the constitution depends upon an aggregate - upon a process of addition giving a general kind of result. This is similar to Martius' (21) idea, that it is the sum of local characteristics of the separate organs that determines the type of the general constitution. Garrod (22) more definitely expresses it as "the sum of all his qualities, his bodily form, the structure of his tissues, his coloration, height, ^ewight, blood pressure and body temperature; as well as his mental and moral qualities, functional processes, and tricks of gesture and action. Rostan (23) in 1822 formulated his point of view as to the nature of the constitution at some length. "It is rare for a perfect balance to exist in all the systems of the animal economy. This complete harmony has perhaps never existed outside the imagination of the ancients. One system nearly always appears to predominate

over all the rest. Accordingly it is easy to conceive that the dominance of one apparatus should imprint an important modification upon our physical and moral constitution.

"In fact the various systems that we have recognised as entering into the make-up of the human body, and the fluids that form part of it, are not always found in such a relation as to produce a perfect balance. Sometimes we have a predominance of the gastro-intestinal apparatus, and from this we have a particular type of organisation. In other cases the respiratory and circulatory organs predominate, from which again we have a new constitution; or the apparatus of locomotion takes the lead, or the neural, or the reproductive &c. We believe that it is the predominance of one or another system that gives its stamp to the various organic constitutions, which are as numerous as the systems themselves, and which differ according to their infinite possibilities of combination. This factor accounts sufficiently for the innumerable varieties of temperament which nature offers us for observation".

Dr. Giovanni (24) also supported this view.

Faber (25) reconciled these different views somewhat by defining the constitution as the nature of the body, which includes such inherent properties as anatomical structure, morphological composition, as well as the functioning properties of separate organs and cells. In other words, it is made up of an important morphological element, together with the aggregate or the sum of the characteristics of the separate organs and tissues. Pende (26) also correlated these two conceptions by suggesting that there is a dominant influence at work in the body-

generally an endocrine factor- but that the contribution made by the other systems plays an important part in the final result. He finally defined it as "the morphological, physiological and psychological resultant (variable in each individual) of the properties of all the cellular and humoral elements of the body, and of the combination of these in a special cellular state having a balance and functional output of its own, a given capacity for adaptation and a mode of reaction to its environmental stimuli. Such a resultant is determined primarily by the laws of heredity and secondarily by the disturbing influences exercised by the environment upon the individual's hereditary plan of organisation". One part of the constitution is temperament, which in Pende's definition is "regarded as the dominant psychophysiological note in a given individual, due to the predominance or deficiency of a function, and especially of a humoral state in the general dynamic balance", for just as the Pende school consider that one disproportion is responsible for the special morphological characteristics, so the temperament which is the psychobiological aspect of the constitution, is marked by one outstanding quality.

This is quite a different use of the word, from that employed by Jonathan Hutchinson (27) when he defined it as "the sum of the physical peculiarities of an individual, exclusive of all definite tendencies to disease. The temperament gives some degree of peculiarity to the morbid processes when such have been induced by other causes, but they do not in themselves involve any special proclivity. "Pende's use of the word is certainly more in line with our modern custom, while Hutchinson

used the word to mark the first stage in a process, which, if a disease proclivity becomes superadded, deserves the stronger word "diathesis", while a third stage in the process he called "idiosyncrasy" which is a "diathesis developed", intensified and specialised by hereditary transmission; "it is individuality run mad!"

Rolleston (28) defined idiosyncrasy more qualitatively as "an abnormal reaction in an otherwise normal person, which may be either on the one hand greatly exaggerated, or on the other hand greatly diminished; more briefly it may be described as an unusual physiological personal equation." It includes functional aberrations as distinct from definite organic defects, but as we shall be considering these in more detail subsequently, we shall devote the remainder of this chapter more strictly to the nature of diathesis.

While Jonathan Hutchinson spoke of diathesis as being a proclivity - a tendency - he defined it more exactly as "any bodily condition however induced, in virtue of which, the individual is through a long period or usually through the whole life, prone to suffer from some peculiar type of disease. Some diatheses are inherited, others acquired. Of some, the effects are permanent or constant, of others, they are transitory, or recurrent after intervals of health. The word should never be used if it is expected to pass away and leave no trace, for the idea of persistency in some sense is always implied." It is quite clear from the study of Hutchinson's book that at one time the phrase "bodily condition" meant one of prolonged peculiarity of health, giving proclivity to definite forms of disease, at other times it was a disease that lasted a lifetime, sometimes active, sometimes latent, and usually a proclivity capable of being

handed on to another generation. He classified the causes of diathesis as (1) climate, responsible for malaria and bronchoceles among cretins, (2) diet, errors of which produced gout, leprosy, scrofula and rickets, (3) senility and (4) heredity. It was evident in Hutchinson's mind that external agents caused diatheses, for according to him the leprosy diathesis was due to eating bad fish, and the tropical climate was responsible for the malarial diathesis, also that actual disease-states may be diatheses. This same idea was held by the French writers, of whom Trousseau (29) described syphilis as fulfilling all the requirements of the definition of diathesis.

Bazin (30) diverged from his compatriots in separating from the diatheses "the seven constitutional maladies; scrofula syphilis, arthritis, leprosy, herpes, scurvy and rickets." They were differentiated because there could be found in each case a collection of morbid products. He still left open however a large field for the diathesis which included inflammations, "homomorphic diathesis" (haemorrhagic, serous, calcareous, saccharic, fatty, fibrous and cartilaginous) and "heteromorphic diathesis" (fibroplastic, tuberculous, fungoid, epitheliomatous and cancerous). But no one else accepted his classification for its arbitrary nature was self evident.

In Germany the word is used in a much more limited way, as when His (31) spoke of diathesis as being "an individual, inborn and often inherited state, in virtue of which physiological stimuli produce abnormal reactions; and conditions of life which are harmless to the majority of members of the race bring about morbid states."

This is very similar to the definition just given of idiosyncrasy.

More recently, Pende (32) has also conveyed the idea that a diathesis is a condition which has almost developed into a disease. "By this term, which etymologically signifies disposition, we mean certain anomalous or morbid temperaments" (departing from the use of the word as he previously defined it), "which no longer belong within the confines of the normal variability of temperaments, but already begin to represent partial disease conditions. They may be distinguished by the fact that physiological stimuli, such as foods, develop abnormal or truly pathological reactions in the diathetic individuals, and that conditions of life that are borne by the majority of individuals without injury (for instance, sunlight) produce morbid states in these subjects. Hence the concept of diathesis enters into the larger concept of constitution, particularly of constitution so seriously anomalous that even ordinary exogenous stimuli may cause special forms of disease to breed upon diathetic soil. But in ^{the} practical application of the diathetic concept, we often speak of diathesis when we have already entered the domains of diathetic disease".

Bearing in mind Allbutt's definition of health as an oscillation about an ideal axis, or as a condition of poise, it appears that those who accept Hutchinson's explanation of diathesis, give it a meaning ranging from slight disturbances of poise to very serious states of disequilibrium. Other modern writers, however, do not accept so wide an interpretation. Hurst (53) considers it as being made up of those "inborn and often inherited characteristics which make an individual liable to react to physical, chemical or psychological stimuli in such a manner that a condition of disease

results, while Ryle (34) more fully states that "diathesis is a transmissible variation in the structure or function of tissues rendering them peculiarly liable to react in a certain way to certain extrinsic stimuli. But not all who acquire the disease have the diathesis, but those who have the diathesis are more likely to acquire the disease than those who have not."

Crew (35) has defined the word rather from the standpoint of a geneticist than that of a clinician. "Diathesis may be defined as the different physiological characteristics corresponding to the different genotypes conditioned in their expression by environmental agencies, which determine the individual's reaction successful or unsuccessful to the stresses of the act of living."

The modern conceptions all include the influence of environment on the inborn hereditary qualities, yet we find that in some conditions the influence of environment is ^{minimal}, while ⁱⁿ others it may have to be very powerful before the diathesis gives place to disease. Of examples of the former we may give hereditary optic atrophy or Leber's Disease. (See Julia Bell) (36) In the present state of our knowledge we know of no environmental factors which seem liable to evoke this disease in those who are predisposed. Although a few patients may ascribe their condition to cold, worry or fright, by far the greatest number are unable to provide any reason for the first manifestation of the condition. In spite of the search for toxin there is no definite evidence that this is an important etiological factor, while Nettleship (37) considers that in some infants the disease-process starts before birth. There are other conditions which illustrate the all-important part of heredity, and suggest that the environmental factor is

for them unimportant, such as congenital colour-blindness, the dystrophies, the hereditary ataxias, dystrophia myotonica, myotonia muscular/congenita, haemophilia (though the disease is not usually diagnosed unless the environmental factor of slight trauma is operative), and the inborn errors of metabolism.

There are some diseases, therefore, in which a definite diathesis is present for some time before actual pathological processes are manifest, and which seem to become active without provocation. Environmental factors are here minimal. But there appear to be all grades between such diseases and those in which strong environmental influences are necessary before lesions become apparent. Although in such severe fevers as glanders, hydrophobia and tetanus, or in the parasitic affections such as hydatid or taenia solium, or in injuries from physical violence resulting in fractures, the exogenous agents are paramount, yet even the exact form of tissue response will depend to some extent on heredity. Further, the malarial treatment of general paralysis has shown us how varied is the resistance to the parasite. Some patients seem to contract the disease with difficulty, while others respond fairly quickly and violently. We may consider alcohol an external pathogenic cause, yet whether the lesion resulting is hepatic cirrhosis, myocarditis, peripheral neuritis, Korsakow's syndrome or delirium tremens is largely dependent on endogenous processes.

Jonathan Hutchinson explicitly stated that some diathesis^e were inherited, and others acquired. He apparently did not doubt that the environment might in itself be responsible for the development of a diathesis. In our modern definitions, however, emphasis is placed on both heredity and environment, so that we need to ask ourselves if a diathesis can be acquired. The sequelae of gastro-

jejunostomy, such as achlorhydria, megalocytic and non megalocytic anaemia, in people who have had ulcers, give additional point to this question. It seems obvious that an external event— an operation—produces a diathesis which may take many years to lead to disability and that this state is definitely acquired. Hurst (38 & 39) has reported 5 cases of pernicious anaemia which developed after gastrectomy, and one case after gastro - enterostomy for duodenal ulcer, while hundreds of people have had these operations without suffering from any form of anaemia. It is therefore apparent that these similar operations had different effects on the tissues because the hereditary predispositions were different. In other words, an acquired condition had activated a very latent diathetic state.

Circumstances of a similar order are indicated by Stockard (40) by observations of a different nature. He has stated that though hereditary type is transmitted, the expression or development depends on numerous environmental influences, and that although a feature may be definitely inherited, it may never be developed or expressed, just as the seabright bantam cock inherits the male plumage but is unable to develop such plumage until his testicles are removed. Similarly, he says, there are two types occurring among all men, but some races show a great majority of one type, and only a few of the other, while the actual ancestry may have been closely similar. He suggests that the linears ("long-thins") are generally found along coastal planes where the iodine in the environment leads to a preponderant secretion of thyroid, and that the laterals ("short-thicks") are found in continental countries where the iodine is less in amount.

In that view, then, a diathesis may be acquired, but only because there is in the germ plasm an inherent and inherited tendency, not strongly, but sufficiently developed, to allow the tissues to react to strong environmental influences. In fact, there ^{may} be two inherited qualities of opposite tendency lying side by side in the same individual, so that the ultimate issue depends upon the relative preponderance in the environment of agents favourable to one or other of those tendencies. In some cases, indeed, these two opposing tendencies may exert themselves at different periods of life, as for instance where hyperthyroidism is followed by thyroid exhaustion and hypothyroidism.

It is sometimes considered that certain diatheses are antagonistic, (See Ibotson) (41) that tuberculosis and gout, for example cannot co-exist. Similarly one might imagine an antithesis between pernicious anaemia and duodenal ulcer because one is causally related to achlorhydria, and the other to hyperchlorhydria, yet Davidson's case (42) where both conditions were found in the same person, and Hurst's cases ^{where} ~~where~~ ulcer was followed by operation and pernicious anaemia suggest that both tendencies may reside in the same individual, the one much more likely than the other to eventuate in disease, and both exceedingly unlikely to evolve simultaneously, but with possibilities of development in both cases given favourable conditions.

Allied to this is the question as to whether predisposition and resistance are hereditary qualities as such, or whether it is not more likely that all degrees between the two extremes are transmitted. It would appear therefore that in some people the forces of heredity have resulted in an organism peculiarly vulnerable to certain

influences and that in others these forces are much less marked, but through very adverse conditions arising from the environment, these latter may eventually suffer from diseases in which heredity usually plays a large part. For example, it is likely that people's resistance to tuberculosis varies enormously and is related to heredity, but the strongest resistance may give place to predisposition if the conditions are adverse enough.

The qualities of resistance and predisposition therefore are not absolute, but purely relative, and the same applies to diathesis. It is important to recognise this, because there is no other logical conception which can explain all the phenomena. Although we may admit for practical purposes, that when we speak of diathesis we usually imply that the hereditary tendencies are well-marked, and that the stimulus necessary to provoke the disease is not excessive, strictly we could not say with Ryle that "not all who acquire the disease have the diathesis." The conception of stimulus and response is a helpful one here, for wherever we find a minimal stimulus producing a well-marked response in the form of disease we are justified in looking for ^{the} manifestations of diathesis.

The earlier clinicians tried to enumerate the different varieties as we saw in the last chapter, while Pende (43) has distinguished 6 principal diatheses; (1) arthritic, (2) neuro-endocrinopathic, (3) psychopathic, (4) heredo-syphilitic, (5) heredo-tuberculous and (6) heredo-neoplastic. It is difficult to see why that special combination should be selected, for it is obvious that he does not consider that he has submitted a full list, as the index of his book mentions 25 diatheses. In general usage the term therefore cannot be restricted and limited to a compact group.

It is evident that there are very many diatheses in all of us, some waxing, some waning and some stationary, that there are many degrees of deflection from the normal, that some diatheses are activated by very slight stimuli while in others a very much greater stimulus is needed. This is well exemplified by the asthmatic. Some people go through life having had only one attack, while others seem to spend the greater part of their life in paroxysm after paroxysm. Similarly it is well known that one's liability to the zymotic diseases decreases with advancing years, although the sporadic cases in adults suggest that this immunity again is only relative.

In spite of the relativity of diathesis, however, we must not let that blind us to the fact that there are innumerable qualities to be found out about predisposition to disease which give absolute ground for its validity. In the present state of our knowledge we use the method of induction, by which we collect and systematise data from many cases of fully developed disease, so that we may distinguish the signs of diathesis from those of disease. It will be apparent that this is not without difficulty because we tend to "speak of diathesis when we have already entered the domains of diathetic disease".

The problem of diathesis brings us to the border-land between medicine and theology, as well as to the realms of psychology, metaphysics and philosophy, for it raises the oft-asked question as to man's freedom. Is disease a fate to which we are predestined as Langdon-Brown (44) suggests, or is there any part we may play to escape our diathetic trends? The whole question is full of interest and ^{reminds us that} brings the field of medicine ^{belongs to} ~~into the realm~~ ^{as well as to the sciences} of the arts where no doubt ~~it~~ should belong more frequently.

It is interesting to note however that whereas present-day theology seems to have forsaken the conception of predestination, modern medicine with its scientific emphasis on the law of cause and effect is giving us new ground for re-believing this old doctrine, and the operation of the principle of diathesis illustrated it supremely well. Where then is the place for the operation of the will? As far back as 1908 Dyce Duckworth (45) stated that "it is possible to be scrofulous throughout life without becoming rheumatic or gouty in any classical form of these maladies." The study of diathesis leads us to look out for the premonitory signs of a disease-trend. These may be suggested by a knowledge of the hereditary history, by the anatomical peculiarities of the individual or by some disturbance of physiological function, such as an unusual fractional gastric analysis, or an abnormal response to food, or by some faulty psychological adjustment to life and its problems, or lastly by some indications that the individual's reaction to organisms may or may not be sufficiently strong to ward off disease, as for example by the Schick and Dick tests, or by a bad family history. The belief in predestination however does not imply absolute impotence, but only that these are limits to our powers. We are not gods that we can stem the tide of every disease - process, nor mere automata that we are carried along blindly by the cosmic forces at work in the universe. There is a middle position where we are able to assess our own powers at their proper value, where we neither think too much nor too little of what we can do, and the greater reconciliation of psychiatry with general medicine will enable us to have greater insight into

the nature of disease and enlarge the scope of what may be done for the ailing population. In general we may say that certain attitudes to life predispose to certain tissue-reactions, and that when these are sustained over a long period of time these tissue reactions will eventuate in frank disease, and that there are few disease-entities which cannot eventually be modified by a willingness on the part of the patient to re-consider his attitudes to life. One can believe all this without denying the validity of the deterministic point of view and our enlarged insight will make us more able to stem the tide of disease, with the realistic hope that there is more to know than is yet known. The physician who seeks to be as complete in himself as it is possible to be, must have become aware of his own disease-trends as these are reflected in his attitudes to his work, his family, his own frustrations, his love-life, his pathological reactions through organ - inferiorities, as well as his more general inferiority reactions. But in addition to this, he must not be blind to the pathological influences at work in bad industrial, housing or other environmental conditions. Towards the inherent properties the physician must ever keep a watchful eye, and at the same time look out for influences at work in the environment which might exercise a deleterious effect on a constitution known to have its weak points of attack. Our task therefore, is not to watch the workings out of a relentless Nemesis leading its poor victim by the path we have observed others go before, to his doom, while we stand by, powerless to help; it is not ours to view the spectacle of heredity and environment coming to grips on the stage of time, so that what is predestined may be enacted merely, in the

but by the exercise of voluntary conscious control to play our part in the act-predetermined, maybe, but none the less cogent and apt, or perhaps one should say, all the more cogent and apt.

By the study of the susceptibilities of our patients , helped by a survey of previous generations, we shall in time be really in a position to stay what Sir Francis Galton (46) steady and pitiless march of the hidden weaknesses in our has designated "the/constitutions through illness to death," because we have learnt how to make weakness, strength, and how to turn insanity into genius, for diathesis is potentiality and latency.

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Chapter. 7.

DIATHESIS AND PSYCHOLOGY.

"The... and the surrounding conditions of society, and with the... must the responsibility be pushed backward. The... are responsible; the unwilling teacher, and not the misbehaving... should be blamed; society, and not the criminal, is... To take it in its most general meaning, the... with their general laws, and not the... are the fools."

Münsterberg. (quoted by J.A. Thomson.

Hereditry. p. 206.)

"The fault, dear Brutus, is not in our stars,
But in ourselves, that we are undeclared."

Julius Caesar. Act I. Sc. 2.

"It is the stars,

That govern us; above us, govern our conditions;
None one will note and note could not forget
Such different legends."

King Lear. Act IV. Sc. 11.

"The causes refer to our ancestors, our teachers, and the surrounding conditions of society, and with the causes must the responsibility be pushed backwards. The unhealthy parents, and not the immoral children, are responsible; the unfitted teacher, and not the misbehaving pupil, should be blamed; society, and not the criminal, is guilty. To take it in its most general meaning, the cosmical elements with their general laws, and not we single mortals, are the fools."

Münsterburg. (quoted by J.A. Thomson.
Heredity. p.506.)

"The fault, dear Brutus, is not in our stars,
But in ourselves, that we are underlings."

Julius Caesar. Act I. Sc.ii.

"It is the stars,
The stars above us, govern our conditions;
Else one self mate and mate could not beget
Such different issues."

King Lear. Act.IV. Sc.iii.

Synopsis.

Our reaction to disease is a diathesis.

In Adler's view, disease arises because we try to mould reality to a false pattern ~~to a false pattern.~~

We imagine ourselves to be stronger than we really are.

We fail to accept responsibility for the interpretation of the symbolic in life, and project our responsibility for getting well on to the physician.

Of other important psychological factors, the place of intuition and the recognition of future eventuality deserve special notice.

It is slowly being realised by the profession that the mind is closely inter-related to the body and that the body reacts with the mind. The principle of psychosomatic unity is not really questioned, though the mode of its inter-action is still far from certain.

Psycho-analytic contributions are of value to medicine (we are not here concerned with its value to other arts or sciences) only in so far as they answer these questions:- 1) Do they help us to understand the psychoses ? 2) Do they help us to understand the psychoneuroses ? 3) Do they help us to understand the whole field of organic disease ?

It is worth realising, I think, that our reaction to disease as doctor or patient constitutes a diathesis. Mr. Punch once classified the profession into 'wind-uppers' and 'pooh-poochers', and within these categories no doubt we can classify very many of our colleagues if not ourselves! Rolleston (1) made room in his definition of 'idiosyncrasy' for abnormal reactions of body or mind, and included under this group such unexpected reactions that do not upset the average person. Accordingly two groups of psychological idiosyncrasies are defined: 1) in which an abnormal insensitiveness to mental stimuli is apparent, as e.g. in 'thick-skinned' individuals who are not morbidly selfish or conceited, and 2) in which a greatly exaggerated sensitiveness is found, with unusual antipathies or sympathies, as e.g. the clergyman who fainted whenever a

certain verse in Jeremiah was read, the men who fainted at the mention of a surgical operation, or the 'natural hydrophobiacs' who from hereditary peculiarity dislike fluids so much that even when feverish they refrain from drinking.

The older clinicians without knowing anything about the jargon of modern psychology have always attached great importance to the mental characteristics of the various types described, thus Hippocrates (2) noted that those who lived in cities exposed to cold winds have "heads that are sound and hard. Such people are liable to be rather long-lived. In disposition they are rather ferocious than gentle!" "Those living in cities exposed to winds between the summer and winter rising of the sun have clear voices and in temper and intellect are superior to those which are exposed to the north". It would be quite absurd, of course, to assume that there was in these observations anything of intrinsic significance for us today, but it is of value to note that correlations of this kind were noted.

Laycock (3) devoted some attention to the psychological features concerned in diathesis and temperament. Thus he described William Hunter as a well-marked example of the nervous temperament, and of a gouty diathesis: He was smart, dapper and had small features. In character as well as in his habits he was active and had a great power of continuous mental labour.

He described the John Bull type of person as a typical Anglo-Saxon, of sanguine temperament, active, of stolid temper and with solidity of action, though somewhat

phlegmatic. Predisposed to gouty and rheumatic diseases, he had a pretty well-developed figure, capacious cranium, big-gish nose, broad chin and cheeks, massy well-set teeth and was ruddy in complexion. John Arbuthnot (1667 - 1735), the originator of John Bull, lived in a much earlier age than Laycock, and was a court physician. In a political skit he wrote "Bull in the main was an honest, plain-dealing fellow, choleric, bold and of a very inconstant nature".

The comprehensive work of Kretschmer (4) on "Physique and Character" will be discussed at length later but it is necessary to consider here now not so much how the extremes of mental instability found in the psychoses may be correlated with physical factors, but rather to note the kind of assumptions that underlie present-day psychotherapeutic practice.

Of the psycho-analytic schools it is Adler (5) who is the most helpful in bridging the gulf between mental events and somatic reactions, by showing that the sense of inferiority resident in any particular organ leads to a process of "compensation through the nervous system". Whether his fundamental viewpoint that "the realisation of somatic inferiority by the individual becomes for him a permanent impelling force for the development of his psyche," is quite as universally true as he would have us believe, is, I think, open to quite severe criticism, but as one way in which 'local weakness' may lead on the one hand to over-compensation of tissue reactions through neuro-humeral mechanisms, and on the other to a definite

purposive direction of the personality to some imagined goal to compensate for his weakness and inferiority, it is unquestionably true. From his approach, then, Adler would say that disease tends to develop, in general, because the individual is trying to mould reality into a false pattern, instead of being willing to accept reality at its own value and letting the interplay of personal and impersonal factors harmonise themselves. If Adler's view were universally correct it would imply that every neurosis is an obsession; the guiding fiction in every neurosis is "I wish to be a complete man", and the ideal that I have set myself is one to which I must attain. It is really a confusion of end with means, for it seeks to attain perfection, in the sense of the ideal, without first being reconciled to the imperfect and the unideal.

But there seems to be a much more commonly applicable way in which the principle of inferiority is operative: and that is in the use of the body to obtain compensation for more general personal inferiority. In other words, as well as the much-cited instance of Demosthenes the stammerer becoming an eloquent orator, there is on the other hand, the more common instance where the body is used to take physical strains and stresses for which it is not really adapted in order to gratify the innate vanity - that of imagined strength - which is part of the lot of our common humanity.

There are very few diseases in common practice where this is not a very important factor, and it includes

such different conditions as varicose ulcers of the leg, 'effort syndrome', rheumatism in many of its forms, neuritis, constipation, Parkinsonism whether as a sequel to epidemic encephalitis or as found in paralysis agitans. And the validity of the principles of rest and relaxation in the treatment of so many different diseases offers widespread confirmation of its truth. It is in the special branches of the healing art where this is just not recognised, and large sections of the suffering public are confirmed in their neurotic attitudes by the kind of treatment they receive by the specialist.

The emergence of the neurotic attitude in the patient with its counterpart in the physician, takes place under the pressure of uncertainty, which tends to become personified or fixed into a definite physical ailment because the individual fails to see in his symptoms a significance which is symbolic of an underlying attitude.

There is no chronic disease which has not something to teach the patient, and to that extent one can see a sense in which all disease may be unconsciously motivated. The macrocosm is mirrored in the microcosm: any future event that happens to me has its counterpart in me now, and though these may be beyond the scope of my active will, yet in an analytical sense, we can speak of one being motivated by the other. The analysts frequently fail to realise that the problem of responsibility is far more a metaphysical one than a personal; far more concerned with the structure of the cosmos, than with what may be considered intrapsychic,

but there is of course a relationship between these two extremes, the responsibility for the discovery of which must rest with the patient.

It is none the less quite wrong, I believe, to attribute disease in general to a wish to be ill, which is what so many psychotherapists do, though it is not unlikely that 'sub specie aeternitatis' all disease may ultimately enrich personality. There is a tremendous difference between believing that disease is inevitable because we are made as we are and because all our experience is necessary for us, and thinking that self-^{knowledge} obviates ill-health. There are two quite separate attitudes that have to be reconciled to each other; that on the one hand which through analysis of experience and its re-interpretation to the individual can see some sort of unity in experience, and that on the other hand which makes no judgment as to personal responsibility for illness, just because it takes no cognisance of unconscious motives. It seems to me that as representing the psychotherapeutic attitude and that of the general physician respectively, each point of view is only partially true, and that not until the physician is willing both to be a psychotherapist and a general practitioner will he be able to practise the real art of healing, in the sense of bringing wholeness to the personality. There is no attitude more schizophrenic than that which sees disease only as something to be alleviated, but not to be understood in terms of personal responsibility, or on the other hand, that attitude of the psychotherapist, who considers that his

domain is not with the body at all. It is admitted that one cannot take on oneself the full responsibility for treating the whole field of disease, but only of finding some sort of holistic attitude to disease, will the physician find his true partiality. The less and less knowledge about more and more of the general practitioner is after all a much more satisfactory one than the more and more knowledge about less and less of the specialist, but it is not impossible to see some sort of reconciliation between these two attitudes. The one represents a much more artistic view of life, and the other a scientific, and we need reminding of the danger of the paranoid attitude of the merely scientific doctor, as well as to note the trifling dilettantism of many general practitioners.

Our diatheses are in some way or other closely related to the ways in which we live. There is no problem of clinical endocrinology, of clinical psychiatry or clinical medicine in general which as far as the patient is concerned is not fundamentally related to the central questions "How does this person live?" and "What is his tacit philosophy?" Medicine seems a long way yet from realising its relationship with philosophy and metaphysics, but in the bridging of the gulf between science and art there is the knowledge and insight brought to us by psycho-analysts, as long as we mean by that:- 1) the evaluation of motives, 2) the re-orientation in a world of real values and 3) the reconciliation of the patient both with his ideal self and

his base self.

Although one cannot deny the very real contribution which Freud has made to psycho-analysis, there is very little of his philosophy which needs to come into the immediate purview of this present discourse, not because Freud has nothing of validity to say, or because what he says is not in the main true, but rather because he denies the validity of the metaphysical and assumes that the explanations that he makes of necessity explain away much that others would accept as perfectly valid.

It is in our failure to accept the irrational without too much questioning, that we display most of all our fundamental paranoid trends, because emotional values are not strictly expressible in rational terms. The things that are best understood may be the most difficult things to express in adequate language, and when we are dealing with such mysteries as the healing art, in spite of all our scientific explanations as to cause and effect, there are tremendous presuppositions involved which would occupy much philosophical speculation if it were all to be examined critically.

And this applies just as much to psychotherapy as to organic remedies. Nothing is more baffling for me than to understand rationally just why and when a person gets better, and if I knew all about the intricacies of pharmacology, pathology and psychology, I should still be unable to offer any really adequate explanation, beyond the mere generalisation that time heals everything. This is not to deny the real place of scientific therapy in all its many

different forms, or for that matter of empiricism, which has its validity also, but rather to indicate the need for some sort of perspective in a 4-dimensional world of space-time, where both organism and environment are changing, and acting and reacting.

Returning to Adler's statement of the problem of the neuroses, there is no inferiority without some sort of compensation and this can be so far beyond the scope of the will as the sort of natural compensation that comes about after one kidney has been removed, or after complete gastrectomy. We are inclined to make one of two opposite mistakes, either to assume that the metaphysical reality underlying the vis medicatrix naturae is so incalculable as to preclude the reckoning of it as a dependable factor, or else to assume a purely materialistic outlook and explain our medicine within the strict limitations of its own bias; but it is not impossible to be both a philosopher and a scientist, or to be a metaphysician as well as a physician. It is our primary need to be content to go just at nature's speed, watching action and reaction, relieving inferiority wherever this seems inherently incapable of correcting itself, but being so acutely sensible that we become extremely reluctant to commit our patients to such extirpation expedients as make the natural law of balance almost irremediable. It is not necessary to specify just how this is done throughout the whole field of operative surgery, but it is necessary to become aware of the fact that would we take the trouble to learn the inner meaning of

symptoms we should be much less eager to do the urgent and radical thing we so often deem necessary.

It is, of course, very evident that what we can do for our patients depends upon 1) our own insight into the symbolism of symptoms as well as on the empirical ways open to us of relieving these symptoms, 2) the patient's own measure of response to the values implicit in our own philosophical orientation. It is necessary to emphasise that whether we know it or not, our effectiveness as healers rests primarily on underlying philosophical assumptions. The best surgeon is not the best technician, not the most academic, but the one with a real reverence for human life, and the most competent physician is not the one most up-to-date in recent advances, but the one with a real sense of responsibility for the patient's fullest welfare. I do not believe that these things are really open to serious question, though I can well believe that in bridging the gulf between being a mere empiricist, whether as a thorough-going scientist, or a general practitioner, or accomplished surgeon, and being philosophically mature in any full sense, all sorts of pitfalls may be encountered which threaten not only technique but also one's very sanity. How to avoid these, is of course a question for the expert to meet as they crop up in experience, but not until they have been met adequately can the arduous way be completed.

It is of supreme importance for psychiatry that more of those with this kind of philosophical maturity should be entrusted with the responsibility for treating

the insane, and it is pitiable for British psychiatry that this sort of leadership is so frequently lacking. The metaphysicians are suspect not merely with the traditional psychiatrists but just as much by his supposedly more enlightened colleague, the psychotherapist. The open mind is the first requisite for real understanding of the psychoses, but it is not as common as one would expect either among the medical officers of the mental hospital or among the scientifically minded physicians.

Now what is the relevance of all this to the problem of diathesis? It is of very real importance for us to know that the fullest kind of maturity brings us out of the limitations of a 3-dimensional world into a space-time continuum where the whole problem of physical, emotional and mental health assumes a quite different sort of problem from the orthodox approach of general medicine or traditional psychiatry. There is no chronic disorder, including even permanent deformities, which may not eventually prove to be an enrichment of personality. Our diatheses are both potential weakness and inadequacy with potential compensations. It is in the reconciliation of the self with its own limitations that constitutes one of the biggest advances towards psychological maturity. There is no need to affirm that this is the most difficult task the chronic invalid has to do. It is so often beyond his powers to see any relevance in his invalidism for his own real benefit, and having seen that possibility, it is still very difficult for him to allow himself to take the

next step into the 'Unconscious', with its threatening taunts, and complete insecurity. No sane person would take the step lightly, but the chronic invalid has for so long run away from this hazard that he is likely to react with violent extremes to its full impact, allowing himself to be drawn into what is at one time volcanic in its outbursts, and at another like a maelstrom in its power to drag down and immerse.

No psychiatrist can understand the volcanic energy of the maniac and the paralysing weakness of the melancholic who has not personally met these two opposing forces of 'facilitation' and 'inhibition' in himself, but unless these realities had deep significance for human life, there would be neither poetry nor music. There are certain diseases where this lability of mood is very noticeable, particularly in the cyclothymia that often accompanies disseminated sclerosis. It is, however, more with the positive phases of euphoria with violent outbursts of temper, than with the more sullen negative phases of depression, that one is chiefly impressed, but the negative phases are there, although they may be disguised because for some reason or other such an invalid feels he must not let his disease 'get the better of him'. How many diseases are due to, or are aggravated by, an unwillingness to be depressed? The refusal of the downward phase of cyclothymia is frequently related causally to so many hysterical phenomena. Adler's conception of 'masculine protest' refers to this kind of attitude, but it may be just as evident in males

as in females, and Parkinsonism in either sex is chiefly due, I believe, to the intense inner resistance which the patient puts up against this perfectly normal negative phase. The treatment of the disease by such antispasmodics as hyoscine, belladonna and stramonium is the expression of the therapeutic attempt to attain relaxation, which is assuredly needed from inside rather than by an objective imposition, valuable adjunct though this latter may be.

We are not realising our capacity as physicians unless we are able to look at our patients with both a psychiatric and a physical eye. But the importance of seeing the patient stereoscopically can only be discovered after we have made all sorts of faulty adjustments through deficient accommodation because the two eyes are not so easily taught to function binocularly. It is difficult to know which attitude lacks most: that of the general physician who knows little or nothing of psychiatry, that of the psychiatrist who knows little or nothing of general medicine, or that of the psychiatrist who suffers from the diplopia of seeing psychiatry through one eye and general medicine through the other, but in whom there is no fusion of images. It seems probable that it is the last of these who sees things most confusedly.

There should be no real cleavage between health of body and sanity of mind, but in order that these images may be fused it is necessary that we have a third property, viz, that of emotional freedom. This is the great unifier, bringing both health and sanity. We are indebted

to Jung (6) for his classification of the 4 avenues of ap-
 perception into 1) Sensation, 2) Thought, 3) Feeling or
 Emotion and 4) Intuition. These represent 4 phases of our
 march towards maturity, and in general we may say that the
 first two are more objective, and the latter ~~two~~ more sub-
 jective, the first two more masculine qualities, and the
 latter two, more feminine. Here, then, we have the potent-
 ial conflict between objectivity and subjectivity which is
 especially marked in the hysteric, but is not absent in
 very many differing disease-types. There is in all of us
 that very marked reluctance to step from stage 2) to stage
 3), because in doing so we are humiliated, we give our-
 selves away, we show people what we really think, because
 our emotions are more genuine than our thoughts. Nothing
 can prevent us from contacting something of the complete
 swing of cyclothymia once we have entered the field of
 reality, and the psychologist's use of the word 'uncon-
 scious' means little of any value unless it is referring
 to the passage from thought to feeling. It is the paranoid
 who violently resents being brought into this field and
 who compensates for his awareness of some sort of ^{impending} humili-
 ation by over-rationalisation. His delusional system is
 due to his unwillingness to bring his emotions into value-
 judgments, though that does not prevent him from expressing
 his opinions both dogmatically and heatedly.

Whether the paranoid is so fundamentally homo-
 sexual as the psycho-analysts believe, is, I think, more a
 matter of the use of words than of real significance, for

it seems to me that his homosexuality is only a protection from the heterosexuality of which unconsciously he is so afraid, because he ^{vaguely} knows how devastating his ~~emotional~~ emotional reactions are likely to be. This is not to deny that fixations having their roots in childhood may not also co-exist, but it is a reminder that time itself may eventually bring the individual to that point in his experience where the transition from a perfectly rational view of life may give place to that which finds a place in it for the emotional view as well. The psycho-analyst with his emphasis on the roots that lie in the past, does not appreciate as he should the time-factor as it concerns the future. The fact that a psychosis is of long-standing may be of good prognostic import, because in some ways a psychosis may represent a patient's unsuccessful attempt at recovery from neurosis, which may be made successful by the timely intervention of the physician. As soon as the patient has learnt all that his psychosis has to teach him, then he is ready to improve radically.

If by 'repression' we mean the barrier within us that prevents us from contacting reality at its fullest, it is obvious that in the order in which we have spoken of it, its applicability is most cogent in the transition from stage 2) to stage 3). What is the nature of that barrier? it is primarily made up of the active will. I will not enter into that realm of intrapsychic experience where feelings and emotions are so acute, with the whole periodicity of cyclothymia, and where the poignancy of love-hate

relationships is so agonising. It is evident that not only is this the domain of the anxiety states and the hysterics, but that many other symptom-complexes also originate here, such as anorexia nervosa, migraine, epilepsy, tics, as well as many organic endocrinopathies.

When we are dealing with 'repression', and the problem of what constitutes maturity, it is very important to realise that our own potential maturity is a very relative affair. The analyst can see the problem only in relation to one factor:- that of reducing the individual to a sense of his basic instinctual needs, those of self-preservation, sex and the herd, where the force of repression operates merely to ward off the pangs of the self's own insufficiency; but the level of our maturity is conditioned by very many other factors, such as the degree of personal responsibility for life the individual has had to assume. It is of first importance to realise that only when one has been able to exist as an independent unit, with a will which has been accustomed to making decisions for itself, and with a willingness to accept the consequences for all its mistakes, has one any real chance of attaining maturity in this life. There are large sections of our community life where that first requisite is completely lacking; all sections of the public which are guided primarily by the principle of collective security are by that very fact precluded from attaining to that fulness of development which is inherent in personality. Nowhere is this more evident than in the 'trade union'

type of mind, but it is prevalent in medicine, the law, and the church, as well as in the artisan class. A slight variant of this type of mind is to be found in those authoritative bodies which administer the law, and who stand for that which is right. The psychopathology of the epileptic diathesis in its varied manifestations may as yet be somewhat obscure, but there is one very common characteristic associated with it, and it is that its sufferers are frequently the offspring of parents whose word is their law and who have a very rigid sense of their rights. I have noted the frequency among the children of such officials as the police, the post office service and among people who are accustomed to such use of power as electricians and railway workers. To those people might is so right, and right so much backed up by authoritative might, that they have never seen the place of wrong or weakness at all.

The factor of the will is at once the central point of dynamic psychology with its repercussions on physical well-being on the one hand and insight on the other. No mere reduction to instinctual levels can take the place of the requisite for accepting fully all the risks and dangers of living life both as a self-contained unit and as a social unit, though with that as a starting point, reductive analysis has its own validity, but how restricted in its application is that form of therapy where this prerequisite does not exist. In psychotherapy the time factor itself is of greater validity than the technique, and gets

far less credit than it deserves. Disease has always its own significant space-time relationship, with its dependence on the one hand, on environmental changes of the widest kind, and on the other, on inner reactions to those changes.

The limitations of present-day psycho-analysis largely consist in its apparent inability to count on unforeseen future event for the dénouement of the patient's emotional difficulties. Its detailed preoccupation with the past is so often unnecessary, when future eventualities in themselves can effect that change of circumstance which is the one needful. On the patient's side, it may be his unwillingness to wait for events to unfold themselves that prove his own undoing, for nothing of real value can be assimilated without the time factor, and "immunity is assimilation". Part of the therapist's responsibility is to help the patient to realise that he cannot have his 'perfection' just when he wants it, for like all good things, its attainment is supremely dependent on patient response to imperfection.

The authority of the collective body of which we are members is a great solace to us, but our freedom has to be bought by foregoing its shelter. No psychiatrist has any real insight into the psychoses unless he has within himself foregone that sort of protection, though this fact may not be known to anyone but the person concerned: it is the inner attitude rather than the external appearance which is the valid criterion, and this can never be really known by anyone except the person who has it. We are never

really in a position to doubt other people's integrity, though most of us probably indulge in the pastime.

What are the marks of the kind of integrity by which we must judge our own development, and thereby gain both the insight necessary for helping the patient, and at the same time know just what we can do and how to do it ?

There is the active will to take on ourselves the responsibility for living in the fullest sense, in the greatest contact with reality as it comprises the four spheres of sensation, thought, emotion and intuition: and associated with this is the passive will for bearing all the pain that comes through those different avenues. There is no full contact with the world of objectivity through sensation without the kind of contact that brings us to a sense of pain: there is no really vital contact with thought which does not cut with the quality of a two-edged sword: there is no deep emotional experience which does not make us aware of the exquisite sensitiveness of the psychic flesh, and there is no physiological way of defining this very real experience: and lastly there is no awareness of full reality without that knowledge of intuition which we may define as the complete response of the whole self to the wholeness of our experience. It involves:-

1. Adequate forms of sensory experience.
2. Assimilation of the experience of the past.
3. Awareness of the potentialities of the future.
4. Responsibility for working out a philosophy of life, which in itself involves personal, social and cosmic awareness.

At the same time, it is quite unnecessary to emphasise that different kinds of work do not call for the same kind of personal development, but it is enough to remind ourselves that our chief responsibility is for us to become aware of our own peculiar response to our own inner values. It is extremely easy for us as individuals to believe that other people's validity rests only on some sort of correspondence with the kind of experience that one has had personally, and nothing short of reverence for every personality as it is found in its own environment, and in relation to its own special capacity at the present moment will save us from making that sort of mistake.

If I appear to have paid too little attention to such an important matter as sexual harmony, this is because I believe that the principles I have adumbrated cover that important function. Our destinies matter more than our origins; the whole is greater than the sum of the parts.

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Chapter. 8.

DIATHESIS AND METAPHYSICS.

Polarity, or action and reaction, we meet in every part of nature; in darkness and light; in heat and cold; in the ebb and flow of waters; in male and female; in the inspiration and expiration of plants and animals; in the equation of quantity and quality in the fluids of the animal body; in the systole and diastole of the heart; in the undulations of fluids, and of sound; in the centrifugal and centripetal gravity; in electricity, galvanism, and chemical affinity.... An inevitable dualism bisects nature, so that each thing is a half, and suggests another thing to make it whole: as, spirit, matter: man, woman: odd, even: subjective, objective: in, out: upper, under: motion, rest: yea, nay.

.....

The same dualism underlies the nature and condition of man. Every excess causes a defect; every defect, an excess; every sweet hath its sour; every evil, its good.

R.W.Emerson: Essay on 'Compensation'.

Synopsis.

Many of the phenomena of disease and responses to treatment can only be understood by the light of metaphysical concepts.

These involve a greater awareness of the avenues of reality, but introduce us specifically to the principles of polarity, whether found in the duality of conscious and unconscious activity, the subjective and the objective, in voluntary and involuntary functions, in personal and collective experience, in this space-time continuum or some transcendent state, in the periodicity of elation and depression, in the totality of the cycloid and the partiality of the schizoid, in the positive phase of elation and the negative phase of depression, in sympathetic and parasympathetic functions and in the bisexuality that runs through all life.

When we try to define the scope of metaphysics in influence on personality for good or ill, we are at once on ground that is most difficult to define; and yet, at the same time we are dealing with relationships that are of the utmost importance. It is obvious, for instance, in hospital practice that conditions like asthma and epilepsy are considerably affected for the better by the withdrawal of these sufferers from their own environment. What is the nature of the noxious influences in the environment, the withdrawal from which has a remedial effect? When we talk of a man being driven to drink by a nagging wife, or of a woman dying from a "broken heart" and suffering mental cruelty at the hands of her husband, what neuro-endocrine mechanisms are implied? It may be that in all such conditions there are underlying neurological mechanisms, though as yet it seems unlikely that we shall be able to describe their exact nature. Who, for instance, will doubt the reality of such phenomena as the repetition in one's children of the silly mannerisms that made their appearance in one's own childhood? These repetitive movements, minor tics and grimaces that afflicted one's own childhood for a brief spell maybe, make their re-appearance in one's own children without, as far as can be known, having been brought about by imitation. Or if one chooses to explain them by some kind of 'engram-hypothesis', it seems difficult to conceive of any such explanation in physiological terms.

There are many similar phenomena that can be mentioned. A child half an hour after its birth reproduced the same movement of putting its right hand with arm upraised under the pillow, exactly as its father had been accustomed to do for many years of his life. There seems to be good evidence for believing, in spite of Locke (1), in some conception of innate ideas, and that there is a mental heredity as well as a physical one. That the former is quite unrelated to the latter is most unlikely. Our western minds find it difficult to hold two antithetic principles, but the inability to do this makes us schizophrenic in the deepest and most real sense of that word, while our sanity depends pre-eminently on our capacity to tolerate this 'tension of opposites'.

This is not the place to discuss in detail the nature of the mind-body relationship, though its relevance to some of the issues raised here will be undoubted, but there can be no gainsaying the fact that thinking is not primarily a neurological event, even though it may have neurological significance in the form of physiological adaptation. When I think, my body tends to assume a certain attitude, and probably circulatory and neurological changes take place, as can be indicated by plethysmograph, sphygmomanometer and electro-encephalography, but these changes are not thinking. Similarly the James-Lange (2) theory of the emotions equates the physiological concomitants of emotion with the emotion itself, but these two things are

different, even though there is a close relationship between them. It may sound like pure nominalism to insist on this differentiation, but unless we can see some sort of difference between mental events and their physical accompaniments we shall make the mistake of confusing the end with the means. We wish, however, to conserve the sort of conventional language with which we express ourselves, even though we might, from an obsessional and ultra-critical attitude, find fault with it. Diabetes is due in some sense to hypoinsulinism. That is a physical concomitant of something else which lies beyond the physical. Its physical nature will always be more exactly definable than its metaphysical, even though its metaphysical aspects are none the less real. The same is true of epilepsy, which may be most exactly defined as cerebral dysrhythmia, even though there are metaphysical aspects to it. It would be unwise to try to revise current terminology when this appears to be too mechanistic, in favour of a more recondite one, even if it were more exact metaphysically, which is unlikely.

The metaphysical aspects of diathesis involve 3 aspects of reality not capable of exact definition in terms of physiology; these are thinking, feeling and intuition. The first of these is primarily the concern of mind, and is used pre-eminently in the elaboration of hypotheses in induction, deduction, and logical inference: the second of these is primarily the concern of the emotions and is

used pre-eminently in appreciation, in love-hate relationships, in criticism and in instinctive reactions generally: the third of these is supremely the concern of the whole man and should enter into every sort of relationship, though not of necessity obviously so. But it accounts for reactions that are often called 'instinctive', though not strictly justifiably so defined. Speaking generally, emotional reactions are fairly prompt; those of intuition and thought delayed. The former may or may not be accompanied by formulation into words of what is felt, though when such formulation does take place one is justified in assuming that it is accompanied by thinking. It is probably not true to say that thought is always accompanied by verbal formulation, but I think it is a useful conception to associate the two together.

When I seek to define the nature of intuition, I conceive it as some irrational faculty, which allows me to make choices that I cannot explain, but that are not done instinctively in the immediate sense, but after deliberation and listening to all that can be said by my other faculties. The metaphysical, I said, involves 3 faculties of the self, that are not capable of exact physiological definition. There is one other faculty of the self, however, which is more capable of definition in physiological language than any other, and that is that of sensation. That is not to say, however, that there is not a metaphysical side to it also, for there are many instances where such

an association clearly exists. Wagner found the touch of velvet helpful to the production of his music. Beethoven's deafness did not prevent the hallucinative experiences that preceded his musical creations. Sir Walter Scott related how a school-fellow of his found that touching a certain button helped him to give the school teacher correct answers, which he could not give when Scott had mischievously cut it off! Similar associations are to be found in musical descriptive themes, as, for instance, Mendelssohn's 'Songs without Words', Beethoven's Seventh (The Creation) Symphony, and Moussorgsky's impressions of an art gallery. Here we have the sensation of sound suggesting sensations of colour, shape and form. It appears to me that these are not directly reducible to each other. There is here a 'mystic harmony linking sense to sound and sight'- an association that correlates the physical sense with metaphysical meanings, or else links up one physical sense with another through the medium of the metaphysical.

The validity of suggestion as a form of therapy is clearly not merely due to the form of words used, but rather to an impression that is conveyed, and to certain temperaments the suggestion of ill-health may be more valuable than one of good-health, and these impressions are not based on the therapist's reason, but on his intuition. The neurotic is primarily a person who has not learnt how to use himself, and if he tries to reduce life merely to sensations he will reproduce many more of the traits we describe as neurotic. Where this begins and ends, it is difficult to say, for it is all so much bound up with our devel-

opment. We cannot see the end in terms of the beginning, and in the intensity of our immediate experience we tend to say 'this is it: this is the touchstone of life and its values'. But to do this is to make the neurotic's mistake of fixing and stabilising that which is inevitably dynamic. 'The moving finger writes, and having writ moves on'. That in itself is a metaphysical allusion making use of the sensory image of the finger to express a truth which is beyond the physical, and so much of our everyday language breathes of this, that it is at our peril that we neglect the truth of which it is a reminder. We make diagnoses; we cultivate bedside manners; we treat diseases; we see red; we talk about the break of day, and the fall of night, when strictly speaking these things are not literally true, but the metaphysical is about that which is not verbally accurate. It is suggestive, parabolic, poetic, allegoric and not literally true. That is one reason why the person who cannot tell a lie is neurotic. He cannot see any sense in being wrong, and he is blind to the whole world of poetry ^{and} music, because their reality lies beyond what is verbally accurate.

What, then, is the relationship between integrity and morality? If we are not alive to the fundamental immorality of ourselves we are of necessity condemned to the same sort of dysrhythmia that is found in the epileptic. In so far as 'I am getting better and better every day and in every way' represents a verbally accurate basic represent-

ation of the Coué school of psychotherapy, it portrays just the sort of dysrhythmia that I have in mind, where one only believes in the up and up phase of life, and where the negative down and down phase is repressed and rejected. Where life is lived at its most superficial level, there is a tempo of phasic variation that is quite evident, but in other more cultivated and civilised communities where morality is defined and made an end in itself there is paranoia. Neither of these two modes of life are mature in any real sense, but each lacks something the other has. It is the reconciliation of the immoral self with the moral one that constitutes the supreme task of psychotherapy, and this cannot be done without a sense of the metaphysical. There is a very real sense in which the metaphysical is the pre-physical: it is non-material and irrational. If we repress this side of the self we cannot escape the paranoia of the self-righteous. We have therefore to do two things:- 1) to find our primitive self, to know it for what it is, and to let it have its own valid form of expression and 2) to learn how to conform to the moral conventions of society. It is the reconciliation of these primary and secondary principles that on the one hand saves the self from projecting its own wrongness on to the other members of society, and from displaying misplaced missionary zeal,- in itself quite an important test of our integrity - and on the other hand shows us how to live as a moral member of the community.

But these primary and secondary principles have, I believe, another validity than their merely ethical one. They are related to the whole problem of growth and differentiation. We cannot say of any fertilised ovum exactly what form it shall take as the years roll by, nor what it is in the genes that determines the exact contour of this or that peculiarity. In other words it appears probable that in the fertilised ovum itself there is latent thought, latent feeling, and a latent sense of the metaphysical. This is echoed in Wordsworth's "Ode on the Intimations of Immortality." Just what is this strange force that holds in the compass of one cell, all the potentialities of genius, all the phenomena of madness, all the heartbreak of love? How can it possibly be that knowledge will occupy the developing personality, and what goes wrong when it just doesn't, as is seen in amentia? Whatever physical forces are involved, as they certainly are, there are also these other metaphysical ones.

Trailing clouds of glory do we come

From God, who is our home.

What happens when the clouds of glory do not trail? There is no separation of the parts, say of mind from body, or the organised from the archaic, that does not involve some sort of inverted reaction, and one form of inadequacy or deficiency is usually the cause and effect of some other.

We are never self-made men, but always the creatures of destiny, endowed with the faculty for self-aware-

ness, if we care to pay the price for it. What we are objectively and what we are subjectively are further expressions of these two principles of the self, the primitive and the cultural. One day we may be able to define more exactly the links between the two, but for our immediate purpose it is enough to realise that one stands for the unconscious aspect of the self, and the other the conscious. This is in harmony with Jung's use of these words.

It is also helpful, I believe, to try to visualise these concepts in terms of voluntary and involuntary in order to bring psychological jargon into some sort of correlation with neurological jargon. Is there any sense in which consciousness and will or voluntary functions may be correlated? It is evident that voluntary muscles may be used involuntarily, as happens for instance in sleep, in start reactions and in so many of the movements associated with emotional expression and gesture. What power have we over involuntary functions? What method have we of influencing sphincter action, e.g. of the cardia, of the pylorus, or of the ureteric orifices? These are important clinical questions and our attitude to them shows us the nature of our personal medical philosophy, for there are other ways of helping the sphincters to relax than by the use of belladonna: there are subjective attitudes that lead to sphincter spasm, and objective forms of treatment are not necessarily the best. In fact, what the patient can do from within will probably represent a greater response to reality than his

meek submission to what is done from without, because in the first case he assumes the sort of responsibility for being ill and getting well that in itself is so necessary, while in the second case he can lay all the blame for the failure of treatment at another's door. Better still, however, is the combination of both attitudes. *That of subjective acceptance of personal responsibility for being ill, and that of submission to objective therapy.*

It is, therefore, in the assumption of responsibility for what is involuntary that measures of therapy of wider effect are made possible. The mode of effect of this change in attitude is almost certainly through the involuntary nervous system, but it also lays open the 'unconscious'. It is advisable to say a word or two about the conception of the 'unconscious', because skittish psychiatrists are to be found who ridicule its use in this connection as though those who used the word spoke of it as though it were a place. It will be evident, I hope, that the word is continually being used in a metaphysical sense, in which spatial concepts are only meant to be allegorical. What is there, then, in the 'unconscious'? As Jung has pointed out, there are two aspects of this of supreme importance. These are 1) the personal and 2) the collective. They comprise all the individual's past experience, as well as portent for the future, and in the collective unconscious are to be found links with the racial past of spiritual inheritance and of animal inheritance. All that has been, is in us: all that will be, is somehow related to what we are now. The macrocosm is mirrored in the micro-

cosm. The universe is part of me as well as containing me. This, of course, is no new conception, but is almost as old as man himself. 'Before time was, I am.' 'I am the God of Abraham, thy father.' This truth has been expressed in many different ways: in poetic form in Swinburne's 'Hertha', and in scientific form in the phrase 'Phylogeny is the ontogeny of the race'. The evolution of the individual recapitulates the whole history of life from the unicellular organism upwards, and in some sort of parallel with this there is the process of devolution or involution which accompanies evolution. The reductive form of analysis does not usually go beyond the events in the patient's own life history, but many psychotic manifestations, especially those found in schizophrenia are not capable of understanding apart from some sort of rapport with the racial past. Similarly, the so-called recollections of birth-traumata, while having some sort of associative relationship with past experience, are psychic experiences of here and now. The past is part of us now, and the significance of this in pathology, while of tremendous import, we have hardly begun to understand. Its relevance in literature appears in every history, but may be supremely illustrated in mythology, anthropology and dreams, as well as in such imaginative writings as 'I, Claudius,' or Joan Grant's 'Winged Pharaoh'. For further accounts of it, however, the reader is referred to Jung's work on 'The Unconscious'.

While our separateness as individuals is so obvious to the eye of sense, it is no mere poetry that makes the

apostle Paul say 'Ye are members one of another', or a greater than he say 'I am the Vine and ye are the branches'. In the unconscious there is that which is personal and individual and unique, but there is also that which is collective, racial and generic. In the confusional psychoses this collective material showers itself on the individual in bewildering fashion, and though the psychiatrist dismisses the patient's account of his experience as hallucinatory, that is of no helpful significance to the patient, though it is quite likely that the greatest help can be given only when the experience has spent itself.

We need, however, a greater sense of our responsibilities as interpreters. The metaphysical world is supremely one that calls for interpretation: otherwise it will be merely schizoid-discrete, disjointed and unconnected with any sort of value-judgments. Now it is in the deepest forms of analysis that one contacts this sort of schizoid experience: it is chaotic, generic and collective. It speaks of experience that is not in this present tempo-spatial field, even though somehow it makes its impact on the individual here and now. Experiences of this kind are not infrequent in the psychoses where they are not usually recognised at their true value, but similar experiences have been recounted by those considered normal, as e.g. in the case of two Oxford lady graduates who, in Paris on a visit to the Louvre, found themselves in the presence of Marie Antoinette (3). It is difficult to ac-

count for these phenomena, as it is to account for the whole realm of fantasy, but a mere wave of the hand will neither account for the strange experiences of men down the ages, or help us to understand the psychoses today. The more confined our own experience is to the mere world of sensation, the less understanding shall we have of the psychoses. No attitude to the insane is more to be regretted than that which thinks of them as essentially different from ourselves. What is happening in the insane is either something we understand from our own experience or it is not: if our imaginative faculties are not, or will not be, so acute that we can understand them, then psychiatry is not our calling. Halliburton⁽⁴⁾ has said 'hallucinations occur normally in all people' which makes it important for us to see their relationship with the metaphysical and the cosmic in order that we may gain more insight into ourselves as well as more insight into the nature of the psychoses. It is possible that one day we may see a closer relationship between the cosmic rays of the ether and hallucinatory experience, but in the meantime we need to know that such hallucinatory experience chiefly affects people of a certain level of experience for which analysis of Freudian type may form the chief bridge. This is all bound up with the problem of auto-self and altero-self: the I and the me of the individual [cf. E.G. Howe. (5)].

It may be true to say, as Gillespie (6) has said, that "No psychiatrist will agree that 'any of us is capable

of being psychotic'," but if it true, it is so only because of one of two reasons, either:- 1) we have emerged from the psychotic levels of our experience, and as an attack of smallpox immunises against subsequent attack, so assimilation of psychotic experience makes repetition of it unnecessary, or 2) our forbears assimilated it, and we have inherited immunity through them. But in either case, I believe, it would be rash to assume an absolute immunity thereby.

When we come to compare the Western races with the Eastern, as for example the ultra-modern American with the slow-moving Chinaman, we see typified there the characteristics on the one hand of progress, objectivity and speed with those of the ancestor-worshipping, philosophical oriental with his apparently purposeless forms of existence. The one is apparently more vital, the other vegetative: the one keen, eager and industrious, the other contented and apparently lazy. They both occupy the world of 1940, and yet they are separated from each other not merely by hundreds of miles, but by hundreds of years. It is obvious that in Japan some sort of new day has broken, but there are signs that in the world in general there is a movement of re-awakening which will not leave the face of the world unchanged. This process of awakening may not be altogether a good thing, or a pleasant thing, but its presence necessitates a greater awareness on our part of the significance of every phase of experience, so that we may know the

answer to totalitarianism and communism as we have met these things in ourselves. Some degree of schizophrenia or partiality is inevitable for all of us, but we shall be most ourselves when we try to enclose in ourselves as much of experience as possible. One very important function of psychology, indeed, is to induce the kind of inner experience that brings understanding, without of necessity producing anti-social conduct.

'Nihil humanum puto alienum a me.'

It is in our exclusiveness that we show our partiality, when we try to get rid of things we cannot understand, or when we exclude facts that make our pre-existing hypotheses inadequate. In Eastern attitudes, especially those of non-resistance, or the detachment of Yoga cults, there is contact with schizophrenic kind of experience. This is recently extolled by Aldous Huxley in 'Ends and Means', (7) and for its effects we have some sort of parallel in the practice of Christian Science. Its chief benefit neurologically is in the facilitation of vagal activities, where the sympathetic system has been in preponderance, but eventually this is followed by the activation of the sacral autonomic system which psychologically is accompanied by release of fantasy as well as painful sexual experience.

It is customary to visualise consciousness as a stream, but it is also helpful to visualise the whole race as part of a stream; the one being the collective side of the other.

'Time. like an ever-rolling stream,
 Bears all its sons away,
 They fly forgotten as a dream
 Dies at the opening day.'

Let us try to see these individual and collective aspects of man as relevant to the whole problem of psychiatry - the reconciliation of part with whole. The schizophrenic is cut off from the whole: the cycloids are part of the whole - they are in everything and part of everything, but only when the cycloid phases are manic rather than depressive. Cyclothymia has its own partiality: in the positive phases we are supremely confident and optimistic that life is good: we feel fine. This is health, well-being, and it is good to be alive. But there is the negative side when life is difficult and painful, when the loneliness of depression cuts us off from those we love, and no words can bridge the gulf. This is the rhythmic periodicity which life in the 'total' individual shares with all those parts of innervated tissue that comprise the body. It is difficult to avoid the conclusion that in schizophrenics the prevailing mood is one of depression, though of course in catatonic excitement the positive phase asserts itself. This polarity of expression has been well put by Miss Dorothy L. Sayers in 'Busman's Honeymoon', where Lord Peter Wimsey asks his wife, "Harriet, what do you think about life? I mean, do you find it good on the whole? Worth living?....."

"Yes! I've always felt absolutely certain it was good - if only one could get it straightened out. I've hated almost everything that ever happened to me, but I knew all the time it was just things that were wrong, not everything. Even when I felt most awful I never thought of killing myself or wanting to die - only of somehow getting out of the mess and starting again."

"That's rather admirable. With me it has always been the other way round. I can enjoy practically every thing that comes along - while its happening. Only I have to keep on doing things, because, if I once stop, it all seems a lot of rot and I don't care a damn if I go west tomorrow. At least, that's what I should have said. Now - I don't know. I'm beginning to think there may be something in it after all....."

"..... One got used to it - to being everlastingly tightened up to face things, you see."

In that dialogue the two attitudes of sadness and pleasure are shown, the one with its enforced acceptance of the grave and the other with its restless pursuit of the gay. Neither of these represents the harmony of maturity, though the former is nearer to it than the latter, because it is so much truer to the time-relationship, content to wait for life to be different, rather than by an act of will to make it different, the final solution consisting in the complete approximation of husband and wife. The first attitude is the submission of the individual to the whole: the

second, the active usurpation of the whole to conform to the individual's needs. The one illustrates the policy of non-resistance, the other the totalitarian method of dictating to life. Without pressing the point further just now but within the context of this section it is necessary to emphasise the partiality of each of these attitudes. No mere dictator or cavalier attitude is going to provide life with the environment it needs for its own nutrition; no mere pacifist attitude is going to provide the self with its real needs, but some sort of reconciliation of both attitudes is supremely necessary. We cannot learn the principle of autonomy without the marriage of both aggressive and passive elements in ourselves, and the recognition of our bisexuality is one aspect of this dual nature of the self. If we accept the Freudian principle of the symbolic nature of visceral activity we shall categorise the various functions as follows:-

Masculine:

All secretion.

Stimulatory phases of
systole.

Expiration.

All muscle contraction
whether striped or un-
striped.

Feminine:

All ingestion.

Inhibitory phases of
diastole.

Inspiration.

All muscle relaxation
whether striped or un-
striped.

The duality principle is apparent in our categorisation of muscle contraction as a male function, and that of relaxation as a female, because a further subdivision of muscles

into agonists and antagonists further brings out the same alternation principle of male and female functions. If on the other hand we categorise the autonomic dysfunctions into sympathetic and parasympathetic activities we have the following divisions:-

<u>Sympathetic.</u>	<u>Parasympathetic.</u>
Inhibition of secretory and motor functions of stomach, small and large intestine.	Hypersecretion of lacrimal glands. " " nose. " " salivary glands. " " gastric " " " intestinal "
	Peristalsis (retrograde in vomiting, excessive in diarrhea.)
	Spastic constipation.
Exophthalmos.	Enophthalmos.
Dilated pupils.	Contracted pupils.
Tachycardia.	Bradycardia.
Hypertension.	Hypotension.
Respiratory facilitation. ('second wind')	Respiratory arrhythmia; asthma. Extra systoles.

While in pelvic activities the functions are regulated as follows:-

<u>Sympathetic.</u>	<u>Sacral nerve.</u>
Relaxation of lower end of intestine, colon and sphincter ani.	Contraction of colon. Spasm of sphincter ani.
Contraction of sphincter vesicae.	Relaxation.

Relaxation of detrusor vesicae.	Contraction.
Relaxation of pregnant uterus.	"
Relaxation of gravid uterus.	"
Contraction of retractor penis.	Relaxation.
Constriction of genital blood vessels.	Dilatation.

It will be apparent that the various functions controlled by the autonomic nervous system are capable of being regarded as male or female not according to their sympathetic or parasympathetic innervation, but only in the light of the particular function required by the whole organism. In other words, although the instinct of fight activates the sympathetic, that male attitude is accompanied none the less by internal adjustments that may be regarded as female, such as inhibition of visceral secretions, increased relaxation of involuntary muscle, and heightened inspiratory phases of respiration. That sort of polarity involves problems that cannot be exactly defined. We have spoken of the instinct of fight as being pre-eminently masculine attitude, which it undoubtedly is, and this is accompanied by sympathetic activity, but the reaction of flight is one opposite to that of fight and yet it is activated also by the sympathetic. These problems are not merely of academic interest for their underlying significance crops up from time to time in analytic experience. Similarly, the parasympathetic functions themselves show this same sort of polarity in the cranial and pelvic parts of it, but the

latter implies a polar relationship which is also outside itself, in the dichotomy of sex. There is the bisexuality within the individual, but of more importance there is the bisexuality running through the whole of life as well as in the parts. There is the truth in pan-sexual theories that as a result of its operation we are born, and as a result of its operation our existence in others is perpetuated, but it is in ^{its} metaphysical apprehension that we become most truly aware of it, a discovery that goes back as far as Heraclitus, (8) though it is very unlikely that he was the first to think of it. It is an injustice to the ancients to imagine that Freud was the first thinker to formulate this doctrine of opposites, but we shall do the truth a greater injustice if we fail to realise the metaphysical significance of this doctrine.

But the principle of polarity works ~~on~~ another way: it is unlikely that sleep is a manifestation of sympathetic activity, or that the sympathetic activates sleep, yet we see in it that inhibition of visceral function which accompanies sympathetic activity, and also that lowering of vasomotor tension which accompanies vagal activity. How convenient it would be if these phenomena could be neatly categorised, if we could denote the vagus as inhibitory and the sympathetic as excitatory, the one depressive and the other facilitating. It is in keeping with the whole doctrine of diathesis that there is always this elusive simplification process at work, so much so at times that one

is inclined to say 'there is nothing in it'.

It is part of our scientific bias which makes us want things straightforward, and facts indisputable, but just as in medicine there are no typical cases, still more in the realm of diathesis there are no fixed rules, but only indications and suggestions, and still we find that impressionability has its own evidential value if we would but cultivate it. There is no irreconcilable antithesis between the scientific outlook and the more impressionable one of the poet-philosopher, because that combination is both much truer to the whole rhythm of life objectively as well as subjectively, and what I see is conditioned by what I am. However difficult it may be for some people to believe in the truth of Berkeley's philosophy (9), it would seem a platitude if we reduced it to the bald statement that it teaches, that if I change my outlook I see things differently. But this repeated process of seeing things differently is part of the whole philosophical problem of change. At no time do I attain absolute knowledge, but only that which is relative to my experience. How does it happen then, that things have the appearance of fixity? There is obviously this same process of relativity at work here, for there are degrees of fixity, and in the most permanent things such as stationary buildings physicists tell us that there is ceaseless change. But perhaps these apparently fixed objects are the least permanent, and the most permanent 'things' are the invisible, the inaudible

and the intangible.

Now it is in psychiatry more than in any other branch of medicine that we see most this problem of change and permanence, for the psychotic appears to carry with him for a long time his disease, which to the unobservant changes very little, but the psychotic is in a much greater state of change than the non-psychotic. His experiences of the metaphysical bring him into contact with a variety of phenomena that he finds literally entrancing and enrapturing, allowing the catatonic schizophrenic to assume his bizarre posture for long periods of time. The problem of cure, as we said before, is that of reconciling the part with the whole, or in most cases, of reconciling the whole with the part. It is not sufficiently appreciated that what we designate sanity may be a far more completely schizophrenic state than what usually goes by the name of schizophrenia. If our awareness of the objective world shuts us off from the subjective, then we are of all men most schizophrenic; but open the door to the 'unconscious', and you will find yourself in this vivid world where analogy is the only language adequate to the experience, and where the whole phenomena of antithetic principles are unravelled serially. If analogy is the language of this subjective world, what sort of check can we make upon it? Or, to put the problem in a more utilitarian way, how can we bring the schizophrenic back into touch with that reality, contact with which passes for sanity? Schizophrenia is metaphysical isolation: the abiotrophies are pre-eminently conditions

in which there is a fusion of that which is metaphysical but which is not admitted into consciousness as such, and its pathological accompaniment is very often destruction of nerve fibres. Both these groups are regressive conditions: they are a shrinking from the tension of opposites. They both represent failure of differentiation, but in the former case there is detachment without identification of the self objectively, and in the latter there is identification of the self objectively without the necessary corrective of detachment. Hereditary and familial diseases in general reproduce this latter form of 'regressive non-differentiation'. There is too much conformation to a fixed pattern, without that renewal of the self which is so necessary for integration and individuation. The schizophrenic, then, needs to conform more to some objective pattern, the victims of the abiotrophies usually to discover their own self-hood. This distinction is neatly summarised in the antithetic principles of analogy and correspondence. It is probable that the various forms of shock therapy now in use for schizophrenia will be of most value only when they facilitate that sort of external contact with reality which comes through another individual. As long as we realise the prior importance of this personal factor we shall see a much greater validity in all these diverse forms of therapy, but the more validity we attach to these means of therapy in themselves, the more likely we shall become disillusioned and nihilistic. An all too frequent state found among psy-

chiatrists is that of thinking that nothing we can do can make much difference. It is true that what we are matters more than what we do, but one of the marks of maturity is this adjustment of faith and work, where that which is of primary importance finds itself expressed naturally by the way of that which is of secondary importance.

Without going into the matter further just now, but by way of conclusion, let us note the following principles:-

1. That, in general, organic disease may symbolise mental attitudes.
2. That no functional disease may not eventually produce pathological tissue changes.
3. That the distinction between organic and functional disease, though convenient, is arbitrary.
4. That the problems of psychiatry are far more philosophical than scientific, though the one should not be exclusive of the other.
5. That general medicine itself is capable of being much more deeply understood if viewed through the binocular vision of art and science.

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Chapter. 9.

THE 'CONSCIOUS' AND THE 'UNCONSCIOUS'.

For all and sundry are of woe,
Franchisement each other's aid, like sea and wind.
The more he guide, that spur the more a steady;
Restraint his duty, than provoke his speed;
The stinger course, like a generous horse,
There must have metal when you check his course.

These rules of old discovered, not devised,
Are nature's still, but nature methodized;
Liberty, like Liberty, is but restrained
By the new laws which first herself ordained.

Now we learned lessons her useful rules contain,
How to restrain, and when indulge our sin;
How, as Rousseau's say her laws she showed,
And pointed out those various paths they would
Lead from error, straight, the immortal prize,
And urged the rest by equal steps to rise.

A. Pope. "An Essay on Criticism".

Nature to all things fixed the limits fit,
And wisely curbed proud man's pretending wit.

For wit and judgment are at strife,
Though meant each other's aid, like man and wife.
'Tis more to guide, than spur the muse's steed;
Restrain his fury, than provoke his speed;
The winged courser, like a generous horse,
Shows most true metal when you check his course.

These rules of old discovered, not devised,
Are nature still, but nature methodised;
Nature, like Liberty, is but restrained
By the same laws which first herself ordained.

Hear how learned Greece her useful rules indites,
When to repress, and when indulge our flights:
High on Parnassus' top her sons she showed,
And pointed out those arduous paths they trod;
Held from afar, aloft, the immortal prize,
And urged the rest by equal steps to rise.

A.Pope. "An Essay on Criticism".

Synopsis.

The contrast in attitude between 'conscious' and 'unconscious' is briefly set forth.

Jung's (1 & 2) use of the words is so definite that one needs to say something more of what is implied in their usage to avoid misunderstanding. When the ordinary man talks of sanity he means primarily a belief in material things. He knows nothing of neurosis, because that is admitting the reality of feeling, and fears that he can dismiss as unreal. It is advisable to contrast these two attitudes because their differentiation implies two contrasting philosophies, the 'conscious' and the 'unconscious'.

1. { Nothing is real unless it is apprehended by the senses.
Everything is real that is apprehended.
2. { Physical cause produces physical effect.
Very dissimilar causes may produce similar effects,
and similar causes may produce dissimilar effects.
3. { Time is a succession of events: e.g. 'one damned thing
after another.'
Time is a dimension, which in certain metaphysical
states becomes 'disconnected' from the individual,
making possible contact with past and future.
4. { Philosophy is a waste of time.
Philosophy is the elaboration of all experience in time.
5. { Sanity is common sense.
Sanity is uncommon sense.
6. { Sanity is an act of will.
Sanity is the incorporation within the self of ab-
normal experience, and includes the assimilation of
experience outside the scope of the active will.

7. { A man's life consists in the sum of his possessions.
A man's life consists in the sum of his experiences.
8. { Things are more real than thoughts.
Thoughts and feelings are more real than things.

Although such a contrast may be rather arbitrary, still it does serve to 'stamp' our various attitudes so that we may know the kind of qualifying epithets we are most inclined to use about life.

In medicine these contrasting types of mind may reflect themselves in the sort of attitude we adopt to our patients:-

The one is concerned with cure, the other more with understanding: the one uses drugs to neutralise effects, the other seeks to find the cause of ill-health in faulty attitudes. The one believes in the priority of physical sign, the other in the priority of symptom: the one in the effort of the will, the other in the validity of relaxation. The one seeks a speedy recovery, the other a time-ly one. And so we might go on at some considerable length trying to make distinct these two different attitudes, while the real differences are much more fundamental even than the ones mentioned. The 'conscious' attitude is much more concerned about prevention and cure, while the 'un-conscious' one assumes the necessity of suffering, and considers pain and loss inevitable. One might legitimately ask, therefore, 'What is the purpose of medicine if it does not relieve suffering?' or 'Why trouble to spend 6 years intensive training in the study of disease, if you do

not intend to make an effort to cure it ?' That is the sort of question that a person dominated by the 'conscious' outlook would ask. I have tried to contrast two opposing attitudes that are not incapable of reconciliation, and while one can believe in the priority of the 'unconscious' attitude, that does not preclude a belief in the 'conscious' one as well; in fact one can go further than that and say that one mark of our maturity is the complete naturalness with which we can accept the ordinary 'common sense' point of view, while at the same time one is true to the values implied in 'unconscious' attitudes.

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Chapter. 10.

DIATHESIS AND THE PROBLEM OF THE
SUBJECT- OBJECT RELATIONSHIP.

My mind's not one room stored, but many,
A house of windows that o'erlook far gardens,
The hanging gardens of more Babylons
Than there are bees in a linden tree in June,
I'm the king-prisoner in his capital,
Ruling strange peoples of a world unknown,
Yet there come envoys from the untravelled lands
That fill my corridors with miracles
As it were tribute, secretly, by night;
And I wake in the dawn like Solomon,
To stare at peacocks, apes and ivory,
And a closed door.

Clemence Dane: 'Will Shakespeare'.

Act 2.

Synopsis.

The problem of subject and object brings us again to the problem of change and permanence, of appearance and reality. Its focus of activity on the neurological side is probably the pituitary and diencephalon, while psychologically it rests in the active and passive moods of the will. These bring us into contact with two differently constellated series of relationships:-

A. That of an extraverted reaction of the subject to the object.

B. That of an introverted reaction of the subject to the object.

Four modifications of these separate groups are brought about, according to the preponderance in each of the functions, thinking, feeling, sensation, and intuition.

It is not easy to know just how far one should allow oneself to be carried away by the grandeur of one's theme. It would be quite easy to devote successive chapters to diathesis and poetry, music, ethics, aesthetics, religion and any of the special branches of knowledge in surgery and medicine, for the individual is one, and his pursuits reflect his personality. We may, however, try to gather up the diversity of man's intellectual pursuits into a unity and consider these in general as manifestations of philosophical evaluations. The things we value most show themselves in the ways in which we spend our time, and if we will become impressionable to people as well as to their diseases we shall form reliable judgments as to why they develop their particular diseases. This is not to assume *necessarily* that we can avoid disease by judicious ways of living, though it does imply a way through to health for many people who, as yet, have not found their way. There is something to be said for the fact that disease may cost us less than health, but the flux of time has its own ways of moving us when we want to be fixated, so that 'that which is shaken may remain'. I doubt very much if the therapist should feel any sense of responsibility for giving his patient a jolt. These things happen in the course of therapy, but the more accidental they are, the better for both therapist and patient.

We began by discussing man's pursuits, and now we mention his fixations. Here we are again in the company of the problems dealt with by Heracleitus. He gets rid,

implicitly at least, of the difficulty of reconciling permanence with change, by the denial that any such thing as permanence exists at all. There is no static Being, no unchanging element; change, movement, is Lord of the Universe. Nothing ever is, but everything is becoming; all things are passing, and nothing abides. "You cannot step twice into the same river, for fresh waters are ever flowing in upon you". "We have the appearance of permanence, just as the flame seems to be an identical thing; in reality, however, its content is every moment altering". (1)

This is part of the age-long controversy of philosophy, that which changes, and that which abides: the many-splendoured moving thing - the appearance, the phenomenon, and the changeless, timeless, fixed, abiding reality behind everything - the noumenon. What part do these concepts take in our study of diathesis? There is the same sort of variation and rhythmical change expressing itself in systole and diastole, vaso-constriction and vaso-dilatation, inhibition and excitation, depression and facilitation, relaxation and contraction, but these are rhythmic alterations of activity of parts of the organism. There is the same thing in the whole man - his wakefulness and his sleep, his rest and his activity, his contemplation and his expression. On the neurological side we can see some sort of relationship between this and the autonomic nervous centres with its connections with the diencephalon and the pituitary, but we shall not be able to see the importance of this mechanism fully until we know more about the relatedness of phenomena that are at present apparently unconnected, and if I can help to state a problem more clearly, that may be as much as I can do.

Where is the focal point of this mechanism ? It rests in the will, which we may describe as having active and passive moods. On the active side it is energetic, executive and masterful: on the passive side it is submissive and suggestible. The force of repression operates usually between these two moods of the will. It separates the things it believes ought to be, from the things that are, but which it does not want to see. There is the crux of the obsessional attitude which is in all of us. I find it difficult to believe that ^{that} which is so determinative in our mental life should not find expression through the most far-reaching mechanisms of the pituitary with its influence on all rhythmical expressions of the self. The full confirmation of this can only come through a much more detailed exposition of pituitary changes with personal growth, both on the physical and the mental side, and it implies an endocrine basis for the manifestations of hysteria and anxiety states, along with an interpretation of life-styles for organic diseases in general. It is because of this conviction of the relatedness of mental events to somatic growth that one employs the anthropometric method, bearing in mind always that such data as are provided by that method are only of inductive value. In other words, if by the accumulation of particular data we derive a general hypothesis, then we are employing the inductive method which we may try out in particular cases in a different field. We find in this same method a circular form of reasoning which from particular data induces a general hypothesis which can be re-applied to particular instances in another field. Both these forms of reasoning are necessary to the advancement of science, though

induction is more characteristic of philosophical speculative thinking than of the scientific method.

On the physical side, then, we are looking for some way of showing 1) the universal influence of the will on somatic functions and 2) the particular ways in which this influence is exerted. Not until that is done will this present work be vindicated, but that need not prevent us from being impressionable, as long as we are prepared to revise our impressions in the light of fuller knowledge. It will also not prevent us from the formulation of hypotheses, so long as these are regarded tentatively. 'A priori' reasoning is associated with the name of Kant (2) pre-eminently, and is used in philosophy generally, but its validity is enhanced when we employ it along with 'a posteriori' reasoning. These again are illustrative of the polarity principle, for in 'a priori' reasoning we are proceeding from cause to effect, and in 'a posteriori' reasoning from effect to cause. The latter is pre-eminently employed in analytical technique, but the validity of the former cannot be gainsaid when one can trace cause to effect in the course of therapy. The whole problem of causality in analytic technique is full of interest, and for an enlightening discussion on the whole subject the reader is referred to a paper by Graham Howe (3). It is sufficient to note here, however, that whereas the introvert tends to argue from effect to cause, the extravert tends to move from cause to effect. The one is centripetal in direction, the other centrifugal. In their partiality, both are eccentric forms of reasoning, because to ensure balance each must check the other, but both are inclined to persevere until they change direction, so to speak. The way in which this works out is to be found in paranoia, where

effect is traced to further effect, and every conclusion takes one further from the truth. The paraphrenic, however, in his awareness of the metaphysical may be even less inclined to come into objective relationship with reality because of the apparently greater authenticity of his world as compared with that of the average paranoid man or woman. The relation between projection and introjection is only seen at its best in the light of these 'a posteriori' and 'a priori' forms of reasoning, and is closely bound up with the whole problem of the subject - object relationship.

We may notice here, however, the following corollaries to this problem:-

1. The object may be in a different relation to the space-time continuum than the subject, for whereas the former can be localised to space and time, the latter is free under certain conditions to occupy regions incapable of such delimitation. (cf. Swinburne's 'Hertha')
2. The problem of sanity is that of accommodating subject-object to the same space-time continuum.
3. While it is customary to think of mental diseases and organic system diseases as of a similar order, the one is concerned primarily with states of mind, and the other primarily with tissue-fixations; the one being descriptive of change, the other of that which has changed.
4. While this dichotomy is inevitable, it is also advisable to note that there is some sort of underlying unity binding them together, and that increasingly the treatment of organic disease will aim at modifying objective conditions by securing greater awareness in the individual of his own subjectivity and of its relationship to objectivity.

No psychology will be of very extensive application to the field of general medicine unless and until it is able to provide some working hypothesis for the greater understanding of the psychoses. At present the psychotherapeutic schools are chiefly interested in psychiatry only where this borders on the preserves of the psycho-neuroses which are considered by the analysts to be their particular field. Only Jung (4) among them has really made any contribution of comprehensive worth to this much greater problem, and that is because he is a philosopher before he is an analyst. His main division of types into 1) Introverts and 2) Extraverts is really a modification of William James' (5) classification of the 2 contrasting types:-

<u>Tender-minded.</u>	<u>Tough-minded.</u>
Rationalistic (going by principles).	Empiricist (going by facts)
Intellectualistic.	Sensationalistic.
Idealistic.	Materialistic.
Optimistic.	Pessimistic.
Religious.	Irreligious.
Free-willist.	Fatalistic.
Monistic.	Pluralistic.
Dogmatical.	Sceptical.

Jung quite legitimately criticises these classifications, though admitting that it is concerned with the same kind of differentiation that he has tried to outline under the headings of Introversion and Extraversion. In his opinion, the distinction resides in their particular attitude to the object. The introverts attitude to the

object is an abstracting one; at bottom, he is always facing the problem of how libido can be withdrawn from the object, as though an attempted ascendancy on the part of the object had to be continually frustrated. The extravert, on the contrary, maintains a positive relation to the object: to such an extent does he affirm its importance that his subjective attitude is continually being orientated by, and related to, the object. Au fond, the object can never have sufficient value; for him, therefore, its importance must always be paramount.

A. In relation to the extraverted type we must note:-

1). The General Attitude of Consciousness.

"When the orientation to the object and to objective facts is so predominant that the most frequent and essential decisions and actions are determined, not by subjective values but by objective relations, one speaks of an extraverted attitude." Mere adjustment to what is local, temporal and conventional, rather than real adaptation is the typically extraverted way of reacting to the environment. "He becomes caught up in objects, wholly losing himself in their toils. The functional (nervous) or actual physical disorders which result from this state have a compensatory significance, forcing the subject to an involuntary self-restriction.....Hysteria is by far the most frequent neurosis with the extraverted type." It is an exaggeration of a normal attitude, and is complicated by compensatory reaction from the side of the 'unconscious', which has a more introverted character and which for the morbid intensification of phantasy.

2. The Unconscious Attitude.

"It focuses libido upon the subjective factor, i.e.

all those needs and claims which are stifled or repressed by a too extraverted conscious attitude." "Adjustment and assimilation to objective data prevent inadequate subjective impulses from entering consciousness. These tendencies take on a regressive character corresponding with the degree of their repression, i.e. the less they are recognised, the more infantile and archaic they become."

3). Peculiarities of the basic psychological functions in the Extraverted attitude.

a). Thinking: this is orientated by the object and objective data, rather than from subjective or unconscious realities. Extraverted thinking is typically found in such employments as merchants, engineers, architects, or natural scientists, chemists or druggists. Very often they are derived from tradition, or borrowed from the intellectual atmosphere of the time, though it is also to be found in such materialistic philosophies as underlie communism and socialism. But the price of this kind of attitude to life is that for its sanctions of what is right and proper, other vital forms of the self's expression are inhibited or repressed, and these are those forms dependent on feeling, aesthetic activities, taste, culture in the largest sense, poetic values and romantic movements in art or literature. The faculty of criticism is sharpened to the very finest point, and can be used to hurt and wound the feelings of others because there is no one more sadistic than the kind of person who, not himself being aware of the sensitiveness of feeling types, so extraverts his own repressed feelings as to intensify this as it concerns others. Arbitrary, conservative, judicial, dogmatic, obsessional and paranoid is such an individual likely to be, with an idolatrous devotion to

the 'absolute'. It is typically found in men rather than women; it is positive, productive, and in its judgments, synthetic and predicative.

b). Feeling: it is difficult to know whether one should accept Jung's description of extraverted feeling as a real entity, though no doubt the thing that he describes can be recognised, but it is supremely a pose, and to that extent must be unreal. Nowhere in the whole field of subjective reality is there anything so real and vital as feeling, so that when one sees a quality that has all the appearance of imitation and affectation one doubts whether to include it as a real type or only as a caricature, but in so far as his description does connote something with an objective reality, even if the thing itself is unreal, we must give some space to the description of its appearance. The valuations resulting from the act of feeling correspond with objective values, or at least chime in with certain traditional or generally known standards of value as found in classical literature, music or art and its devotees are found in the church and the theatre; they are observers of fashion and support social, philanthropic and cultural enterprises. They are represented by the Forsytes described by John Galsworthy.

"'A Forsyte,' replied young Jolyon, 'is not an uncommon animal. There are hundreds among the members of this club. Hundreds out there in the streets; you meet them wherever you go!'

'And how do you tell them, may I ask? said Bosinney.

'By their sense of property. A Forsyte takes a practical - one might say a commonsense - view of things, and a practical view of things is based fundamentally on a

sense of property. A Forsyte, you will notice, never gives himself away.'.....'He knows a good thing, he knows a safe thing, and his grip on property - it doesn't matter whether it be wives, houses, money, or reputation - is his hall-mark.'..... 'Hereditarily disposed to myopia, he recognises only the persons and habitats of his own species, amongst which he passes an existence of competitive tranquility'... 'They are,' repeated young Jolyon, 'half England, and the better half, too, the safe half, the three per cent, half, the half that counts. It's their wealth and security that makes everything possible; that makes your art possible, makes literature, science, even religion, possible. Without Forsytes, who believe in none of these things, but turn them all to use, where should we be? My dear sir, the Forsytes are the middlemen, the commercials, the pillars of society, the corner-stones of convention; everything that is admirable!'.....'The great majority of architects, painters, or writers have no principles, like any other Forsytes. Art, literature, religion survive by virtue of the few cranks who really believe in such things, and the many Forsytes who make a commercial use of them. At a low estimate, three-fourths of our Royal Academicians are Forsytes, seven-eighths of our novelists, and a large proportion of the press. Of science I can't speak; they are magnificently represented in religion; in the House of Commons perhaps more numerous than anywhere; the aristocracy speaks for itself. But I'm not laughing. It is dangerous to go against the majority - and what a majority!' He fixed his eyes on Bosinney: 'It's dangerous to let anything carry you away - a house, a picture, a - woman!'..... 'My people.....possess in a remarkable degree those two

qualities which are the real tests of a Forsyte - the power of never being able to give yourself up to anything soul and body, and the "sense of property".'" (6)

The type represents a necessity and is the main support of those who with true feeling are responsible for art productions, because without their support the artist would be unable to carry out his enterprises. The danger is that having become identified with the object, the feeling becomes cold, material and untrustworthy. It is not disinterested as is expressed in the aphorism 'art for art's sake', but it has an unconscious ulterior motive which probably rests on being thought well of by society, or even on some more material purpose. It comes to give an impression of pose, inconstancy, unreliability, and in the worst cases appears definitely hysterical. It is found most commonly in women who in their love-choice are governed by what is 'suitable' and correct in standing, age, height, capacity and family respectability; and for the most part its representatives are to be found in the very many 'happy' marriages that are lived on conventional levels. Thinking is repressed in this type of person but in unconscious levels may be found of an infantile, archaic and negative kind.

'The stronger the conscious feeling relation, and, therefore, the more 'depersonalised' it becomes, the stronger grows the unconscious opposition. This reveals itself in the fact that unconscious ideas centre round just the most valued objects, which are thus pitilessly stripped of their value. That thinking which always thinks in the 'nothing but' style is in its right place here, since it destroys the ascendancy of the feeling that is chained to the object'.
'Hysteria with the characteristic infantile sexuality of

its unconscious world of ideas, is the principle form of neurosis with this type.'

Jung considers both these types as rational or judging types because they are characterised by the supremacy of the reasoning and judging functions, and the accidental and non-rational are excluded from consciousness. "Everything disagreeable and painful, everything disgusting, ugly and evil is scented out or suspected, and these as a rule only correspond with half-truths, than which nothing is more calculated to create misunderstandings of the most poisonous kind".

c). Sensation: he is the stern realist. 'His life is an accumulation of actual experience with concrete objects, and the more pronounced he is, the less use does he make of his experience'. He is athletic, and takes delight in what he calls the joy of living. The male sex is predominantly represented, though there are large sections of the population of Lancashire women whose gospel is work, that fittingly can be classed in this category. Speaking generally, people of this class rarely touch the problem of cyclothymia in its depressive phases, though they may frequently be hypomanic and plethoric. He is by way of being the most completely extravert, because so completely on the periphery of life and so far away from his real centre that what comes from within is morbid and objectionable. In some respects he is the least neurotic of men, neither obsessional because he is not concerned with the perfect or ideal, nor hysterical because he is too superficial for that, but commonly he suffers from arterial degeneration, with all its consequent

possibilities, and very many of this type die from chronic renal disease and high blood pressure. He is an epicure, keeping a good table for his friends, sociable in a crude kind of way, and in many ways very infantile. He may be liable to suffer from general paralysis of the insane, though such other psychotic disturbances as depression and mania have an unhappy knack of making their appearance at critical periods of life, either as a reaction to an elated level of living over a long time, or as an exaggeration of what has been habitual for so long. According to Jung this type is liable to compulsive affections and anxiety states with jealous phantasies and phobias.

d). Intuition: the extraverted intuitive type is characterised by the adventurer in politics, love, industry or travel. Other types may play character parts to his lead, but he is the dashing sort of man, ingenious, full of ideas, the originator of new movements, with energy and zeal, but with the failings of his type, not able to carry through the projects of which he is the originator. He needs others to bring to earth the thing of which he has dreamed. He may be accused of unscrupulousness, because he seizes the opportunity that he thinks is sent by Heaven, whereas in reality he knows with inner certainty that to live successfully is to know how to take risks. At the same time he may blunder badly and the onlooker may wag his head as if in wisdom, as much as to say 'I told you so', while he is conscious only of the urge within, which assumes a compulsive sort of power, and to whose inexorable fate he becomes more or less reconciled. Such a man surely is Hitler. "His conscious attitude, both to the sensation and the sensual object is one of sovereign superiority and disregard. Not that he means to be inconsiderate or superior;

he simply does not see the object that everyone else sees. For this oblivion the object sooner or later takes revenge in the form of hypochondriacal compulsive ideas, phobias, and every imaginable kind of absurd bodily sensation". There is a real affinity here with the sort of de-realisation that occurs in some schizoid states, and the correspondence between outer reality and inner psychic tension ^{is} much closer than outward action would suggest. It is quite true to say that these people are immoral, but they are immoral in the way the Jesuits are said to be immoral, because they see that somehow reality transcends morality, that in some circumstances the end does justify the means, and they are not sufficiently allied to their own destinies in time for their sense of reality to include morality.

Jung calls these two latter types irrational, because their commissions and omissions are based not upon reasoned judgment but upon the absolute intensity of perception. They are irrational, but not unreasonable; in a high degree empirical, but in whom judgment cannot keep pace with experience. To them life in all its accidental events is supremely more important than the cold rationalisations of those who profess to live by the cold light of reason merely. Fate or common sense: which shall we allow to govern our lives ? as though there could really be any choice in the matter, though strangely enough, if we choose to live life rationally we shall meet a different kind of fate probably, than if we choose to be governed by all the whims and irrationalities of all the forces that are at work in the world. But how can we understand these forces unless we do make the experiment ?

B. In relation to the introverted type we must notice:-

1). The General Attitude of Consciousness:

'The introvert interposes a subjective view between the perception of the object and his own action, which prevents the action from assuming a character that corresponds with the objective situation.' It is as though the individual were aware of Descartes' formula 'cogito, ergo sum', but had never realised the full validity of the objective nature of thought or sense data. In a very real sense, Berkeley in his stress of the importance of the ego in the perception of objects, Descartes as aware of the validity of the self primarily as a thinking being, and Freud in his emphasis on the sexual orientation of the individual, are all concerned about the recognition of subjective factors in the evaluation of personality, and no psychology can have any extensive validity unless it comprehends the intrinsic rightness of the subjective. The schizophrenic, the hallucinated and the deluded in one sense are perfectly right as they give expression to the appearance of things as they seem to them: the non-philosophically minded just say 'this is madness', without trying to define just why this precise form of madness should make its appearance, and the reason for this neglect is to be found in the objective nature of our medical and psychiatric point of view, which arises from our much-vaunted 'scientific' attitude.

2). The Unconscious Attitude.

'The superior position of the subjective factor in consciousness involves an inferiority of the objective factor'. And as far as general medicine is concerned, it is

probable that in the rebound from the more or less normal extravert attitude, the psychotherapist loses his sense of the physical and empirical, but only sees disease in terms of motives, and, even in his ideas of causation and cure, adopts a much too easy and rationalistic outlook. There is quite a definite 'split-mind' in many analytic circles, because having found the relevance of one point of view, little or no attempt has been made to link it up with the traditional outlook of medicine in general, to say nothing of the very important branch we may classify as scientific. In the patient, such attitudes lead typically to psychasthenia characterised by extreme sensitiveness on the one hand, and on the other by a liability to exhaustion and chronic fatigue. His conscious relation to objectivity is relatively repressed, and so in the 'unconscious', evidence of this is found in infantile and archaic expressions.

3). Peculiarities of the basic psychological functions in the introverted attitude.

a). Thinking: ideas and images are of more value than facts, and so its reasoning approaches the 'a priori', rather than 'a posteriori' method, and in a sense its judgments are 'arm-chair' and 'breakfast-table' rather than experimental. They are pre-conceived rather than proven, generalised rather than particularised, more inductive than deductive, and within their category are to be found philosophers like Kant, Locke and Berkeley. Their search for truth has an inward direction rather than outward, it is intensive rather than extensive, abstract rather than concrete, hypothetical rather than factual, concerned with transcendental rather than immanental reality: theoretical and 'high falutin' rather than practical: mythical rather than actual: detached from the life of common men, rather

than identified with it 'as one of them', shunning the base and the low, but always aspiring to be high and formal.

Although the scientist is generally typically found in the extraverted thinking type, yet examples are to be found of his species in this type, especially those whose laboratories may prove rather a hide-out than a place for substantiating facts drawn from actual life. There is nothing hard and fast, of course, in these categories, but at one time or another every research worker who has no real responsibility for the sort of treatment he may prescribe, must show some of the traits described under this heading. Lack of practical ability, indifference or aversion to his fellows, an attitude more academic than clinical, exact rather inconsequential, and a contempt for rough and ready methods of treatment characterise the type as it is found in our profession. Among the psychopaths, such people show extreme rigidity, scrupulosity, and complete detachment from the life of men, and include many schizophrenics of the male sex, who may adopt a litigious attitude, insisting on rights and despising all wrong to such an extent that the other sex is carefully avoided. No romantic could belong to this class, though no doubt romanticism offers the sort of foil to the natures of such people that would provide the only possible kind of corrective.

b). Feeling: in general such types impress one with their lack of development. They are easily aroused by emotion, changeable, with no real spring of action because their life is controlled by the kind of sentiment that has no objective reference, except one of depreciation and under-estimation. It is primitively religious, and may know the intensity of mystical experience without seeing any sort of relevance in it to everyday affairs. Such types are

commonly found in the lower classes, more in women than in men, and the ranks of the Salvation Army are swelled by them. According to Jung, this attitude makes men silent and difficult of access; with the sensitiveness of the mimosa, it shrinks from the brutality of the object, in order to expand into the depths of the subject. It puts forward negative-feeling judgments or assumes an air of profound indifference, as a measure of self-defence. This is an attitude well-known in the 'shut-in' sort of individual who is also to be found in the schizophrenic class, but there is in addition to this, the low-grade hysterical woman whose emotional responses are much more evident, and who is quite evidently subjective in her evaluations. One has noted ^{that} people of this kind slowly drift from frank hysteria to schizophrenia, as though there had been some attempt at achieving the right kind of relationship with objectivity, but which had appeared to be too much for them and they had become more and more thrown back on to their own inner self. In the better educated classes, however, this type prevails as a cold critic, whose will to dominate is concealed by a show of affection quite out of proportion to its own inner power to respond to emotion or love. Such women are intuitive in a negative kind of way, because frequently they belong to the chronic anxiety class, which seems able to give them the quite uncanny power of sensing danger, where those people are concerned on whom their sense of power depends, and whom they consider very dear to them. From a clinical point of view one sees these people liable to rheumatoid arthritis, with infantile attitudes to sex, and in later life to cardio-vascular degenerations without hyperpiesis. In psychiatric clinics no doubt their depressive states

may call for attention, but very often there is a markedly paranoid colouring which may show itself in delusions of reference or even come out in amorous or persecutory forms, because 'what others think' is so evidently a distortion of the things the patient dare not think. Many sufferers from involuntional melancholia belong to this class. Among the less psychopathic, there is no type of personality which can so paralyse, by its own denial of the desires within itself, the creative ability of those around.

c). Sensation: as a sort of bridge between the introverted feeling type and the introverted sensation type one must interpose the descriptive novelists and poets, such as the Brontës. There is no creative faculty without the sort of tension that existed in the inner life of the Brontë sisters, and yet few analysts would have allowed for them any real measure of mental health, though out of their predisposition, the influence of the harsh tyrannical father with his intense attachment to his daughters, develops on the one hand, imaginative works such as 'Jane Eyre' with all its compensatory fantasies as well as description of fact, and on the other, the tuberculous diathesis which annihilated the three sisters. Here it seems as though the father belonged to the introverted feeling type, though it is difficult to say whether his daughters did not also share this category with him, or whether they do not come into the introverted sensation class, because of the abundance of audible, visible and kinaesthetic impressions which abound in their works.

In some members of the community, however, all the wealth of art breaks through their conscious critical faculty, and the flair for colour and light that belongs to van Gogh, Dégas, and Gauguin is manifested, making the extra-

verts say 'but this is not real', because they fail to note the validity of the subjective criterion which depends on the invisible and intangible, as apart from the objective criteria of visibility and tangibility.

It is probable that many tuberculous belong to this category and that Elizabeth Barrett Browning, R.L. Stevenson, van Gogh, Francis Thompson, Shelley, Keats and numerous other artistic geniuses share it.

d). Intuition: in so many different ways do the phenomena of introversion overlap, that it is difficult to differentiate with any clearness the prevailing characteristics of any one of these 4 subdivisions, but if we see in a line the qualities of thinking : feeling : sensation : and intuition, then we may say of them that as typical of each class are the cold formal lawyer : the amorous paraphrenic : the tuberculous artist and the prophet "who is a voice crying in the wilderness." There is about this last category all the intensity of the Jewish prophets, with their sense of mystic vision, their stern ruggedness, and their inner response to the unpleasant truth that burns within them. No words can describe the feeling of intensity which, in the words of Jeremias, "burned in his bones", and no doubt the epilepsy of many men of this type is its index, though it overflows into artistic genius as with Dostoievsky and van Gogh, and can often be found in men of strongly rational tendencies like St. Paul.

There is a difficulty in defining the frontiers of introversion and intuition which makes the whole subject of psychology a matter difficult to interpret with scientific exactitude, but if we take Jung's definition of introversion as a turning inwards of the libido, so that interest turns more to subjective than to objective reality, and take

intuition to mean that function which transmits perceptions in an unconscious way, and may appear in either a subjective or objective manifestation, when on the one hand it interprets realities that are within and on the other, realities that are without, we may see that it has a reference to the Gestalt psychology, which accounts for the psychological faculty of filling in the gaps caused by the limitations of our perceptive processes operating objectively, by assuming an internal process of integration, that allows us to see things whole, when, in actual fact, the chains of sensory evidence are incomplete. This kind of faculty is, indeed, one form of introverted intuition. But the main point that one would make just now, is that in a more or less normal kind of thinking extravert, introversion itself will bring the individual into the intuitive realm which will meet with Jung's ^{designation} ~~division~~ of subjective or objective, just in so far as it is complete or not. From the example of a man like Hitler, it appears that introversion has brought a sense of the validity of intuition, but that this process has not been completed. Its 'blitzkrieg' tendency shows its failure to be subservient to the whole scheme of time.

Between the acting of a dreadful thing
 And the first motion, all the interim is
 Like a phantasma or a hideous dream;
 The genius and the mortal instruments
 Are then in council; and the state of man,
 Like to a little kingdom, suffers then
 The nature of an insurrection.

Julius Caesar. Act II.Sc.i,

And woe to the man who projects his own conflict on to
 those around him!

Introversion is a function to be recommended only to the extravert. The degree of his integration will rest completely upon the thoroughness with which he completes his task. There is no royal road to maturity: it is painful in the extreme, but its goal is attained only through 'the open way', which steadfastly sets itself to face all obstacles from within, and to externalise these conflicts only when this is inevitable. It is supremely necessary for the individual to realise that this process is pre-eminently one of growing into an environment that is in every way suited to its own inner stresses. For its completeness, it is dependent on an inner pacifism and a spirit of non-violence. When the process is completed, the individual is ready to lay bare any aggressor.

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Chapter II.

NEUROSIS AND PSYCHOSIS IN RELATION TO DIATHESIS .

"Life invests itself with inevitable conditions, which the unwise seek to dodge, which one and another brags that he does not know; that they do not touch him; - but the brag is on his lips, the conditions are in his soul. If he escapes them in one part, they attack him in another more vital part. If he has escaped them in form, and in the appearance, it is because he has resisted his life, and fled from himself, and the retribution is so much death. So signal is the failure of all attempts to make this separation of the good from the bad, that the experiment would not be tried, - since to try it is to be mad, - but for the circumstance, that when the disease began in the will, of rebellion and separation, the intellect is at once infected, so that the man ceases to see God whole in each object, but is able to see the sensual allurements of an object, and not see the sensual hurt; he sees the mermaid's head, but not the dragon's tail; and thinks he can cut off that which he would have, from that which he would have."

R. W. Emerson: Essay on "Compensation"

Synopsis.

The focus of the psycho-somatic interaction on the emotional side, rests pre-eminently in the attitude to the parent, especially the mother. Anxiety and obsession represent both the threat of change, and also the innate tendency to 'stay put'.

Neurosis and psychosis represent the neural and the psychological aspects of experience, which are correlated as follows:-

A. Neural elements subserving subjective functions.

- I Those for sensation.
- II Those for thought.
- III Those for emotion.
- IV Those for intuition.

B. Neural elements subserving objective functions.

- I Motor responses to sensation.
- II Motor responses to thought.
- III Motor responses to emotion.
- IV Motor responses to intuition.

C. Neural elements correlating subjective with objective functions.

- I Those correlating sensation with motor responses.
- II Those correlating thought with motor responses.
- III Those correlating emotion with motor responses.
- IV Those correlating intuition with motor responses

The principle is discussed that every disease is a neurosis, but that the whole personality is capable of assimilating every experience.

This is discussed in relation to dementia, and

Synopsis continued.

illustrated from Hughlings Jackson's writings,
and also in relation to many of the diseases
of general medicine.

Our health consists in adaptation to ambivalence.

The paradoxical nature of diathesis is indicated.

and a comment is added on 'Appearance and Reality'.

The words "neurosis" and "psychosis" as at present
used imply for the former a condition for which there
is a hepatic origin, or for which there is no clearly
defined tangible cause or structural change; and for
the latter, a more profound disturbance of the psycho-
somatic equilibrium, involving loss of insight and loss of touch with
reality. Formerly these words were not used in quite
this sense but rather as equivalent to nervous activity
and mental activity, so that, when it is said, that
there is no "neurosis" without "psychosis", a state-
ment is made implying the interdependence of mental
and nervous activity.

It is such here in that sense that the word "neurosis"
is here used, though it also includes the case mentioned
above in common use.

That is, a disorder is not necessarily hereditary. In other words, each disease

We have tried to outline some of the forces at work in the environment, and we have tried to indicate some of the forces at work in heredity. Out of the clash of those two forces springs disease-potentiality and personality in all its many-sidedness. For our present purpose we are to define in a little more detail what are the nervous factors concerned in the interpretation of experience, and therefore, in the development of disease.

The words "neurosis" and "psychosis" as at present used, imply for the former a condition for which there is psychogenic origin, or for which there is no clearly defined tangible cause or structural change, and for the latter, a more profound disturbance of the personality producing loss of insight and loss of touch with reality. Formerly these words were not used in quite this sense but rather as equivalent to nervous activity and mental activity, so that, when it is said, that there is no "neurosis" without "psychosis", a statement is made implying the interdependence of mental and nervous activity.

It is much more in that sense that the word "neurosis" is here used, though it also includes the more restricted sense in common use.

What is commonly spoken of as hereditary is not necessarily inescapable. In other words, such diseases

as diabetes, epilepsy, and all the variations of familial disease, though they may have a hereditary basis, as indeed all disease must have, are none the less capable of modification for the better by adjustment of all those environmental factors that come under the heading of nurture, as well as by modification of all those factors that come under the heading of nature.

The crucial instance of the convergence of the forces of nature and nurture is to be found in the mother-child relationship. We cannot say, because we do not know, just exactly how an anxious mother affects her growing child. The intestinal colic and vomiting of infancy is frequently a precursor of the exudative diathesis of Czerny, and this is accompanied by fat intolerance, which later may show itself in attacks of acidosis, migraine or bilious headaches, and predisposes to catarrhal jaundice. No single factor can be blamed for these eventualities, but nothing short of treating the mother-child relationship will really basically modify that pathological sequence of events that in adolescence tends to show itself in ^{or}hypothyroidism; and when the life-patterns have become so fixed that no form of psychotherapy is likely to be beneficial, the sequence is to be found in later life of arthritic changes, gall bladder infections, hypertension, ~~hypor~~hypothyroidism and various psychotic traits. Underlying all this, then, there is a mother-fixation which remains even when the mother is dead. It is perpetuated in the

unfortunate daughter or other relative or friend who is called upon to bear the brunt of the invalid's burden. That a person can have a mother-fixation to one's daughter seems impossible, but obviously what is so designated is an attitude of undue dependence on those around, which is conveniently termed one of mother-fixation because it is a persistence into adult life of what should have been outgrown in infancy and early childhood. It is a mistake to press such terms into strict literal usage, and a certain amount of poetic licence must be allowed in their interpretation.

Similarly we must allow that the process of weaning, though literally applying to that process of changing the routine of feeding from breasts or bottle to more solid fare, has a much deeper and more widespread sphere of usage as a process that goes on through infancy, early childhood, adolescence, maturity, middle life, climacterium, later life and death. At no point in our development can we sit back and say "now I'm done with being weaned", for the process is continually re-happening. As every life-period ensues, I have something to give up, and new responsibilities to take on, and I have to accommodate myself to new conditions and a new tempo of living. If that is not really part of my outlook on life, then somewhere I am fixated and the trouble that I will not accept will catch me where I am ~~fix~~
~~ated~~

not expecting it. And so the age-long discovery of Heracleitus again comes to ^{our} mind us that though there is ceaseless change, yet somehow behind all this there is a permanence, an abiding place that time can never alter: and on the other hand that 'the more things change the more they remain the same'.

The central neurosis of our civilisation is the unwillingness to change, but that is only one aspect of our attitude, for there is something else in us which will not rest, will not abide, will not be still, and our health depends upon the reconciliation of ourselves to the polarity of change and changelessness - to radicalism and conservatism. But this is not all, for I am partly fixed and rooted here within myself when another part of me would traverse the universe: How can I be reconciled to myself in time and space when I belong to the boundless spaces of eternity? And that is at once the problem of the schizophrenic and the saint. But how can we be whole until we have been schizophrenic, and how can we be really objective or scientific, until we have plumbed those depths in ourselves, that will obtrude themselves over there in the objectivity of our work, unless we recognise them in ourselves as part of ourselves?

But what is neurosis if it is not flight from reality, and what is reality if in its totality it does not include the psychotic? Is there any escape from

a man -

the dilemma, that to be whole I must integrate the partiality of psychotic experience within ^{himself} myself? And can there be any neurosis in anyone else that is not somewhere in me? I cannot be everyone or reproduce every phase of life in mine, but I have the faculty of imagination or phantasy which tells me how another feels what he feels, and thinks what he thinks, and the quality of my feelings and thinking is part of my problem. But phantasy and imagination are also ways of escape from this painfully real world, and while I have no conscious desire to evade legitimate responsibility, there is much in me that wishes to evade the illegitimate responsibilities that life insists on thrusting on to me, much against my will and my desire. How can I be anything but anxious when my security is threatened on every side, when life would rob me of my virtue, the thing I treasure most?

The roots of anxiety and obsession surely lie side by side, and are not always easy to isolate. I must be anxious when my fixations shake; I cannot be otherwise than obsessed if I see in front of me the yawning void of chaos. Who would leave the security of certainty, for the insecurity of doubt, and who would trust the invisible more than the visible, unless circumstances themselves brought the individual to the point where no other option were possible? And yet the bridge of neurosis can only be left behind by going out into the unknown, like Abraham 'not knowing whither he went'. But what awaits the individual when he has taken that step? When Pandora opened her box, the only spirit that remained was the spirit of hope, and though eventually all things may return

to us, the interim period is essentially an experience of the psychotic, with its terrifying hallucinations, its threatening voices, its dangers from the macrocosm and its pin-pricks from the microcosm. To become sensitive is to become more liable to be hurt; to be stabbed into wakefulness is not merely glorious, but it is also to see the solemn shadows and the departing glory of yesterday. Such a price we pay then for growing up, but to know the eventuality of the unseen and the metaphysical has its own peculiar compensations, and not all the flesh-pots of Egypt can be compared to the treasures of unearthly vessels. But this experience is also something from which we have to be weaned. The reality of spiritual objectivity - the sense of God as transcendent - must fall into its place in time and be outgrown. We buy it by selling everything; we lose it by the mere inevitability of time, by the painful awareness of our creatureliness, and find ourselves out in the world again, free in a new sense, but circumscribed and limited by all the barriers of time and space.

This essential process of outgrowing the objectivity of things, to find the objectivity of spirituality, is equivalent to the process of losing our neurosis by finding a psychosis; but this also has to be foregone before we can find our real sanity.

The liaison between general medicine and psychiatry must be made by the recognition on the part of general physicians that whereas, in times past, they have been content to speak of prognosis in terms of life and death,

there is another standard of prognosis, and that is in terms of the patient's maturity. Similarly, the psychiatrists in times past have been content to see the patient in some no man's land of his own folly, and have not dared to leave the security of ~~their~~ own limited sanity to help him through to the other side, where there is terra firma once more, because they have failed to realise that there is a kind of meaning in the schizophrenic's nonsense, and that hallucinations are real phenomena. To designate them as projections may in one sense be true, because there is much to be said for the position that all our sense experience is projection. The tree that I see over there, is only really seen there because certain light rays impinge on my retinae, setting up nervous actions which course through the brain, resulting in afferent stimuli to the visual cortex, where ~~in~~ in the light of past experience, they are interpreted as meaning that over there is a tree. This subjective experience is projected into space as part of a reality that corresponds with what I sense.

The pains that are felt in the abdomen, no matter by what pathways they are conveyed, are felt somewhere in the abdomen. This sensation of pain is a projection - relating to the periphery what is really felt through its impulses conveyed to the cortex. Similarly this referred pain, for example, at the shoulder tip through acute cholecystitis, is also a projection in a double sense, for the site of the pain is neither its origin, nor the destination of its nervous connections.

Our awareness of things depends upon the intactness of our sensory pathways; our awareness of thoughts depends upon the integrity of our inner response to truth. These are the two main avenues for our realisation and interpretation of objectivity and subjectivity respectively, but they are interrelated by a third sphere - that of the emotions, and together they give evidence of a fourth reality - that of intuition, which enables us to make judgments about the nature of sense perceptions, thoughts and feelings, judgments about their meaning and about their worth.

In other words then, there are in me - the subjective and more conscious part of me:-

I. Sensory Mechanisms for the perception and localisation of things, sounds, and people, outside of me, but also proprioceptive mechanisms for the appreciation of my position in space through receptors in the skin, muscles and joints, eyes, and labyrinth, as well as visceral sensations (Sensation).

We may enumerate these as they are conveyed in their respective nerve fibres:-

1. Those conveying general sensation and finding their way through to the ascending spinal tracts, of which there are i) superficial, relayed through the cutaneous nerves, and carrying protopathic and epicritic sensations. Of these, the former are protective, and are destined for the ventral nuclei of the thalamus, while the latter are discriminative, and are destined for the sensory cortex in the post central gyrus. ii) Deep, conveyed through the motor nerves.

We may group these according to the following Table:↓

Fibres conveying Sensations from the General Body Structures.

	(Protopathic.	{Heat. (a) {Cold. (b) {Pain. (c)
Superficial (in cutaneous nerves)	Epicritic	{Appreciation of light touch, (d) {Appreciation of light pressure (e) {Tactile localisation. (f) {Tactile discrimination. (g) {Appreciation of mild degrees (of heat and cold. (k)
		{Appreciation of deep pressure and its localisation. (l) {Appreciation of painful pressure. (m) {Appreciation of position and of movements in muscles, joints and tendons. (n) {Appreciation of vibrations. (o)
Deep (in motor nerves)		

All these enter through the posterior nerve routes, where they re-group themselves. Protopathic, epicritic and deep nerve fibres are grouped together, except a few of the tactile fibres. Therefore, there are only four groups in the spinal cord: heat, pain, touch and muscle fibres. The first three end around the posterior horn cells, and the new set cross to the opposite spinō-thalamic tracts. The muscle fibres continue up the same side in the columns of Goll and Burdach.

We may set forth the re-grouping of the fibres in the spinal cord according to the following Table:-

Spino-thalamic tracts(crossed)	{ Thermal	{ (Protopathic, (a), (b) (Epicritic. (h), (k)
	{ Pain. Deep	{ (Protopathic. (c) (Deep. (m)
	{ Tactile.	{ (Epicritic. (d) & (e) partly; (f) (Deep. (l)

Columns of Goll & Burdach (uncrossed)	{ (Muscle sensations. (n) (o)
	{ (Tactile appreciation. (d) & (e) partly.
	{ (Tactile discrimination. (g)

In the medulla oblongata the columns of Goll and Burdach end in the gracile and cuneate nuclei, and new fibres form the medial fillet which is later on joined by the spino-thalamic tracts.

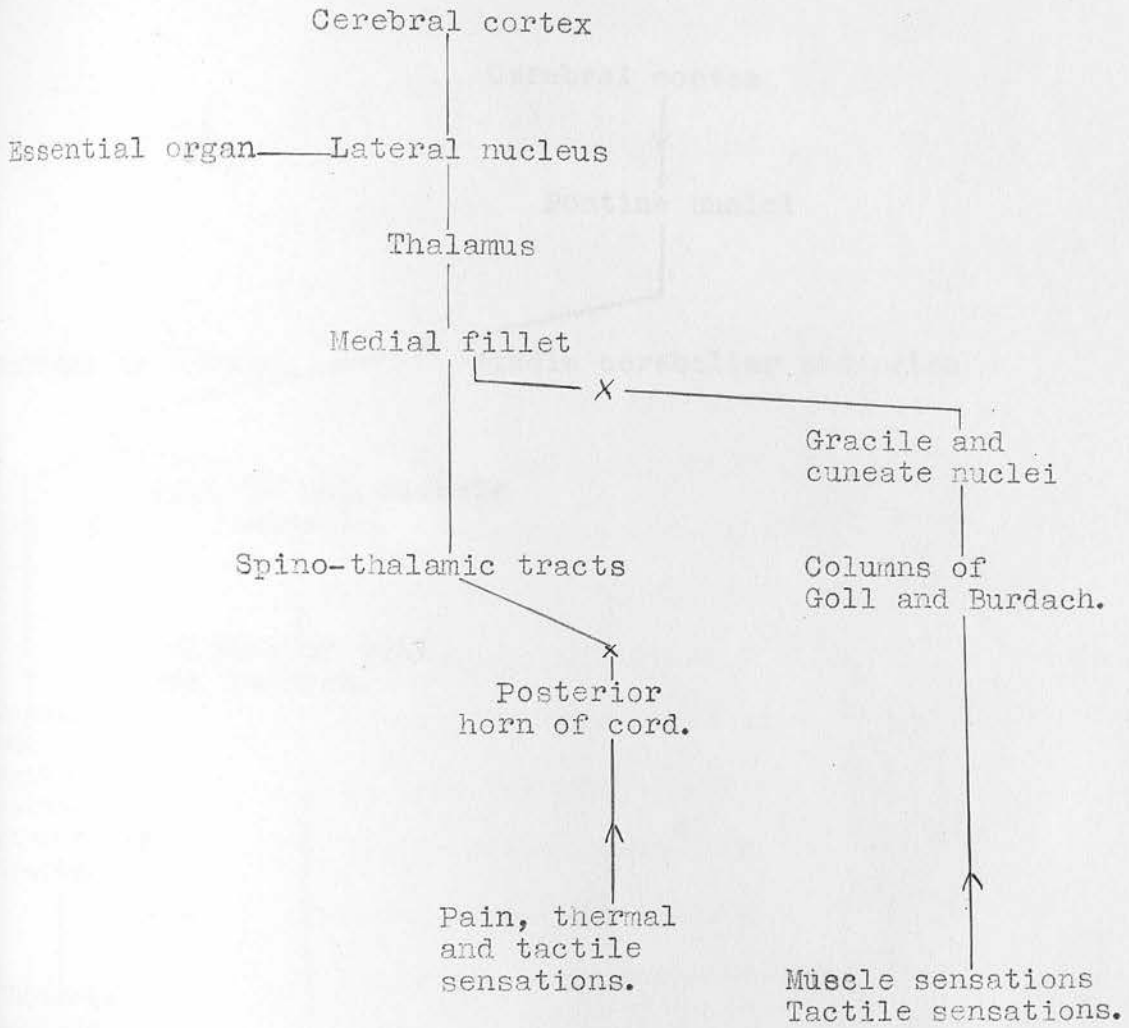
The fibres are grouped in the Brain-stem according to the following table:—

Medial part of medial fillet. Muscle sensations.

Lateral part of medial fillet. { Thermal.
{ Pain.
{ All tactile.

The medial fillet ends in the thalamus and a new relay of fibres carries impulses mainly to the cortex, but partly to the thalamus.

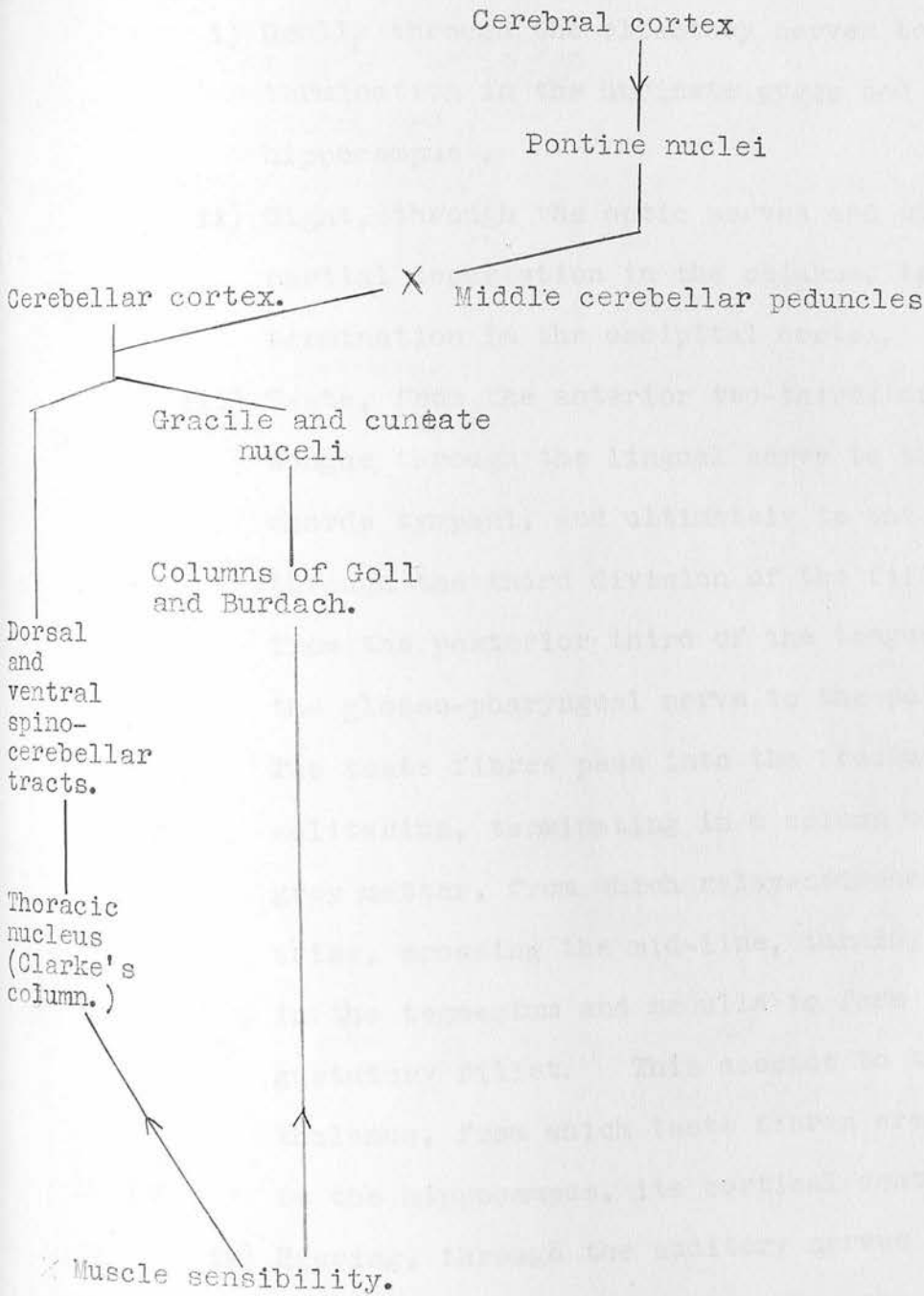
These are indicated in Diagrams 15 and 16.



X Indicates crossing to the opposite side.

Diagram 15 (after Lickley. (1))

Showing schematically the course of fibres conveying general sensation.



X Indicates crossing to the opposite side.

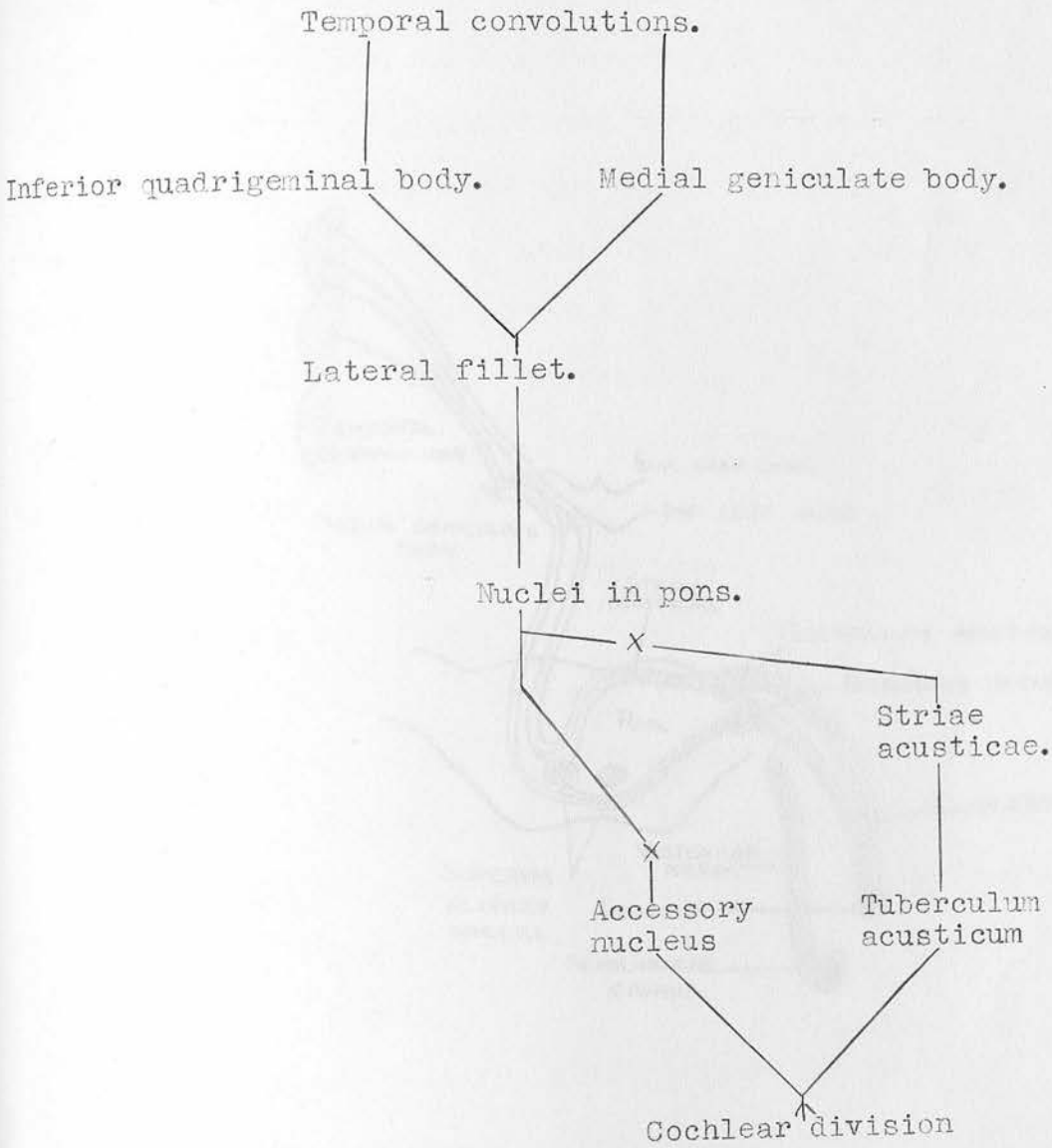
Diagram 16 (after Lickley).

Showing schematically the course of fibres conveying muscle sensibility.

2. Those conveying special sensation, classified as:-

- i) Smell, through the olfactory nerves to their termination in the uncinatè gyrus and the hippocampus .
- ii) Sight, through the optic nerves and their partial decussation in the chiasma, to their termination in the occipital cortex.
- iii) Taste, from the anterior two-thirds of the tongue through the lingual nerve to the chorda tympani, and ultimately to the pons through the third division of the fifth nerve; from the posterior third of the tongue through the glosso-pharyngeal nerve to the pons. The taste fibres pass into the tractus solitarius, terminating in a column of grey matter, from which relay-neurones arise, crossing the mid-line, turning upwards in the tegmentum and medulla to form the gustatory fillet. This ascends to the thalamus, from which taste fibres are relayed to the hippocampus, its cortical centre.
- iv) Hearing, through the auditory nerves to the cochlear nuclei, from which they run in the lateral fillet, after decussating in the pons, to pass up to the inferior corpora quadrigemina and the internal geniculate bodies.

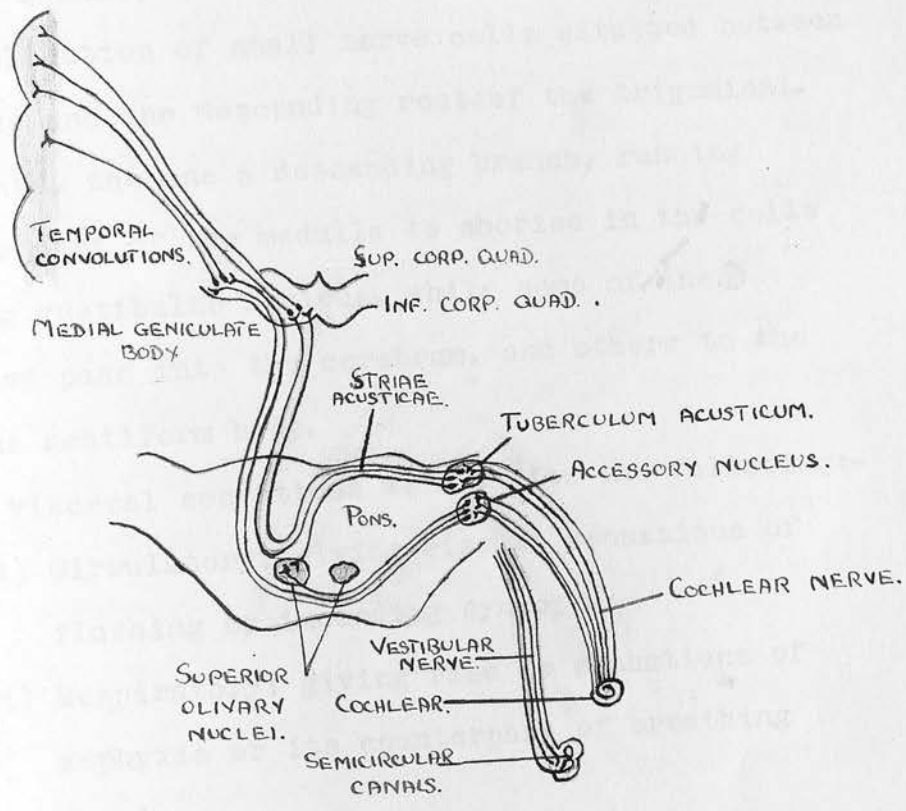
Their course is indicated in Diagrams 17 and 18 .



X Indicates crossing to opposite side.

Diagram 17 (after Lickley).

Indicating the course of auditory fibres.



Diag. 18. (after Lickley.)

Showing the central connections of the cochlear nerve.

3. In addition to the sensation of touch and kin-aesthetic sense from muscle and joints, already considered, we have to make mention of the receptors for the sense of balance arising from the labyrinth, conveying impulses from the semi-circular canals, through the auditory nerves, which pass through a collection of small nerve cells situated between the restiform body and the descending root of the trigeminal. Here they bifurcate, the one a descending branch, running towards the lower part of the medulla to terminate in the cells of the descending vestibular nucleus, while some of the ascending branches pass into the cerebrum, and others to the cerebellum by the restiform body.

4. Of visceral sensations we may cite the following:-

- i) Circulatory: giving rise to sensations of flushing or impending syncope.
- ii) Respiratory: giving rise to sensations of asphyxia or its counterpart of breathing freely.
- iii) Alimentary: arising from the pharynx, oesophagus, stomach, intestine and rectum and comprising sensation of thirst, hunger, distension, various sensations accompanying antrograde or retrograde peristalsis such as 'cardio-spasm', vomiting, borborygmi, tenesmus, and colic, to which we may add the sensation of heat and cold which is present in some of these different parts.
- iv) Vesical: comprising sensations of distension and those accompanying its relief.

- v) Sexual: comprising awareness of desire, and the feeling associated with its expression and release.

These include:-

- a) Dendrites of autonomic cells in the sensory ganglia, the various cranial and spinal nerves which have come through the autonomic ganglia by white rami communicantes. Afferent fibres of this system are found in the fifth, seventh, ninth and tenth cranial nerves and may be present in any or all of the spinal nerves; they pass into the brain stem, and by posterior root fibres into the spinal cord.
- b) Peripheral sensory nerves supplying the parietal peritoneum which find their way into the posterior horn cells.

Head and Holmes (2) assigned to the thalamus the function of being in some way the centre of consciousness for the affective side of sensation. They conclude that after leaving the thalamic centres, the sensory impulses emerge in five main functional groups for distribution in the cortex:-

1. Those which underlie postural recognition and the appreciation of passive movement.
2. Those which underlie the recognition of tactile differences, or the power of appreciating those qualities of touch other than contact and roughness (for example weights of objects on hand).
3. Those upon which depend spatial discrimination (compass points) and its allied faculty, the recognition of size and shape.

4. Those impulses which enable the patient to recognise the spot stimulated. (localisation).
5. Thermal impulses.

These authors postulate 'schemata' or systems of neural paths slowly formed during the ontogenetic life process, capable of being destroyed by cortical lesions. The focus of attention and the ability to recall past experiences are in their view related to these thalamic functions, and their 'schemata' correspond to Semon's (3) neural engrams.

In addition to these functions we are to mention the sensory aspects of speech with their localisation in the temporal area for heard speech and in the visual cortex for the ability to read; though Head (4) is of the opinion that our views on the localisation in the cortex of the functions of speech tend to be too arbitrary. The border-line between these sensory functions and the more definitely intellectual ones is impossible to define clearly, for sensation and meaning are like two sides of a sheet of paper.

II An inward awareness to the meaning of my sensations, giving 'body' to thought, but also related to the faculty for the understanding of language. It involves the ability to define to myself every kind of experience, but its initial development usually follows the course of identification with the external world, though its awareness of visceral sensation may make it acutely consciousness of the internal milieu. (Thought).

How do we learn?

1) By trial and error: - objective.

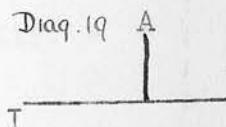
2) By reflection: - subjective.

But in terms of the categories we have just outlined we may say that **k**nowledge first comes through sense experience. The non-ego contacts the ego; **o**bjectivity becomes increasingly real to the subject.

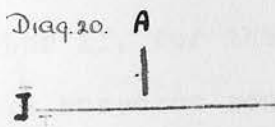
According, in the first instance, to the emotional attitude of parents or guardians, and later of teachers, events become charged positively or negatively for us and we react in either of these ways to events: this may be 'all or none'; or subliminal and ~~therefore~~ possibly ambivalent. Conditioned reflexes would appear to be the ways in which impulses either centrifugally or centripetally become 'fixed' in the cyto-architectonics of the body.

The subjective response may be either positive or negative according as the individual welcomes or rejects new experience. This simple pattern is fundamental to the physical pattern of our development:→

I feel A

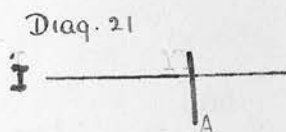


It may hurt

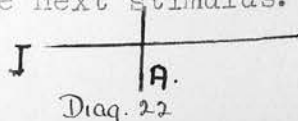


This introduces an element of anticipation, which in itself adds to the basic facts of experience.

It has hurt



It hurts, but is followed by an attitude of acceptance and readiness for the next stimulus.



The introvert is one whose development consists of more negatively charged emotional experiences than normal.

The extravert is one whose development consists of more positively charged emotional experiences.

Assuming the fundamental nature of the reflex arc: 1) Afferent; 2) co-ordinating and 3) efferent neurones; for the introvert, the psychic component from experience leads to an over-development of the afferent-co-ordinating system, and the extravert one whose ~~parental~~ ^{instinctual} drives' tend to help him through experience and even get him to develop 'co-ordinating - efferent' systems without getting the full benefit of 'afferent' experience.

Experience thus tends to be predominantly of three types:)

- 1) Afferent.
- 2) Cognitive.
- 3) Efferent.

		I	II
		either producing:-	or:-
I may feel A	{	Afferently. -	Pleasure : Pain.
		Cognitively. -	Appreciation : Dislike
		E	Repetition : Avoidance.
		Efferently. -	from choice. :
		:	:

The former I is the starting point for the mechanism of projection, and the latter II, for the mechanism of introjection. Locke said all thought is based on sense experience, but this only accounts for some underlying philosophical attitudes, such as

- | | | |
|---|-----|---|
| 1) Empiricism.
('a posteriori'
reasoning from
experience), | and | 2) Hedonism, based
on what I like to
do (desire). |
|---|-----|---|

Now Kant introduces a new idea; that of transcendentalism, though Descartes had previously stated that thought was the most prior form of experience - "Cogito, ergo sum".

There is such a thing as pure thought or pure reason - rationalism, which is relatively independent of sense experience; the idea of duty : the moral imperative: what I ought to do. This is 'a priori' form of reasoning. 'Act from a principle universally valid'. (Kant). "So act that what you do, may become a universal law'. 'Act as if you were yourself legis-
lating or enacting for the world.'

III Aliveness to impulse. The importance of Freudian psychology rests far more on its reminder of something forgotten, than on its uniqueness. It is a recall to the claims of the heart (Emotion) as opposed to those of the head, and as such can claim little distinctively new, though its terminology would make us think otherwise. The conflict between love and duty is no new problem and its resolution takes us both into the simplicities and the complexities of life's deepest experiences. If we could recognise the 'id' and the 'super-ego' as respectively desire and reason, we should feel more at home with its terminology. Where it is customary for us to talk about instinct, our theological forbears would talk of original sin, and where we talk about rationalisation, they would talk of conscience. Bishop Butler's (5) conception of conscience is, in fact, closely related to what in Freud's (6) view is the super-ego, but the focus of healthy conduct and inner responsiveness to reality is neither so absolute, nor so fixed as Butler's intellectual exposition of it would suggest, since

we must regard both Kant and Butler as being too obsessional in their outlook.

For Freud would say: Your reasons for doing things are what Kant says they are, i.e. rationalisations, but are not so virtuous as you suppose, because there is a third order of development, which is represented by the thorough expression and working out of what is primitive and instinctual. In other words, whatever may be said about the moral law and its necessity, the primal and instinctual needs must be attended to; for if not, then neuroses and psychoses must ensue. The principle of conditioning may operate in one of four ways:—

- 1). { I have felt A and liked it.
(I will continue to feel it and like it
- 2). { I have felt A and liked it.
(But it may not be good for me.
(I will not do it again.
- 3). { I have felt A and not liked it.
(I will not do it again.
- 4). { I have felt A and not liked it.
(But it will be good for me to do it again.

Now stages 2 and 3 are the ones with peculiar applicability to Freud's theory of repression, which is in essence the refusal to accept the logic of experience. Freud himself would probably not have accepted so bland a statement of his theory as correct, but for practical purposes it is convenient to think of it in this way.

Locke says we learn through sense experience.

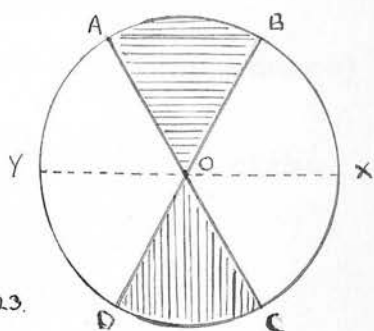
Kant says we learn through rationalisation from sense, but also independently, through the exercise of principle, in

conformity to the idea of duty.

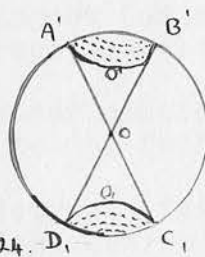
Freud says in effect, we learn through instinctual experience, which is more subjective than Locke, more intimate and basic than Kant, and more final, though not in itself, necessarily ultimate and complete, because rationalisation from experience is a vital necessity to the growth of personality. Super-ego and id are both necessary functions of the psyche.

Here we have a working basis for Freud's classification of ego, super-ego and id, and the world is indebted to him for helping us to recognise the instinctual needs of the individual; but that is not to say that his recognition of the censorship of the super-ego is necessarily right in all its implications.

It is quite true, however, that in the relationships of the various parts of the self to each other are to be found clues which are fundamental for psychiatric understanding.



Diag. 23.



Diag. 24.

Taking the circle A B X C D Y as a symbolical representation of the individual's sense of the world, or of reality, O as the focus of consciousness, and the shaded portions A B O and C D O as super-ego and id respectively, we may say that the problem of schizophrenia is represented by over-development of A B O at the expense of C D O, or where the foci of

of intellectual and instinctual activity have not met (Diagram 14)

Our development at any given point in our life is only partial; we can never say that we have attained, though there may be times when in the flush of self-realisation we think we have, especially when A O B and C D O come to some sort of fusion in consciousness; when A O B and C D O become contingent at their apices O.

There are wide extremes between those who would reduce the categories of instinct to self-preservation, sex and herd, and those who like McDougall (7), find it necessary to describe 14 as follows:→

Names of Instincts
(Synonyms in parentheses)

Names of Emotional Qualities
accompanying the Instinctive
Activities.

- | | |
|--|--|
| 1. Instinct of escape (of self-preservation, of avoidance, danger instinct.) | Fear (terror, fright, alarm, trepidation) |
| 2. Instinct of combat (aggression, pugnacity) | Anger (rage, fury, annoyance, irritation, displeasure.) |
| 3. Repulsion (repugnance) | Disgust (nausea, loathing, repugnance) |
| 4. Parental (protective) | Tender emotion (love, tenderness, tender feeling.) |
| 5. Appeal. | Distress (feeling of helplessness) |
| 6. Pairing (mating, reproduction, sexual) | Lust (sexual emotion or excitement, sometimes called love - an unfortunate and confusing usage.) |
| 7. Curiosity (inquiry, discovery, investigation) | Curiosity (feeling of mystery, of strangeness, of the unknown, wonder) |
| 8. Submission (self-abasement) | Feeling of subjection (of inferiority, of devotion, of humility, of attachment, of submission, negative self-feeling.) [to this we should add depression.] |

Names of Instincts

(Synonyms in parentheses)

9. Assertion (self-display)
10. Social or gregarious instinct.
11. Food-seeking (hunting)
12. Acquisition (hoarding instinct)
13. Construction.
14. Laughter.

Names of Emotional Qualities accompanying the Instinctive Activities.

- Elation (feeling of superiority, of masterfulness, of pride, of domination, positive self-feeling)
- Feeling of loneliness, of isolation, nostalgia.
- Appetite or craving in narrower sense (gusto)
- Feeling of ownership, of possession, (protective feeling).
- Feeling of creativeness, of making, of productivity).
- Amusement (jollity, carelessness, relaxation)

"The minor instincts of scratching, sneezing, coughing, urination and defecation, are so simple in their bodily expressions that we cannot recognise as specific qualities the excitements which accompany their exercise; though the impulse of each may on occasion be excited in great strength".

For the present, however, we may reduce ^{the} ~~the~~ apparent diversity of emotion to the simple principle that it is concerned with the registering of our appreciation of things, thoughts and people through which we are able to separate our likes and dislikes, giving potential in a positive or negative way. Its physiological correlates are the thalamic centres for the appreciation of 'feeling-tone' which, in the absence of cortical control, give awareness of pleasure or unpleasantness, without discrimination as to the exact nature of the stimulus, and the afferent paths to the hypothalamus.

These are:-

a) Olfactory impulses, which biologically seem to have been the earliest indicators of warning from the outside world, are mediated from the olfactory receptors to the posterior hypothalamus by the following routes:-

Unmyelinated fibres traverse the cribriform plate of the ethmoid to enter the olfactory glomeruli where they form the primary olfactory ganglia. From here axones pass to the mitral cells forming a second synapse from which the olfactory tract emerges. This is connected with the cortex by way of the anterior and posterior olfactory lobes and the anterior pyriform lobe.

Association connections are made through the anterior commissure, the limbic lobes, through the lamina terminalis to the frontal Broca convolutions, nucleus amygdalus and to the cornu ammonis by way of the fornix. Afferent connections from the cortex arise from the hippocampal systems by way of the fornix connecting with the mammillary body which communicates with the anterior thalamic nucleus by way of the mammillo-thalamic tract or bundle of Vicq d'Azyr.

b) Optic impulses enter the hypothalamus from the pre-geniculate nucleus of the lateral geniculate body:

c) Auditory from the ventral part of the medial geniculate body:

d) Pain impulses from the reticular nucleus of the spino-thalamic and trigemino-thalamic systems: and

e) Touch from the medial fillet ending in the mammillary peduncle.

f) The connections of the hypothalamus with the afferent fibres of the autonomic nervous system, through which the constancy of the internal environment is maintained. It is suggested that the posterior hypothalamus is an orthosympathetic, and the anterior, a parasympathetic centre, stimulation of which has been associated with :-

i) Penfield's orthosympathetic epilepsy.

ii) Cushing's parasympathetic epilepsy.

Their effects may be compared as follows:→

<u>Penfield's (8) orthosympathetic epilepsy.</u>	<u>Cushing's (9) parasympathetic epilepsy.</u>
Brought on: by irritation of posterior hypothalamic nuclei.	by irritation of anterior hypothalamic nuclei.
Produces: Vaso-dilatation.	Flushing.
Perspiration.	Sweating.
Fever, variation in pulse-rate and volume : shivering.	Fall in temperature, B.P. and B.M.R.
Slow respiration.	Increased peristalsis.
Salivation: lacrimation:	Pyloro-spasm.
Exophthalmos, with dilated pupils.	Gastric hypersecretion, retching and vomiting; increased gastrointestinal activity.
Hiccup.	Contraction of bladder wall.

Neither of these pictures appears to be characteristic of activity distinctive of one particular phase of sympathetic or parasympathetic stimulation, and like the ^{similar} clinical condition, Gower's vaso-vagal attacks, both aspects of the autonomic nervous system may be deranged.

It is evident, therefore, that the hypothalamus receives afferent impulses through all the somatic and visceral sense modalities.

IV. The Sense of reality. We shall have something more to say of the mechanisms involved in our fullest contact with reality, under the heading of the metaphysical basis of consciousness, but for our present purpose we may describe it as that faculty of the inward response of the total organism which determines my reaction to all the data of experience here outlined, on which insight depends, but which is also related to the complete orientation of the individual in the space-time continuum. (Intuition).

To each of these aspects of the subjective, however, there is both an external and an internal aspect, which we may summarise as follows:-

- I. Aliveness to the external world and my orientation in it.
- II. Interpretation of language and experience, and the process of conceptualisation.
- III. The reception of pleasurable and painful experiences and reaction to them.
- IV. The sense of reality and insight.

The subjective part of me registers awareness of data that tends to growth in knowledge: it is concerned pre-eminently with epistemology, and is receptive, passive, symbolised by the feminine and the centripetal.

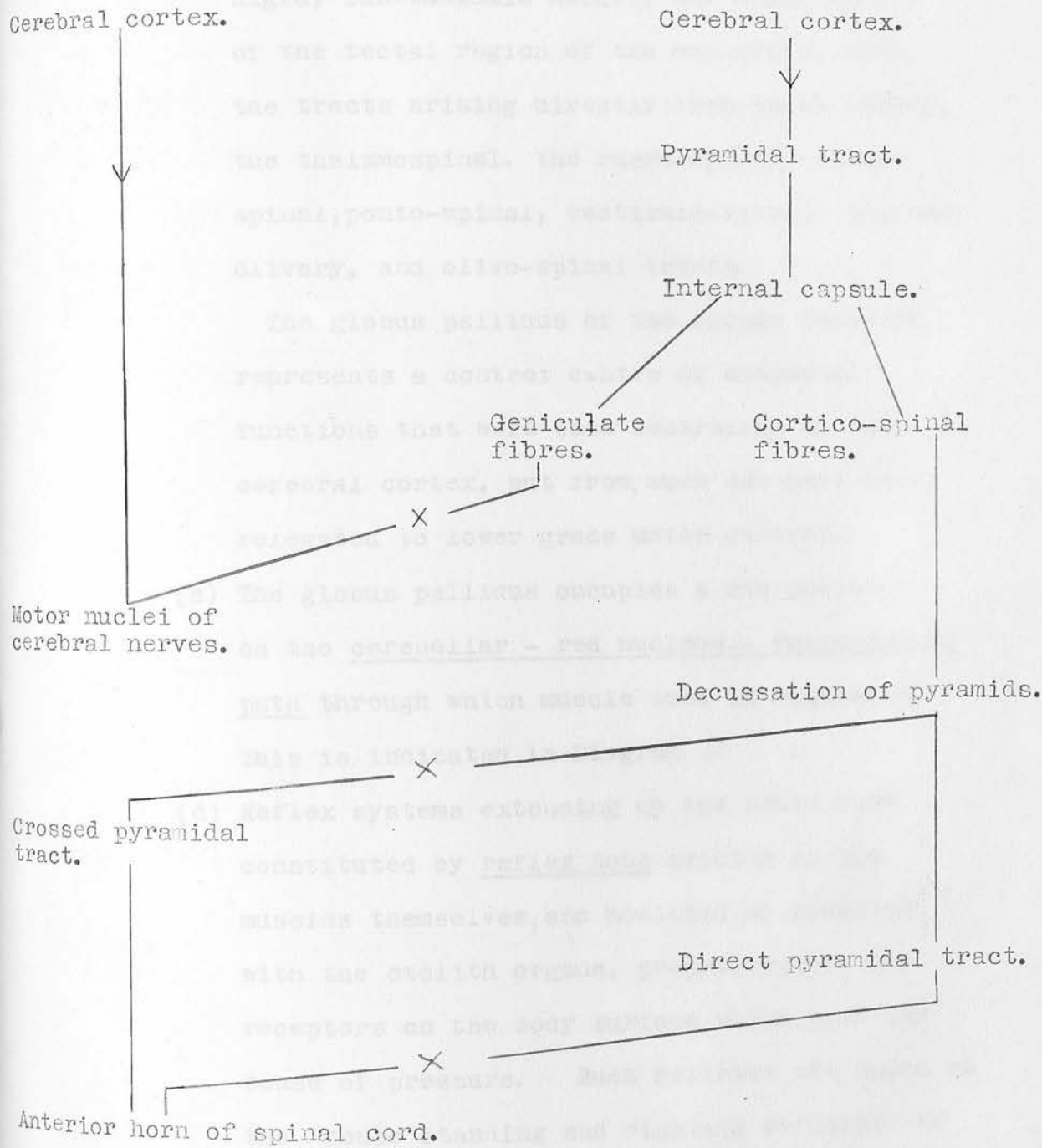
The objective part of me is conative. It wants to do something about all the experiences that the self encounters. It is aggressive, active, symbolised by the masculine and the centrifugal, and as complementary to the subjective self, may be said to be made up of the following functions:-

I. Motor responses to sensation.

These include:-

- (a) Impulses mediated from the motor area of the brain from the pre-central gyrus through the pyramidal tracts which pass through the corona-radiata to the internal capsule, from whence it passes through the mid-brain, pons, to cross in the lower part of the medulla oblongata as the crossed pyramidal tract, which occupies the lateral column of the spinal cord until it reaches its destination, which lies in the arborisations round the cells of the posterior horn, whence they are relayed to the anterior horn cells, whose axons pass out from the spinal cord to the muscles. Some of the pyramidal fibres, which do not cross in the medulla are known as the direct pyramidal tract, and remain in the anterior part of the spinal cord throughout, crossing lower down.

This is indicated in Diagram 25 .



X Indicates crossing to the opposite side.

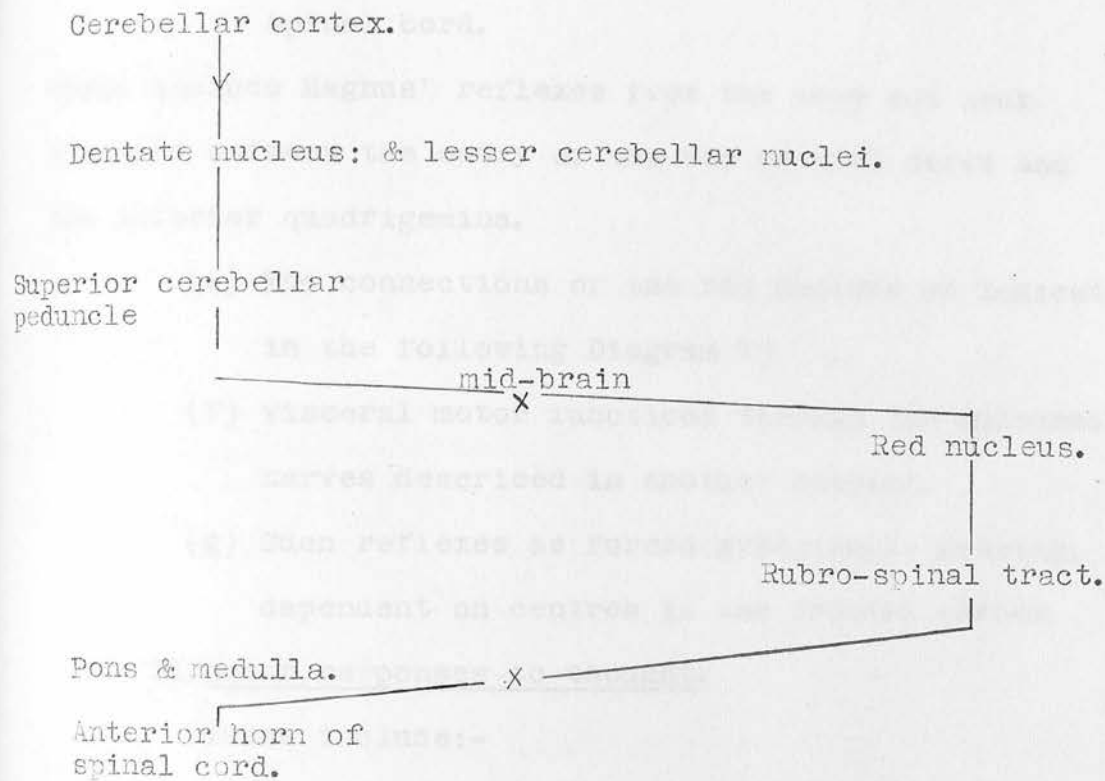
Diagram 25 (after Lickley).

Indicating the course of the chief motor pathways.

- (b) The Extra-pyramidal paths which includes the corpus striatum, the red nucleus, substantia nigra, sub-thalamic nuclei, and other nuclei of the tectal region of the mid-brain, with the tracts arising directly from these namely, the thalamospinal, the rubro-spinal, tecto-spinal, ponto-spinal, vestibulo-spinal, thalamo-olivary, and olivo-spinal tracts.

The globus pallidus of the corpus striatum represents a control centre of automatic functions that were once controlled by the cerebral cortex, but from much use have been relegated to lower grade motor centres.

- (c) The globus pallidus occupies a mid position on the cerebellar - red nucleus - rubro-spinal path through which muscle tone is regulated. This is indicated in Diagram 26 .
- (d) Reflex systems extending up the brain stem constituted by reflex tone arising in the muscles themselves, and modified by reaction with the otolith organs, proprioceptors and receptors on the body surface which give the sense of pressure. Such reflexes are known as the 'tonic standing and righting reflexes' of Magnus and De Kleijn . Postural reactions are controlled by static reflexes and, righting reflexes, so that posture is maintained both at rest and after movement. Another reflex



X Indicates crossing to opposite side.

Diagram 16 (after Lickley).

Indicating the course of the rubro-spinal tract.

- (a) Motor paths for speech...
- (b) The rubro-spinal tract...
- (c) Motor mechanisms responsible for the control of gesture and mediated through the rubro-spinal tracts.
- (d) Motor mechanisms for precision of hand...

system consists of short lived movements with a reflex arc that does not extend above the spinal cord.

These include Magnus' reflexes from the head and neck situated between the entry of the 8th cranial nerve and the inferior quadrigemina.

- (e) The connections of the red nucleus as indicated in the following Diagram 17.
- (f) Visceral motor functions through the autonomic nerves described in another chapter.
- (g) Such reflexes as forced grasping, or groping, dependent on centres in the frontal cortex.

II. Motor responses to thought.

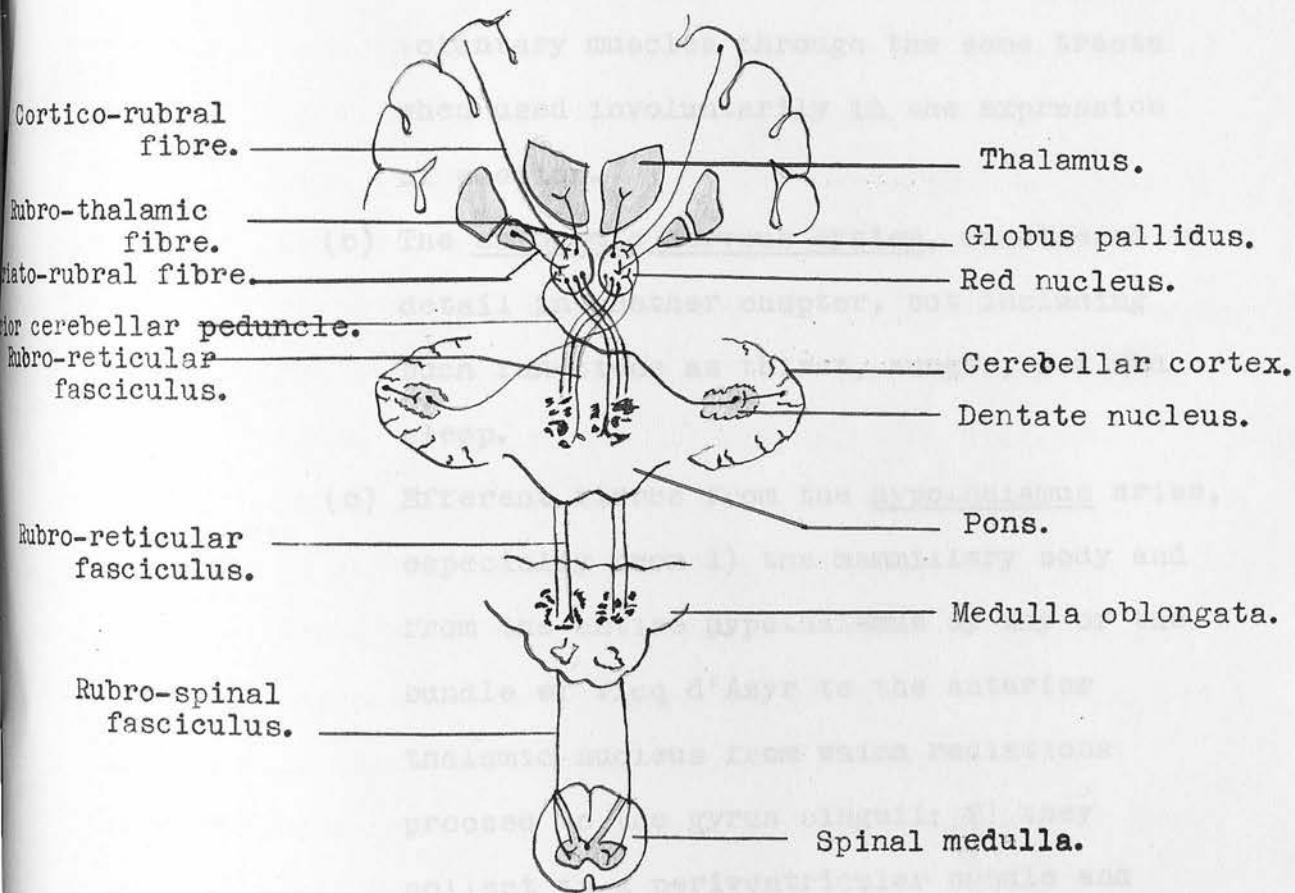
These include:-

- (a) Motor paths for speech situated in Broca's convolution in the frontal area of the brain, behind which is the motor area for the movement of the tongue and vocal cords, called by Bastian the glosso-kinaesthetic area.
- (b) The cheiro-kinaesthetic area is the corresponding region for hand movements concerned in writing, and is situated in front of the motor area for the hand.
- (c) Motor mechanisms responsible for the communication of gesture and mediated through the pyramidal tracts.
- (d) Motor mechanisms for production of vocal speech in the vocal cords through the vagi.

III. Motor responses to emotion.

These include:-

(a) voluntary muscle activities through the pyramidal system for the somatic expressions of fight or flight, also the activation of



Diag. 27 (after Lickley.)

A scheme to show the connections of the red nucleus.

Charles Darwin (18) has formulated the following three principles governing the associative factors in the expression of emotion:-

1) Principle of servile habits.

Whenever the same state of mind is reached

III. Motor responses to emotion.

These include:-

- (a) Voluntary muscle activities through the pyramidal systems for the somatic expressions of fight or flight, also the activities of voluntary muscles through the same tracts when used involuntarily in the expression of emotion.
- (b) The autonomic nervous system, considered in detail in another chapter, but including such functions as thirst, hunger, sex and sleep.
- (c) Efferent fibres from the hypothalamus arise, especially from 1) the mammillary body and from the entire hypothalamus by way of the bundle of Vicq d'Azyr to the anterior thalamic nucleus from which radiations proceed to the gyrus cinguli; 2) they collect in a periventricular bundle and are distributed to the thalamus and brain-stem by way of the dorsal longitudinal bundle of Schütz; and 3) connect up with the pituitary body from the pars optica and lower autonomic centres from the pars tuberalis.

Charles Darwin (10) has formulated the following three principles governing the associative factors in the expression of emotion:-

- 1) Principle of serviceable habits.

"Whenever the same state of mind is induced

however freely there is a tendency through the force of habit and association for the same movements to be performed, though they may not then be of the least use."

2) Principle of antithesis: "certain mental states lead to certain habitual actions which are of service. When a directly opposite state of mind is induced, there is a strong and involuntary tendency to the performance of movements of a directly opposite nature, though these are of no use."

3) Principle of direct action of the nervous system: "when the sensorium is strongly excited nerve-force is generated in excess, and is transmitted in certain definite directions, depending on a connection of the nerve cells and partly on habit."

These principles are formulated in order to account for all the manifold varieties of physical movements that accompany such emotional expressions as occur in rage, horror, perplexity and curiosity etc.

IV. Motor responses to intuition (using the word in its fullest sense of integration.)

These include:-

- (a) The motor functions of the whole man as these arise out of conscious voluntary activity. Their functions are mediated through the pyramidal systems, but they include a whole series of gross movements for conveying the body from one place to another, as well as those for the delicate

use of the small muscles of the hands for fine, creative work.

(b) In the consideration of any simple voluntary movement we must include: 1) Agonists or prime movers; 2) Antagonists, or muscles tending to interfere with the desired joint displacement; 3) Synergists, or muscles facilitating the precise movement. For the integration of nerve impulses to these different muscles the mechanism is supplied by the process of 'reciprocal innervation' as described by Sherrington (11). This is attained in such a way that the contraction of one or more muscles is accompanied by the simultaneous relaxation of the antagonistic one and is well illustrated by the actions of the internal and external ocular recti and by the flexors and extensors of the thigh.

It now remains for us to define, as well as we may, just what nervous factors are involved in relating the subjective to the objective self.

I. In the correlation of Sensation with motor responses, we must include:-

(a) Intercalary neurones connecting afferent with efferent pathways in the reflex arc of the spinal cord covering those that are in general use for clinical examination.

(b) Short chain/connecting different levels of the spinal cord, such as the ground bundles, the ascending Lissauer's tract and the descending comma tract.

(c) Reflexes for the automatic control of visceral functions such as defaecation, micturition, through long reflex arcs with its pontine centre, and the gastro-colic reflex.

(d) Connections between the proprioceptive system and the motor functions governing movement and posture. These have been classified as:-

1. In the Kinetic system.

- i) Archeokinetic system, or spinal cord reflexes.
- ii) Palaeokinetic system, or automatic associated movements of striate-spinal (extrapyramidal) origin.
- iii) Neokinetic system, or voluntary dissociated movements of cortico-spinal (pyramidal) origin.

2. In the static system.

- i) Archeostatic system, or segmental mechanism of spinal cord and brain-stem.
- ii) Palaeostatic system { or cortico-cerebellar and
- iii) Neostatic system { cerebellar spinal mechanisms, the cortico-pontine-cerebellar path corresponding to the pyramidal tract.

(e) Connections of the thalamus and the corpus striatum, as follows:-

- A. Fibres coming from elsewhere and ending in these nuclei.
- (i) To thalamus by all general sensory paths.
 - (vii) (ii) To thalamus from contralateral cerebellar nuclei.
 - (viii) (iii) To thalamus from ipsilateral cerebral cortex.
 - (iv) To thalamus from corpora mammillaria.
 - (x) (v) To globus pallidus from ipsilateral red nucleus (and thus from contralateral cerebellum).
- B. Fibres arising and ending within these nuclei.
- (i) From thalamus to caudate nuclei.
 - (ii) From thalamus to globus pallidus.
 - (iii) From caudate nucleus to putamen.
 - (iv) From caudate nucleus to globus pallidus.
 - (v) From putamen to globus pallidus.
 - (vi) From globus pallidus to thalamus.
 - (vii) Commissural fibres between the two thalami and the two lenticular nuclei, crossing in the commissure of Forel.
- C. Fibres arising in these nuclei and ending elsewhere.
- (i) From thalamus to ipsilateral cerebral cortex.
 - (ii) From thalamus to olives (thalamo-olivary tract).
 - (iii) From thalamus to subthalamic nucleus.
 - (iv) From thalamus to spinal cord (thalamo-spinal tract).
 - (v) From globus pallidus to ipsilateral red nucleus and thence by rubrospinal tract to contralateral cord.

- (vi) From globus pallidus to ipsolateral substantia nigra, and thence probably to lower motor centres.
- (vii) From globus pallidus to subthalamic nucleus.
- (viii) From caudate nucleus to ipsolateral red nucleus.
(from Hewer & Sandes (12)).

(f) Deep connections of the cranial nerves:-

1. of the olfactory nerve through the hippocampus of one side ~~via~~ the fornix to: i) the other hippocampus, ii) the corpora mammillaria and thence to the anterior thalamic nucleus with further relays to the corpus striatum and subthalamic nucleus, and to the tegmentum, iii) the habenula, and iv) the pyriform area;
2. of the optic nerve through the superior corpus quadrigeminum to the oculo-motor nuclei;
3. of the oculomotor nerve with the trochlear, abducens, vestibular and cochlear nerves especially through the posterior longitudinal bundle;
4. of the facial nerve with the trigeminal through : i) the motor nucleus of the fifth fibres connect with the motor nucleus of the seventh, ii) connections between the spinal sensory root of the fifth and the motor nucleus of the seventh;
5. between the motor nucleus of the seventh and the contralateral pyramidal tract;

6. of the sensory part of the facial to the median fillet, and thence by the thalamus to the hippocampus;
 7. of the vestibular division of the eighth nerve with the vestibulo-spinal tract and lateral fillet;
 8. of the glosso-pharyngeal with the vagus with which it shares its sensory nucleus, both of which connect through the medial fillet with the optic thalamus, and thence with the hippocampus;
 9. of the vagus with the spinal accessory;
 10. of the cranial autonomic ganglia: i) the spheno-palatine ganglion connecting the facial with the trigeminal ii) the otic ganglion connecting the glosso-pharyngeal, the facial and trigeminal; iii) the sub-maxillary ganglion connecting the facial with the trigeminal; iv) the ciliary ganglion connecting the oculo-motor with the trigeminal.
- (g) Connections between the pyramidal tract and the cranial nuclei via sensory cells (such as those in the substantia nigra).
- (h) Association areas in the cortex, some connecting surface portions of the same hemisphere, some short running between adjacent convolutions, but some much longer

as in the occipito-frontal fasciculus, the superior longitudinal fasciculus, connecting the temporal with the occipital regions, and the perpendicular fasciculus connecting upper and lower parts of the occipital region.

II. In the correlation of thought with motor responses, we must include:-

- (a) The lower and posterior part of the frontal lobe.
- (b) The Island of Reil.
- (c) The temporal cortex.
- (d) The lower parietal cortex.
- (e) The occipital region.

III. In the correlation of emotion with motor response we are to include:-

- (a) The nuclei of the hypothalamus which have been classified as follows:-

1. Anterior Hypothalamus:

The paraventricular Lateral and medial pre-optic nuclei, are situated below the anterior commissure, sending fibres

- (b) Its connections extend posteriorly to the main body of the hypothalamus, the thalamic peduncle and the posterior hypothalamus.

2. Paraventricular or filiform nucleus

is situated along the wall of the third ventricle sending fibres to the thalamus, the tuber cinereum, the preoptic nuclei, and descending by way of the mammillary bodies, crossed and uncrossed intercalated neurones

as far down as the medulla oblongata, if not into the spinal cord.

Supraoptic nucleus, across the optic chiasma, sending fibres into the posterior lobe of the pituitary, as the supra-optico-hypophyseal tract.

2. Middle Hypothalamus or pars tuberalis containing ventromedian and dorsomedian nuclei.
3. Lateral Hypothalamus or mammillo-infundibular nucleus, extending throughout the middle and posterior hypothalamus embedded in the medial forebrain bundle.
4. Posterior Hypothalamic nucleus lying above and in front of the mammillary bodies, composed of large motor cells which send fibres through short chains to the lateral grey columns at various spinal levels, and from the chief efferent system.

The par~~s~~ mammillaris with one large and three small nuclei.

(b) Its connections with the autonomic nervous system

the activities of which may be summarised as follows:-

<p>The parasympathetic controls anabolism; it lessens the efficiency of the sensori-motor system and operates in the interest of individual organs. It furnishes the brake on activities, conserves resources, and reserves and builds up tensions.</p>	<p>: The orthosympathetic : : enhances the functions of : : the sensori-motor system, : : increasing its functional : : output, and is concerned : : with catabolism. It affects : : massive discharges in the : internal tensions.</p>
---	---

Is concerned with sleep	:	Is concerned with protective
	:	
and sexual activities.	:	functions.
	:	

"The hormono-autonomic system, as the name implies, acts both by way of body-fluids and nervous system. The body-fluids supply certain chemical substances which are in part translated into nerve-electrical impulses. They travel through the nerves to their end arborisations where they are instrumental in manufacturing new chemicals such as, for example, acetylcholine and adrenalin (sympathin). These in turn affect the autonomic nervous system. Acetylcholin, also called Sympathin I (inhibitor) is liberated at the endings of the parasympathetic nerves, while sympathin, i. e. Sympathin E (excitor), is formed at the sympathetic nerve endings. This is so characteristic that one speaks of cholinergic and adrenergic nerves to indicate the two main divisions of the autonomic system. The two kinds of nerves are so specific that successful joining of nerve trunks is possible only in nerves which are alike in that respect." (13)

- (c) Through the autonomic nervous system, the endocrine glands, of which the most important is the pituitary, along with its axial relationship with the gonads, but which also stands in some sort of axial relationship with all the other endocrine glands, provide a very important factor in correlating the subjective with the objective self.

(d) Other connections exist between the hypothalamus and the thalamus, the subthalamus and the globus pallidus, and the thalamus and the frontal lobe. It is connected, therefore, with the cortex indirectly through the thalamus and by direct afferent and efferent fibres with the peripheral autonomic system and its lower centres, and with the pituitary.

"The hypothalamus therefore lies as a central organ, intermediate between the cortex and peripheral autonomic system connected directly and indirectly with both territories by a two-way neural system of fibre pathways." (14)

We may here conveniently summarise the important points of the hypothalamic functions as given by Grinker (15).

Papez states (16) that the great sensory station within the thalamus gives rise to three great pathways. These converge - 1. To the striatum which constitutes the stream of movement. 2. The cortex or stream of thought and 3. to hypothalamus-gyrus cinguli unit as the stream of feeling. The latter gyrus receives impulses which evoke feelings, then influencing other cortical areas. The gyrus is the cortical centre for dynamic vigilance, for tumours there are associated with apathy and drowsiness. The hippocampus is also largely concerned with feeling, for rabies in that situation is associated with negri bodies in which insomnia and fright are found.

"Evolutionary development took away from the hypothalamus its dominant role in emotional expression during

the processes of encephalisation. Instinctual cravings become synthetised and formulated in a slower acting more adaptive structure in which the processes of conditioning, or learning by experience, dominate rapid reflex action. To achieve these slower adaptive responses the hypothalamus became subordinated to higher, new cortical centres by inhibitory processes emanating therefrom. The hippocampal-cinguli formation, subserving the conscious sensation of emotion revalued in relation to other cortical functions, also damps down hypothalamic excessive responses and allows only mild peripheral activities to be carried on in economically graded form, avoiding excessiveness".

Its drives are synonymous with id demands or necessities of the instincts. There is postulated a mutually antagonistic system with cortical inhibitory influences predominating in most spheres. A phasic release of such inhibition results in appropriate centrally directed visceral responses and graded emotional expressions. Cortical inhibitions are, however, directed by learning or conditioning involving ego functions. Psychologically we are justified in assuming that such inhibitions or releases are directed upon the ego by environmental or social forces or their intropsychic encrustations. Freud spoke of all this when he stated that the ego serves three masters: reality, the super-ego and the id.

IV. In the correlation of intuition with motor functions, we must include:-

- (a) Silent areas of the brain in the anterior part of the frontal region, and in the parietal association area behind the post Rolandic convolution.
- (b) Projection fibres of which the most important is the corona radiata.
 - i) Tract from the frontal gyri to the pons nuclei and so to the cerebellum.
 - ii) Pyramidal tract between the cortex and the internal capsule.
 - iii) The sensory tract for touch running to the parietal region.
 - iv) Visual tract to the occipital cortex.
 - v) Auditory tract running to the temporal region.
 - vi) The three cerebellar peduncles.
- (c) Commissural fibres which link the two hemispheres of the brain together, the most important of which are the corpus callosum, the fornix, the anterior and posterior commissures, and the massa intermedia.
- (d) The six primary layers of the cortex of which we may mention:-
 - i) The pyramid cell layer, the highest level of association, with its tangential connections, dissociation in which is said to produce loss of recollection.

- ii) The granule cell layer, the middle level of association, spoken of as cortical perceptrors, dissociation of which produces loss of consciousness and recognition.
 - iii) Lower level of cortical receptors, dissociation of which causes loss of consciousness.
- (e) Conditioned Reflexes, in contra~~o~~distinction to unconditioned reflexes or instincts, represent the acquisition of function as apart from that which is inherited. Pavlov (17) has investigated these and briefly we may apply to them the following characteristics:-
- i) They are essentially localised in the cortex.
 - ii) They are conditioned in the sense that their formation depends on the association of stimulation of a receptor organ with excitation of an effector organ.
 - iii) They are of three types, simultaneous, delayed and trace.
 - iv) They are specific, enabling discrimination between different forms of stimuli to be made.
 - v) They may be inhibited externally by any stimulus applied during or shortly before the occurrence of ~~a conditioned~~ ^{the} reflex.
 - vi) They may be inhibited internally by the development of an active inhibitory process within the individual, as might obtain by negativistic states of mind.

vii) Inhibition of inhibitions may be brought about by the introduction of new stimuli.

viii) Sleep is considered to be due to the integrative action of irradiation of inhibition. It is also true that every

ix) With ablation of parts of the cortex the remainder is able to acquire new conditioned reflexes similar to those lost. (Lashley (18 & 19) Köhler (20)).

x) Nervous breakdown has been induced in dogs by conditioning its response to a circular disc, and then by introducing an elliptical disc which provoked a state of confusion.

xi) The importance of the polarity principle is suggested by building up positive responses to excitation without introducing inhibitory ones, ^{which produced hysteria.} Similarly neurasthenia has been attributed to the over-production of inhibitory responses.

As we try to define the neurological components corresponding to experience we are aware that underlying our analysis, there is a synthetic process at work. As Sherrington has indicated in his expressive phrase, there is an 'integrative action of the nervous system', underlying the activity of all its separate parts. In many ways, profound significance.

Disease is said to 'cause' the symptoms of insanity, the manifestations of disease may be regarded as breakdowns of that mechanism, or better still, as breakdowns of the integrative action of the whole organism. It is also true that every disease represents some phase of experience that is both inevitable to the individual and in some sense necessary, in order that functions not properly developed may have opportunity to do so, or that mistakes not previously corrected may be remedied. We may state therefore, the following paradox:-

1. Disease represents a breakdown of the personality as a whole.
2. The whole personality is capable of assimilating every experience.

In a general sense, therefore, every disease is a neurosis, which may yet represent a stage of integration.

It would be impossible to substantiate this for every clinical entity, but the following illustration of the principle may be cited.

Dementia is the most profound disintegration that can affect the human personality, yet the changes accompanying that condition represent the most fundamental and radical form of psycho-analysis conceivable. That we do not yet seem to have learnt how to stem the tide of dementia, is a mark of our failure, which does not affect the principle. Hughlings Jackson's observations on this subject are of profound significance.

"Disease is said to 'cause' the symptoms of insanity. I submit that disease only produces negative mental symptoms answering to the dissolution, and that all elaborate positive mental symptoms (illusion, hallucinations, delusions, and extravagant conduct) are the outcome of activity of nervous elements untouched by any pathological process: that they arise during activity on the lower level of evolution remaining." (21)

Similarly in his conception of the different nervous levels we see this process of dementia as one of reduction of man to his basic instinctual levels, *though he spoke more explicitly of epilepsy.*

"We must speak of three degrees of exhaustion, increasing depth of dissolution, which are affected by epileptic discharges of different degrees of severity, taking count of the corresponding three degrees of decreasing shallows of evolution. First depth.- There is defect of consciousness significant of dissolution of the topmost layer along with the rise of a certain kind of ideation significant of increased activity of the second layer. The double condition is roughly analagous to ordinary sleep with dreaming.

Second depth.- There is so-called loss of consciousness, significant of dissolution of the topmost and second layers, along with actions of more or less elaborateness (one example of which is post-epileptic unconsciousness with mania), significant of increased activity of the third layer. The double condition is analagous to sleep with somnambulism.

Third depth.- There is coma significant of dissolution of the first, second and third layers, with which, seemingly, there is persistence only of 'vital' operations, such as respiration and circulation, significant of retention of activity of the fourth layer. The double condition is analagous to deep slumber, to so-called dreamless sleep." (22)

One of the most important features of the diathetic concept is its capacity for bringing together clinical medicine and psychiatry. It is not sufficiently realised, either on the part of clinician or of psychiatrist, that the ordinary disease states of clinical medicine represent individuals who are more or less fixated at certain psychobiological levels, while those of psychiatry represent those in states of much greater flux. This distinction may perhaps be exemplified simply by reference to cyclothymia, in which the diagnosis must rest on the recognition that one emotional phase is followed by another. In other words, the factor of time is inherent in the clinical picture, and in general medicine we usually see no necessity for reserving our diagnosis in order that we may see what is coming next, though no doubt the same principle of equilibrium is at work in the one sphere as in the other, for phases of stimulatory activity tend to be followed by inhibitory ones. One could cite many illustrations of that general principle, but we must here rather note some additional principles.

a) There are considerable variations in the rate of biphasic activity. Hyperchlorhydria, for instance, is liable to affect an individual over long periods of time, while its negative phase does not tend to be so apparent.

b) The negative phases are inclined to be more permanent than the positive ones, e.g. hypothyroidism, cardiac decompensation, achlorhydria, tend to occur as extensive sequelae to their opposite phases, though we know too that they may arise de novo.

c) One local phase of hyperactivity may be associated with another of hypo-activity, e.g. auricular fibrillation with diminution of skeletal muscular activity.

d) Dysrhythmias between positive and negative phases may lead to all kinds of different clinical pictures; e.g. epilepsy, spasmodic torticollis, pylorospasm, achalasia of the cardia, or of the ureteric orifice, and different varieties of colic.

e) The factor of perseveration is the chief hindrance to the equilibrium of health.

In these different conditions, the conceptions of schizophrenia and cyclothymia are relevant, for they usually involve a break in the continuity of biphasic activity, which is schizoid, while one phase of heightened activity, for the sake of equilibrium, may need to be followed by a markedly opposite phase.

Sympatheticotonia usually accompanies phases of heightened activity, and vagotonia the opposite, though each of these has its own inhibitory and stimulatory phases.

Schizophrenia is essentially a condition in which the patient is unable to find his true polarity, but the same principle may obtain with mania or depression, unaccompanied by cyclothymia. Dementia is the end-result of uncompensated nervous activity and the conditions necessary for its prevention are:-

1. Opportunity for counter-expression of previous tendencies.
2. Interpretation of the phenomena of psychotic experience.
3. Opportunity for re-direction of anti-social impulses in creative activity of many different kinds.

To this end we might mention a few desiderata for the more satisfactory treatment of insanity:→

1. A greater tolerance on the part of the community in general towards the insane.
2. For the sake of the patient and for his relatives, much shorter, and probably more frequent periods of hospitalisation.
3. Much less concentration of the insane in mental hospitals, and a much greater measure of infiltration of the psychotic with the enlightened normal in communities.

In general, disease is due to the inability to hold to the truth of ambivalence, and functions wane partly because of over-use, and partly because of disuse. Tensions within the nervous system arise, partly because the process

of strain is not distributed throughout, and partly too, because the body sometimes only learns to acquire its potential functions when those it is accustomed to over-use, are for a time inactivated.

Our health depends upon our ability to reconcile opposites, and the negation of one aspect of truth, increases the burdens of one part of the body, while diminishing that borne by another.

Our sanity depends upon our ability to see that life is so constituted as to be most truly interpreted as paradoxical. In conclusion, therefore, let us look at this, in terms of:-

1. The paradoxical nature of diathesis.

2. Appearance and reality, though something has

been said under this heading in Chapter 4 .

1. Concerning the Paradoxical Nature of Diathesis.

It will be apparent from many of the statements made in these pages that the difficulties of believing in the reality of diathesis largely consist in the paradoxical nature of disease-phenomena in general. Thus a duodenal ulcer diathesis may apparently coincide with a pernicious anaemia diathesis, when actually hyperchlorhydria is typical of the former, and achlorhydria of the latter. Similarly hyperthyroidism may occur at one life-period to be followed at another by myxoedema or a definite hypothyroidism. Part of this paradox resides in the ^emore periodicity or rhythmicity of many of life's processes, but in psychiatric states this paradox may be even more bewildering. Thus schizophrenia and cyclothymia represent two contrasting psychiatric types, though the former may have its fitful episodes, where violent activity follows a long period of quiescence, and the latter represents one kind of detachment from the fullest kind of reality, which is fundamentally schizoid, if not apparently schizophrenic.

Similarly it is customary to think of schizophrenia and hysteria as in some sense antithetic to each other, where the former represents detachment from people and the latter an 'inordinate affection' for them. It is true also that the one is less marked by somatic symptoms than the other, the one is typically found in introverts and the other in extraverts, and the one is 'shut in', while the other shuts others out. But hysteria can merge into schizophrenia,

and the schizophrenic can produce somatic symptoms, and 'la belle indifference' of the hysteric is much more typically found in schizophrenia.

Schizophrenia and paranoia also represent conditions that are in some ways complementary, where lack of concern for the opinions of others is typical of the former, and violent antagonism to the real or imagined criticism of others, of the latter.

The one is characterised by the mechanism of introjection the other by that of projection, but both these phases may be part of a fundamental periodicity which connects them both, so that one may legitimately speak of the schizophrenia-paranoia series as though there were an underlying relationship between them.

The success of convulsion-therapy for schizophrenia raises the question as to how far the schizophrenic's need is not something that the epileptic has got. The one is an 'introjector', the other a 'projector', but both have this in common that they are fitful in their moods, and lack any real smooth phasic variation in their emotional fluctuations. While one is aware of a contrast between schizophrenia and epilepsy, the similarity between the extraversion of epilepsy and hysteria may prevent us from noting the introvert character of the epileptic's aura and the sheer negativism of many of the hysteric's symptoms, typical of the schizoid pattern.

This whole series of apparent contradictions should

serve to remind us that disease is one: its appearances are diverse, certainly enough, but its one underlying reality rests in its inability to be reconciled to the biphasic nature of all experience. The 'spes phthisica' of tuberculosis, the euphoria of disseminated sclerosis, the agitation of melancholia, the projection of mania, the negativism of schizophrenia, the rigidity of Parkinsonism, the delusions of reference of paranoia, the fitfulness of epilepsy and the 'la belle indifference' of hysteria are all indications of that schizoid attitude to life, which says "I will have this that I like, but not that, that I don't like." I do not know what could happen if these people were to accept the principle of acceptance; no doubt, many would learn to 'stay put' physically or perhaps to worsen, even if they learnt to move emotionally, but in any event, they would find some compensation for their change in outlook.

- Let us formulate a few guiding principles:
- 1). We must be willing to give an unqualified assent to the reality of the world of objectivity.
 - 2). We must equally be willing to give an unqualified assent to the reality of the world of

2. Note on Appearance and Reality.

We have given some account of the nature of environment in its subjective and objective forms, and we have also tried to account for some of the neurological correlates of experience.

We have suggested that our environment has both an internal and an external aspect, and that our experience is characterised both by phases of introjection and phases of projection.

The question arises as to the relative truth of these different forms of experience.

Philosophically, Berkeley showed how incomplete was the commonsense point of view of the nature of matter, and he has made it clear that the ordinary objective interpretation of reality of things leaves much to be desired; since his day, however, physicists on the one hand and neuro-physiologists on the other, have both shown us something more of the complexity of the material world, and also something more of the complexity of the nervous mechanisms involved in sensation. Similarly through psychiatry we know that our judgments may be deluded, and our sense experience may be both hallucinatory and illusory. How then are we to test the evidences of our senses?

Let us formulate a few guiding principles:-

- 1). We must be willing to give an unqualified assent to the reality of the world of subjectivity.
- 2). We must equally be willing to give an unqualified assent to the reality of the world of

subjectivity, even though it appears to

(1). J.D.L. contradict the evidence of sensation.

3). At the same time, we must be willing to hold

(2). Henry a doubt along with the convictions that we

(3). Richard have both about subjectivity and objectivity.

(4). Henry Only thus can we be delivered from the snare
of the obsessional attitude.

(5). 4). This same principle is capable of extension

(6). Sigmond to all our theories as to cause and effect in
both in medicine and philosophy.

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(vegetative)

Let us alone. What is it that will last?
All things are taken from us, and become
Portions and parcels of the dreadful Past.
Let us alone. What pleasure can we have
To war with evil? Is there any peace
In every climbing up the climbing wave?
All things have rest, and ripen toward the
in silence; ripen, fall and cease:
Give us long rest or death, dark death or
dreamful ease.
How sweet it were, leaning the downward
Stream,
with half shut eyes ever to seem
falling asleep in a half-dream!

CHAPTER 12

THE RELATIONSHIP OF THE VEGETATIVE
NERVOUS SYSTEM.

Lord Dunsany:
The Lotus Eaters

(Sympathetostonia)

Old parson, red-eyed as a ferret
From nightly wrestlings with the spirit;
I ran across, and barred his path.
His turkey gills went red as wrath
And then he froze, as parsons can.

.....

Your only fire's the jolly fire
Where you can guzzle port with Squire,
And back and praise his damned opinions
About his temporal dominions.

SYNOPSIS

The conceptions of Eppinger and Hess on vagotonia and sympathicotonia are discussed.

Guillaume's conception of neurotonia

- a) with vagotonia dominant,
- b) in which sympathicotonia alternates with vagotonia, is also outlined

The symptoms and signs of vagotonia ^{and sympathicotonia} are classified

as:-

- 1) Digestive or metabolic.
- 2) Cardio-vascular.
- 3) Respiratory.
- 4) Special.
- 5) Related effects.
- 6) Exacerbations.

Various etiological factors are mentioned.

The application of the conception to the phenomena of various diseases is also discussed.

The local effects of stimulation and extirpation are outlined.

After the work of Gaskell (1,2) and Langley (3) on the separation of the vegetative system into sympathetic and autonomic divisions, some 25 years elapsed before Eppinger and Hess (4) brought these physiological observations into close alignment with clinical medicine, though Van Noorden (5) called attention to various conditions associated with increased vagus irritability and designated them vagus neuroses in 1892. With the realisation that certain pharmacological substances seemed to have antagonistic effects on the two systems, these clinicians in 1910 first postulated the theory of vagotonia, which they said was a purely functional disease, not referable to any organic basis, which did not affect one organ alone but spread out, even if but transiently, in several branches of the autonomic system until finally it involved them all and affected the entire autonomic system. The ultimate test, however, was a pharmacological one, for they said that this state included all those constitutional conditions in which, along with an increased autonomic tone, there existed also a condition of increased sensitiveness to pilocarpine. On the other hand, they postulated that if their theory were correct, then there must be a pharmaco-dynamic antagonism, so that individuals who reacted promptly to adrenalin (the sympathetic agitator) would be less reactive to pilocarpine, which numerous observations have confirmed, along with the converse, viz:- that strong pilocarpine reactions imply reduced adrenalin reactions.

Following on the portrayal of the vagotonic, the picture of the sympatheticotonic was drawn later, when it

appeared that a third group was necessitated by refusal of the facts to sort themselves into either one of these two groups. Guillaume (6), accordingly, described neurotonia as a state in which the symptoms of sympatheticotonia and vagotonia ^{overlapped} coincided, so that a disequilibrium was produced which manifested itself in one of two ways :- a) "neurotonie intriquée", with vagotonia dominant, or b) sympatheticotonia alternating with vagotonia. In either case there was found to be an excessive reaction to both pilocarpine and adrenalin.

Guillaume grouped the symptoms and signs of vagotonia under six headings:-

1) Digestive and metabolic. The digestive secretions tend to be increased in amount, so that excessive salivation is noted, while gastric acidity is frequently very high. Nausea may be prominent and this may develop into actual vomiting and be related to epigastric and hypochondriac discomfort. This syndrome is very frequently accompanied by the "cow-horn" shape of stomach described by Holzkecht (7), which is well known to be hyper-secretive, and hyper-active in its muscular tone, and hyper-acid. It is typically the sthenic stomach and liable to pylorospasm. Spastic constipation affecting especially the transverse and descending colon may also be marked. The patient may put on weight more easily than the normal individual, because there is a lowering of the basal metabolic rate along with an increased tolerance to carbohydrate. He can tolerate more than 100 gm of glucose without glycosuria, and more than the normal amount of fat (from 100 to 150 gm fat daily).

In the tissues there is a tendency towards alkalinity: Ca ions are diminished and in colloid form, while K ions are increased. In the blood also there is a tendency to alkalinity with few Ca ions and K ions (8). According to Pende (9), however, in arthritics with a colloido-clastic diathesis along with hyperexcitability of the parasympathetic, there is a tendency to deficiency of blood Ca with excess of blood K, with alkalosis and increase of blood PO_4 ions, as occurs in spasmophilia and tetany following parathyroid deficiency. This is associated with greater liability to anaphylaxis, hydrophilia, agglutination and flocculation of colloids.

Vagotonia is commonly associated with gastric hyperacidity (cf. ulcer and gallstones) though the active hydrogen ion concentration in the blood may not deviate beyond normal limits -- but alkali retention may lead to acid tissues (Kuntz) (10). The acid-base balance can be changed in the direction of acidity by the administration of Ca. Likewise an increase in K ion concentration results in a change in the direction of alkalinity.

2) Cardio-vascular. There is a well-marked instability of the circulatory system, which manifests itself by arrhythmias, poor peripheral circulation, liability to blush easily, low blood-pressure and vaso-dilatation along with bradycardia. Chilblains and Raynaud's disease are frequently observed, though feelings of heat and burning sensations may be easily brought on by food or by other changes, as occurs in part of the usual Raynaud sequence. There may be frequency of urine, though actual polyuria

is unusual. The urine is often observed to be concentrated, and this may be responsible for the bladder irritability found in children with nocturnal enuresis.

Eosinophilia is a frequent finding along with a preponderance of mononuclears, and we should expect such subjects to be more liable to infective mononucleosis, as well as other more specific allergies.

3) Respiratory. Respiration is inclined to be rather slow, possibly irregular and may be associated with that form of cardiac arrhythmia known as vagus irritability or sinus arrhythmia. Wherever such arrhythmias are found in adults they are always associated with hypoevolution, in my experience. There is frequently a sense of oppression at the base of the chest as though the patient is unable to take a full breath, and furthermore, at night time complaints may be made of stifling feelings which may accompany difficulty in expiration as in asthma.

4) Various special signs. Of these the phenomena known as dermographia is the most typical. This may take the form of a white line between two red ones as seen in florid people or, more commonly, of one red line especially to be found in pale subjects, in either case, however, induced by the pressure of a pointed object purposively drawn over the skin. Other phenomena include cold, moist, pallid skin, acne vulgaris and keloid formation.

5) Related effects. The organism is in anabolic phase, consequently functions more suggestive of passivity and sleep are to be found. Apart from such frank manifestations as

narcolepsy, there is a general damping down of the individual's awareness to the environment. The eyelids droop, the pupils contract and depressive tendencies with easy fatigability show themselves. It is in such individuals especially that 'effort syndrome' makes its appearance. The patient feels less inclined to do things than usual and instead of accepting his limitations for the time being, he insists that he must feel better, and either badgers his doctor for tonics or else begins to take strenuous forms of exercise to make him feel fitter. This leads to an 'effort syndrome', and ^{may be associated with} [is frequently the cause of] such very different clinical entities as myasthenia gravis, narcolepsy, D.A.H., migraine, vertigo as well as the various neurasthenias or so-called traumatic hysterias. Occasionally such individuals are diagnosed as suffering from anxiety neuroses, but there may be little real difference as far as etiology is concerned between neurasthenia at one end of the scale and hyperthyroidism at the other, with all sorts of conditions in between that are usually considered quite unrelated, such as soldier's heart, primary cardiac overstrain, angina innocens and vaso-vagal attacks. His unwillingness to think of himself as temporarily an invalid makes him foolhardy when he contracts influenza, and if he does stay off work, he goes back too soon and may come in a few days complaining of tiredness and depression that he cannot understand. It is at this point that the secondary effects of sympathicotonia may appear, such as high blood pressure, wakefulness and restlessness. This is no uncommon picture in general practice where the effects of fatigue and depression are

met with renewed attempts to 'throw off' dull care and weariness by strenuous effort and 'strong will', when the polarity principle demands a cessation of activity and possibly long periods of rest. 'Effort syndrome' is a frequent concomitant of depression, as the patient feels he must exert himself to conquer this 'weakness'. But these states would not legitimately be termed vagotonic, but represent ^{induced} sympathetic reactions to vagotonic phases.

More typical are the states where there is a complete acceptance of the depressive phases, in which there is hesitation of purpose, with timidity or apathetic reactions to life's issues. There may be a fear of disease with hypochondriasis, and suicide may appear to be the most satisfactory way through. It is in such states of mind that the reality of the 'death instinct' described by Freud becomes apparent. A pessimistic outlook is a natural reaction to the feelings of inferiority that of necessity accompany such lassitude. The individual is slow and sleepy, he wants to lie down, and finds it difficult to get up in the morning. Such individuals look hypothyroidic and there is a peculiar aptitude in ~~the~~ ^h term 'vegetative' that may be applied to them. There are many associations that one can conjure up with regard to their appearance, and in regard to the diseases one associates with such individuals. The skin is sallow, looks soft, and they correspond to types described by observers of previous generations as phlegmatic. There is a close correspondence with those types described as 'lymphatic' and not infrequently one sees the victims of lymphatic leukaemia and Hodgkin's disease with just such appearances. One

has seen other cases where allergic reactions are prominent in which the whole problem of resistance has become associated with vagotonia.

6) Exacerbations. There is a liability to recurring sudden exacerbations which may come on in this order of frequency:-

- a) such digestive troubles as constipation, pain in the right iliac fossa, muco-membranous colitis, enteritis and hyperchlorhydria,
- b) attacks of asthma or laryngismus stridulus,
- c) skin manifestations -- of urticaria or acne,
- d) bladder irritability,
- e) circulatory disorders like palpitation, arrhythmias, and vaso-dilation.

In addition to these indications, confirmation of the vagotonic state is supplied by the response to pilocarpine and belladonna, and various reflexes, such as the oculo-cardiac *reflex* and others considered later.

Vagotonics have enteroptosis as in the status degenerative of Julius Bauer (11), frequently neurasthenia, hysteria, high arched palates, flat foot and syndactylism. The relation to lymphatism has been indicated.

Vagotonia is typical of asthenics but as one phase of development can, of course, occur in any type.

Similarly the characteristics of sympathicotonia have been grouped as follows:-

- 1) Digestive and Metabolic. As the suprarenal medulla is catabolic in function, the digestive processes are relatively in abeyance, so that ~~the~~ dryness of the mouth, and deficiency of gastric ferments are observed. Epigastric pain may be complained of. The sphincters are opened, allowing

frequent abundant stools and even diarrhea. The appetite may be voracious, and yet there is little tendency to put on weight as the basal metabolic rate is increased. There is frequently an increase of blood sugar, with an increase of sugar tolerance. Alimentary glycosuria may be found. The temperature is found to be unstable.

The sympathicotonic tolerates less than 100 gm glucose, and quite often is unable to assimilate fat, though in many cases of obesity in very active women, one is forced to conclude that other mechanisms are brought into play which facilitate both fat and protein deposition.

The tendency to acidosis which is characteristic of hyperactivity leads to a marked increase in calcium colloid, with decreased potassium ions, while in the blood there is a less marked rise of calcium ions, with a rise in potassium ions.

Kuntz (12) has stated that the effect of adrenalin on sympathetic nerves has proved conclusively that the effect of adrenalin is influenced by the chemical reaction of the circulating fluids, so that there is a greater rise in blood pressure from adrenalin injection if the blood is alkaline than when it is acid. Atzler and Müller (13) observed inhibition (indicating vagal activity) when the perfusion fluid was acid, and facilitation when it was alkaline, indicating therefore that sympathetic tonus is increased by changes to the alkaline side, parasympathetic by change to the acid side.

2) Cardio-vascular. Tachycardia is a prominent finding in sympathicotonia, and is generally accompanied by an increase in blood pressure and polyuria. Anginoid pains may

be complained of. At the beginning of a sympatheticotonic state a lymphocytosis of the blood is found, which in half an hour gives place to a neutrophil leucocytosis and an eosinophil decrease.

3) Respiratory. There is an opening up of the bronchi to facilitate oxygen exchange, for the increased production of energy, and respirations may be increased in rate and amplitude.

4) Skin. The skin is usually dry, thick and fairly stiff. There may be feelings of chilliness with goose-flesh and erection of the hair papillae. There is skin hyperaesthesia as shown by ticklishness.

5) Related Effects Psychological: This nerve-state is denoted by one of watchfulness and anxiety, accordingly exophthalmos and mydriasis ^{maybe} are found. Not unrelated to this are feelings of suspicion, tendencies to insomnia, fits of agitation and gesticulation and liability to weep.

There are latent reserves of power in such subjects so that at times of crisis as in the stress of war they are able to perform stupendous feats of endurance not normally possible. On the other hand, some thwarting of the individual may lead to flaring up of such reactions as urticaria or more specifically sympathetic reactions such as tremors, dryness of the mouth, painful cramp, tic doloureux or such atypical neuralgias as sciatica, ciliary migraine and brachial neuritis.

6) Exacerbations. These come on after the requisite stimuli. A crisis may last from ten minutes to two hours, and has been divided into three stages: a) initial agitation, beginning with fleeting pains, disagreeable temper, and mild

expostulations, deepening into b) the actual state and perhaps associated with anger. The teeth chatter, the face is pale, there are tremblings, erection of hair papillae, dilatation of the pupils, exophthalmos, frequent gulpings, then violent accusations volubly expressed, with a disregard for the explanations or arguments of others. Gradually this merges into c) the recovery state of distant "rumblings", feelings of prostration, suppression of sobs, complaints of heart, or stomach, or excessive heat.

The condition of hypersympatheticotonia is denoted^t by the signs one would expect in an increased adrenalin-aemia, the state required during activities of fight and flight.

There will probably be polyuria, and maybe glycosuria and diarrhea. As the flare gradually wanes, lethargy and drowsiness eventuate, so that a state of natural sleep may terminate the crisis. As one would expect, this crisis either partially or totally may be initiated by injections of adrehalin.

The sympatheticotonic tends to be excessive in everything, his ideas, friendships, enemies, passions or opinions. Going to bed late, he rises early, ardent in work, inclined to fidget, moving objects about restlessly. He has control of subordinates, though doing a fair amount of work himself. Inclined to intolerance, he is feverish in agitation, demanding almost instant satisfaction of his wishes. He is often led to sarcasm or fiery utterances, for which he may soon be sorry. He is inclined to exteriorise if things go wrong, blaming everything outside himself, and this fact makes him

appear self-righteous. Symptoms of this kind occur along with some of the qualities described above appearing in cases of anxiety neurosis, which may be accompanied by manifestations of melancholia. Guillaume (14) considers a pulsatile aorta with epigastric pain a frequent combination in sympathicotonia, and suggests that "angioalgia" in the aortic, iliac, axillary, femoral or humoral arteries and high blood pressure are related to anxiety states.

Langdon-Brown (15) attributes sympathetic troubles observed with certain toxæmic troubles to the action of monoamines due to ferment^{ation} in the intestine from the influence of the amino-acids which normally are made into urea by the liver. This sympathetic syndrome (or sympathetic neurotonia according to Guillaume) is less frequent than the vagoneurotonic but the sympathetic element is represented by vasomotor disturbances with anxiety, and by pain over the solar plexus. Some cases of high arterial blood pressure are found among these sympathicotonics with defective hepatic function.

Sympathicotonia is typical of the sthenic habitus, but again may be quite easily followed by vagotonic phases.

One of the chief difficulties in the way of accepting the theory just outlined was stated by Eppinger and Hess (16), who noted that symptoms of both vagotonia and sympathicotonia may appear in Grave's disease, while extreme variations were found in mental disorder. In catatonic or maniacal excitement there occurred in quick succession strong glycosuric reactions to adrenalin, followed by marked responses to pilocarpine. A similar double reaction was noted in disseminated sclerosis and transverse myelitis. Eppinger and Hess, looking over their case histories of hyperthyroids, observed that cases showing alternately signs of irritation of the

two systems were not complicated by mental disturbances, while those who showed these signs simultaneously were often complicated by psychological disturbances of one kind or another.

To overcome these difficulties Guillaume (17) suggested a third group, the neurotonics, which comprised a) a condition with indications of both vagotonia and sympathicotonia, with the latter preponderating, and b) a condition in which one followed the other. In either case, there is a disequilibrium. In "neurotonie intriquée" there is a violent response to all forms of stimulation, whether pharmacological, physical or mechanical. This may show itself by a great liability to fainting. This vaso-motor instability is also seen in character, for optimism and pessimism quickly alternate. Attention is fleeting; and in conflict these subjects are easily beaten, and they may develop ideas of persecution. Complaints referred to the viscera or of physical fatigue, or of depression are easily induced by noise, or confinement in closed spaces. Four groups of symptoms are prominent:-

- 1) Digestive troubles. Variability is a marked feature, one day complaints are made of the stomach, another of intestine, then of pharynx or oesophagus. Constipation alternates with diarrhoea.
- 2) Circulation. Bradycardia alternates with tachycardia, or pallor may quickly be followed by blushing.
- 3) Metabolism. According to the prevailing mood of optimism or pessimism, there is a tendency to put on or lose weight.
- 4) Pain. Vague complaints are made of pains in the back,

or in the other muscles of the body, of neuralgias of the face, breasts or epigastrium.

There may be coexisting exophthalmos, increase of basal metabolic rate, with raised arterial tension, and spasm of arteries or viscera. As Guillaume indicates, this picture is closely paralleled by Eppinger and Hess (18) in their description of the vagotonic disposition.

Mention has been made of the psychological make-up of these patients. Melancholia may exist with anxiety. The individual may be afraid of himself or of others, so that he has ideas of persecution. Suicidal tendencies may show themselves. In the alternating form of neurotonia, one state follows the other after a few days interval, as for example, after menstruation. It is likened to the oscillations of a pendulum from one side to another. The most typical state in which this condition is found is cyclothymic depression, or "folie circulaire", in which bouts of mania are followed by times of depression or melancholia.

According to Guillaume (19), the neurotonias are the commonest and most important manifestations of the vegetative neuroses. Vagotonia is especially common in dyspeptics, while sympathicotonia is rare in its pure form.

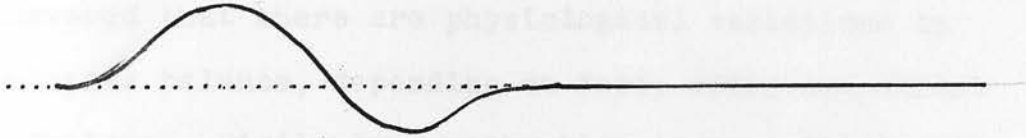
As regards diagnosis, many tests have been devised, and it is ~~apparently~~ important that they should be carried out under basal conditions. One of the best known reflexes is the oculo-cardiac, which acts through exciting the parasympathetic and is elicited by gradually compressing the eyeballs up to thirty seconds without pain, with the patient recumbent. A positive result is obtained with a slowing

of the pulse
 down of over twelve beats per minute. A normal reading is got with a slowing down of only four to twelve beats, while if there is no retardation, the reflex is absent, and if the reflex is inverted there will be an acceleration of the heart.

Guillaume (20) recommends graphic representation, from several readings of the reflex taken at intervals after the application of the stimulus. He gives four types of curve:-

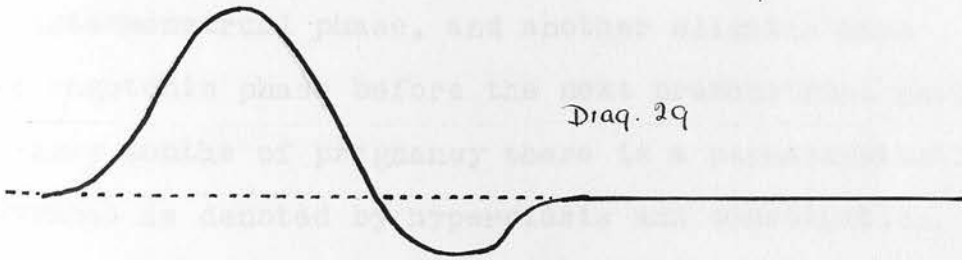
- 1) Normal, with slight parasympathetic predominance .

Diag. 28



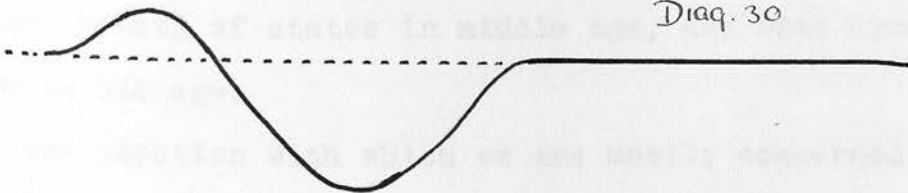
- 2) With strong parasympathetic predominance .

Diag. 29



- 3) Weak parasympathetic effects, sympathetic predominance .

Diag. 30



- 4) Parasympathetic and sympathetic effects successive for $\frac{1}{2}$ hour or more .

Diag. 31



Of particular help in diagnosis Guillaume considers:

- 1) Oculo-cardiac reflex together with the pharmacological tests with progressively increasing doses of pilocarpine and belladonna.
- 2) B.M.R. along with effects of pharmacological substances already mentioned.
- 3) Consideration of tolerance to fat and carbohydrate.

From his extensive enquiry into the responses of different individuals to the pharmacodynamic substances, Guillaume has discovered that there are physiological variations in the vegetative balance, depending on food, sleep and effort causing fatigue. Similarly, menstruation is associated with a sympathicotonic phase at the premenstrual and menstrual stages, followed by a mild vagotonic phase, a mild sympathicotonic intermenstrual phase, and another slightly more definite vagotonic phase before the next premenstrual phase. In the early months of pregnancy there is a parasympathetic preponderance as denoted by hyperpiesis and constipation. In the same way, one finds that children tend to be vagotonic (with anabolic functions in the ascendant) with a greater variety of states in middle age, and with hyperneurotonics in old age.

The question with which we are mostly concerned is to define the extent to which we can postulate a vagotonic or sympathicotonic diathesis. From what has been already stated, it is evident that external conditions can determine the swing of the vegetative nervous balance to a very large extent. Guillaume (21, 22) classifies the etiological factors under the headings of:-

1) Physical, reflex causes, such as foreign bodies (cf case of man with shrapnel in the eye which led to vagotonia, remedied by its extraction), internal displacements, hernia, intestinal worms (of the associated eosinophilia denoting a vagotonic state), X-radiation, train sickness, fatigue, in convalescence, or stuffy atmospheres, appendicitis, dyschezia, or cancer.

2) Humoral:

a) endogenous toxins, as in diabetic coma, uraemia, gout, or focal sepsis,

b) exogenous toxins, such as morphia, nicotine, alcohol,

c) disturbance of endocrine functions, as hypothyroidism or hyperthyroidism, menstruation and menopause,

d) allergic states, causing colloid disturbances or protein shock.

3) Psychological causes, such as strong emotions, e.g. fear, rage or joy, or manic-depressive states.

In considering the relationship of these neuroses to the infections, Eppinger and Hess (23) noted a very definite tendency for cases of tuberculosis to show signs of vagotonia, possibly owing to the depressive effect of the tuberculous toxins on the chromaffin system, and suggested that there was a close connection between vagotonia and infection. Guillaume (24) went further and declared that tuberculosis often attacked the vagotonic. In the respiratory form of influenza, vagotonia appears at

the beginning, follows the infection, and continues in convalescence. In fact, convalescence after such fevers as tonsillitis, pneumonia, typhoid, erysipelas, rheumatism and scarlatina is followed by a vagotonic state.

In such exanthemata as measles, scarlet fever, and the syphilitic roseola, the erythematous stage coexists with a sympathicotonic state, being followed after the eruption by vagotonia.

Among the infections of the alimentary tract, it appears that in cases of gastric ulcer, the vagotonics present more typical histories than do the rest. Bocca (25) operated on 22 ulcer cases, one of whom was a sympathicotonic, one a neurotonic and the rest vagotonic. The previous hyperchlorhydria suggests that vagotonia is antecedent to ulcer formation, while according to Guillaume, neurotonia may result from the lesion, which is relieved by the cure of the ulcer. The association of the ulcer diathesis to the vegetative nervous system is discussed by Hurst and Stewart (26, 27). Eppinger and Hess (28) comment on cases of gastric ulcer diagnosed at autopsy, which in life were symptomless and unaccompanied by signs of vagotonia or hyperchlorhydria. They suggest that these are cases which tend to develop true neoplasms -- callous ulcers.

The relationship of gastric crises in tabes dorsalis to vagotonia is also noted, and it is recorded that definite degenerations have been found in the vagus of such tabetics.

In gallstone colic the relationship to vagotonia is brought out, and cases of biliary colic without gallstones are considered under the same heading.

So far little has been said of the relationship of the endocrine glands. It is usually considered that the functions of the thyroid, adrenal and pituitary glands are synergistic, and probably cooperate with the gonads. Their role is to expend energy for activities involved in creative work, executive pursuits and the rhythmic functions of growth, fat deposition, muscular contractions, menstruation, lactation and child bearing. They are essentially catabolic in function. The pancreas and parathyroid glands, however, are anabolic. They regulate the storage of glycogen in the liver and the metabolism of calcium. Furthermore the parathyroids have an inhibitory influence on the sympathetic. Parathyroid tetany may be aborted by extirpation of adrenals. Similarly castration has led to cessation of tetany.

There is some evidence that sympathetic irritability increases during the climacterium and after castration, also that the ovary inhibits the sympathetic because adrenalin hyperglycaemia is prevented by ovarian extract (29).

The effects of sympathetic stimulation are all designed to activate the body for a struggle, and increase its powers of defence, while parasympathetic stimulation replaces a display of kinetic energy by storage of potential energy. The sympathetic is catabolic -- it directs the stream of energy outwards; the parasympathetic is anabolic, it directs the stream of energy inwards. When one is stimulated, the other is inhibited, and the rhythm of life is dependent on a balance between the two (30).

According to Pende (31), since the vagotonic functions are anabolic, one would expect hyper-parasympatheticotonia to be associated with the "short-thick" types, since they tend to put on weight much more quickly than the asthenics. This type of build is frequently associated with hypothyroid-hypopituitarism or hypothyroid-hypergenitalism or the hypothyroid-hyperadrenal type. The association with the last-named might appear rather unexpected, but it may be difficult to understand why Pende should include this type amongst the predominantly parasympatheticotonic as his description of pure hyperadrenals corresponds with that representing the sympatheticotonic. Pende speaks of the hypothyroid-hyperadrenal as having vagotonic qualities. Goldzieher (32,33) believes that cholin is made from the adrenal cortex and that this is very directly antagonistic to adrenalin. Similarly as thyroid and phaeochrome tissues are antagonistic, and enhance their activity mutually, so the adrenal cortex is antagonistic to thyroid also, while the antagonism of adrenal medulla to pancreas is well known. The pure hyperadrenal type of Pende (34) would fall into the sympatheticotonic group, as the characteristics of this type are largely due to the properties of the adrenal medulla.

The sympatheticotonic are, on the other hand, predominantly long-thin -- or catabolic -- associated with hyperthyroid-hyperpituitary, or hyperthyroid-hyperthymic, or hyperthyroid-hyperadrenal or hyperthyroid-hypogenital types (35).

Of interest in this connection is the work of Cushing (36), which seems to suggest that the posterior lobe of the pituitary secretes into the ventricle of the brain,

and thus stimulates some parasympathetic centre in the hypothalamus; and further that the relation between the posterior pituitary and parasympathetic system is analagous to that between the adrenal medulla and the sympathetic system (37). These findings have been confirmed (38).

Eppinger and Hess (39) found their chief difficulties to the theory in the various types of hyperthyroidism, but eventually decided that there were two types of the disease, one a vagotonic and the other sympathicotonic. The two types may be contrasted:-

Vagotonic type:

Sympathicotonic type:

- | | |
|---|--|
| 1) Slight increase of pulse rate. | 1) High tachycardia. |
| 2) Subjective cardiac symptoms. | 2) No subjective symptoms. |
| 3) Von Graefe's sign and wide lid slits. Moderate exophthalmos. | 3) No Von Graefe's sign. |
| 4) Moebius' sign. | 4) Moebius' sign and Loewis' sign. |
| 5) Marked epiphora. | 5) Dry eyes. |
| 6) Excessive sweating. | 6) No sweating, with tendency to high temperature. |
| 7) Profuse diarrrhea. | 7) No diarrrhea. |
| 8) Gastric hyperacidity. | 8) Achlorhydria. |
| 9) Eosinophilia. | 9) No eosinophilia. |
| 10) Disturbed rhythm and mechanism of respiration. | 10) No respiratory disturbances. |
| 11) Absence of alimentary glycosuria. | 11) Alimentary Glycosuria. |
| | 12) Marked fall of hair. |

Other difficulties which have prevented the wider acceptance of the theory are the lack of a clear-cut differentiation between the symptoms associated with vagotonia

and those associated with sympatheticotonia, and the amphitropic action of certain drugs and certain of the natural hormones".

Petren and Thorling (40) found certain individuals suggesting a diagnosis of vagotonia, who also reacted strongly to sympathetic stimulation and vice versa.

Further unusually strong reactions to either parasympathetic or sympathetic drugs or both, have also been reported repeatedly in certain individuals apparently in good health who exhibited no objective evidence of a functional autonomic imbalance.

We must bear in mind, however, that even adrenaline, the sympathetic stimulant is capable of bringing about a fall of blood pressure in minimal doses. (41, 42). Similarly atropine in small doses stimulates the parasympathetic, but in large doses paralyzes. Moreover, the organism acts as a whole and signs of a local vagotonia may exist along with more general indications of sympatheticotonia or vice versa.

The latest work on the diencephalon, which is considered in another chapter, however, throws the whole conception of vagotonia and sympatheticotonia into another light.

The effects of stimulation and extirpation of the different parts of the autonomic nervous system are considered in the following tables:-

CERVICAL SYMPATHETIC

<u>Organ</u>	<u>Stimulation</u>	<u>Extirpation</u>
Eye	Mydriasis.	Myosis. After degeneration atropine causes dilation, cocaine no effect.
Eye	Widening of palpebral fissure.	Narrowing of palpebral fissure.
Eye	Exophthalmos.	Enophthalmus from paralysis of Müller muscle and disappearance of retrobulbar fat.
Blood vessels of head	Contraction of vessels. Fall of temperature on same side.	Dilation of vessels. Increased temperature. Effects not permanent.
M. Arrectores pilorum	Hair of head, face and eyebrows bristle.	Smoothing of hair.
Glands:		
Salivary	Thickened sputum.	Thin sputum.
Lachrymal	Increased secretion.	--
Mucous	Increased secretion.	--
Sweat	Increased sweating.	Absent sweating.
Trophic	Facial Hypertrophy.	Facial atrophy.

PARASYMPATHETIC FIBRES OF OCULOMOTOR

Eye	Myosis.	Mydriasis.
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PARASYMPATHETIC FIBRES OF VAGUS

Heart	Slowing of rhythm. Inhibition of conduction, constriction of coronaries. Inhibition in diastole.	Tachycardia.
Bronchi	Constriction.	Dilation.
Esophagus	Constriction of lower third.	Dilation of lower third.

Parasympathetic Fibres of Vagus (continued)

<u>Organ</u>	<u>Stimulation</u>	<u>Extirpation</u>
Stomach and	Increased peristalsis. Spasm of stomach. Opening of pylorus.	Peristalsis slightly diminished. Dilatation of stomach.
Glands:		
Stomach	Increased secretion.	Diminished secretion.
Pancreas	Increased external and internal secretion (Lowers the sugar curve).	? ?
Liver	Increased glycogenesis.	--
Kidney	Increased secretion and increased solid content of urine.	Sometimes diminished secretion.

SYMPATHETIC: STELLATE GANGLION

Heart	Rhythm quickened. Conductivity improved.	Inconstant results.
Lungs	Broncho-dilatation. Reversible constriction. Vaso-constriction.	Broncho-constriction. Vaso-dilatation.
Upper limbs	Sweat secretion. Vaso-constriction.	Vaso-dilatation. Sweating inhibited.
Throat and breast	"Erection of hair" Goose skin.	--

SYMPATHETIC: SPLANCHNIC FIBRESTo Coeliac Ganglion and Superior Mesenteric Ganglion

Gastro-intestinal tract.	Inhibition of peristalsis. Relaxation of tonus. Closure of pylorus.	Increased gastric tonus. Increased peristalsis.
Liver.	Increased glycogenolysis.	Inhibition of glycosuria from piqûre.
Adrenals.	Increased adrenalin secretion.	

Sympathetic: Splanchnic Fibres (continued)

<u>Organ</u>	<u>Stimulation</u>	<u>Extirpation</u>
Pancreas	Increased external secretion.	--
Spleen	Contraction.	Relaxation.
Kidney	Diminished secretion.	Increased secretion.
Visceral blood vessels	Contraction leading to increase of B.P. Reversed effect with very weak stimulation of splanchnic.	Dilation. Fall of B. P.

SYMPATHETIC: INFERIOR SPLANCHNIC FIBRES
To Inferior Mesenteric Ganglion

Colon	Inhibition of peristalsis.	--
Internal genitals	Contraction of Fallopian Tubes and of vas deferens.	--
Bladder	First contraction, then relaxation.	--
Pelvic blood vessels	Contraction.	

PARASYMPATHETIC PELVIC

Colon	Increased peristalsis. Relaxative internal sphincter ani.	First constipation. Later peripheral action.
Internal genitals	Not known.	--
Bladder	Contraction.	First flaccid retention. Later peripheral reflex action.
Pelvic blood	Dilation. Erection of penis and clitoris.	--
Retractor penis	Relaxation.	--

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Chapter 13.

Acidosis and Alkalosis.

Whatever else we may mean by the word 'spirit' or 'libido', we ought at least to endow it with an electro-physical nature, and to regard the ionic equilibrium of the internal milieu as one of its modes of activity.

Synopsis.

The conception discussed.

The chemical indications of acidosis and alkalosis are summarised and their etiology set forth.

The body's defences are outlined.

The possible variations are enumerated.

The effect of change in the acid-base equilibrium on cardiac function is noted.

Although the conception of the acid-base equilibrium is particularly applied to the ionic state of the blood, for the sake of completeness we ought to visualise it in terms of the following hypotheses:-

1). Analytically, the dissociation of the chemical compounds of the body into their ionic state provide us with the basic fact of the organism's acid-base equilibrium, with its anions and kations.

The anions are negatively charged particles, so-called because they tend to move towards the anode or positive pole. They symbolise male elements, and their tendency is to form acids with the addition of the hydrogen radicle. Some of these are monovalent, and include 'Cl, Br, I, O H, NO₃ radicles, while some are bivalent and include S, Se, SO₄.

The kations are positively charged particles, so-called because they tend to move towards the kathode or negative pole. They symbolise for the most part, female elements, and their tendency is to form alkalis with the addition of the hydroxyl radicle (O H). Some of these are monovalent, e.g. H, Na, K, and N H 4. Some are bivalent, e.g, Ca, Ba, and Fe, (in ferrous salts) while some are trivalent, such as Al, Bi, Sb, and Fe (in ferric salts).

2). Synthetically, the actual acidity or alkalinity of a complex chemical compound is the resultant of its own electrolytic balance between acid or alkaline elements. This applies to organic acids, and also to inorganic salts,

for while a salt represents the combination of an acid with a base, the degree of association between the two, may ensure that one radicle is more or less equilibrated by the other, which itself is able to exert a basic or acid influence, in addition to that neutralised by the radicle with which it is combined.

The importance of this from a practical point of view is, that although the health of the body demands a certain neutrality in the acid-base balance of the blood and tissues, or a slightly alkaline reaction, the various cell and tissue constituents have differing reactions to acid or basic stains. Of these we may cite the polymorphs of the blood which take up basic dyes for the most part, but which have acidophil granules. Similarly, the eosinophils take up acid stains (i.e. are fundamentally basic in nature - or feminine symbolically), and the basophils, basic stains (i.e. fundamentally acid in nature - or male symbolically). It is probable that part of the importance of the pathology of the acidophil and basophil cells of the anterior pituitary rests upon their inability to tolerate each other, so that eosinophil tumours are significant because they are characterised by relative lack of basophil cells, and basophil tumours are characterised by relative lack of acidophil cells. This intensely local acid-base equilibrium therefore is characterised in health, before puberty by a harmony of acidophil elements working synergically with gonads and producing increase in height, along with basophil activity working

synergically with the adrenal cortex producing increase of growth in breadth and masculinisation. It is also known that the basophil cells secrete a follicle-stimulating substance (Prolan A), derived from acid extracts of the gland, and a luteinising substance derived from alkaline extracts (Prolan B).

3). In addition to this relatively fixed acid-base relationship, there is a more fluctuating one, dependent on the tissue changes that follow exercise. Thus muscle activity is followed by the local production of lactic acid which gives rise to a local acidosis, capable of correction by oxidation.

4). The excitability of nerve tissue is inhibited by the condition of anelectrotonus (set up at the anode through previous stimulation), even though the negative kathode pole be hyperexcitable.

5). Different parts of the alimentary tract function best in different media, thus the saliva is alkaline, the stomach acid, and the duodenum alkaline from the bile, though it contains glycocholic and taurocholic acids which are capable of hydrolysis.

6). The equilibrium in the blood is maintained by the following mechanisms:-

- a. The use of 'buffer' substances in the blood.
- b. Through the respiratory mechanism, allowing for the escape of CO_2 through expiration.
- c. Through the excretion of acids or alkalis in the

urine.

7). Vegetarian diets tend to produce alkaline states, and meat diets acid states.

8). The bacterial world is apparently constituted in a similar acidophil-basophil way.

The chemical indications of acidosis or alkalosis are:-

- 1). The H-ion concentration of the blood.
- 2). The alkali reserve of the blood.
- 3). The alveolar CO_2 .
- 4). The reaction of the freshly passed urine.
- 5). The amount of aceto-acetic and ammonia in the urine.
- 6). The amount of sodium bicarbonate which is necessary to make the urine alkaline, 5 grammes being usually sufficient.

The chemical conditions under which these states occur may be tabulated as follows:-

Acidosis:-

1). The acidosis of children, with cyclical vomiting, migrainous attacks and biliousness.

2). Any condition leading to excess CO_2 in the blood, such as occurs with diminished secretion of HCL in the stomach, conditions of sleep, diabetic coma (ketosis), salicylate poisoning, the cyanosis of emphysema and bronchitis, the hyperpnoea of uraemia and all conditions in which Cheyne-Stokes breathing occurs.

3). Diarrhea in which there is an excessive loss of alkaline substances, due to evacuation of alkali from food and also from the intestinal secretions (pancreatic

juice and bile). These include coeliac disease, fatty diarrheas of adult life, gastro-enteritis.

4). Cachexias with the breakdown of tissue-fat and protein: these lead to keto-and other acids derived from protein. These therefore include such diverse conditions as inanition from starvation, anorexia nervosa, Simmond's disease, pulmonary tuberculosis, cancer and rheumatoid arthritis.

5). Post operative conditions, as in delayed chloroform poisoning, acute yellow atrophy of the liver, eclampsia, hyperemesis gravidarum and "cholaemia" due to any one of a number of different diseases in which this state may be terminal.

6). Certain mental states. (v. chap.5)

Alkalosis:-

1). Physiologically, the acid secretion of the stomach due to digestion is accompanied by a rise in the alveolar CO_2 . This is considerably increased in the vagotonic states such as pyloric stenosis of infants, hyperchlorhydria, pyloric stenosis of adults, but may also occur with hyperemesis gravidarum or any other state of prolonged vomiting, such as occurs in high intestinal obstruction.

2). Anoxaemic conditions due to living at high altitudes, states leading to hyperpnoea and hyperventilation tetany.

3). Excessive administration of alkali as in the treatment of gastro-duodenal ulcer.

- 4). From pyrexia.
- 5). Spasmophilia.
- 6). Nephrosis.
- 7). Some workers report alkalosis in sleep and disorders associated with somnolence.

Now while it is convenient to visualise such states as typical of a shift of the acid-base equilibrium to one or other side, these states are by no means so absolute as suggested, for in many ways they are rather to be regarded as nature's attempt at regaining an equilibrium that has been disturbed. Thus the vomiting of infants may be seen as an attempt to eliminate acid in acidosis, but it is also a state likely to lead to alkalosis; similarly the hyperpnoea of a high altitude is compensatory, and equally so is the dyspnoea of emphysema and bronchitis. Another important point to remember is the condition in epilepsy which according to some authorities has been regarded as precipitated by alkalosis, though the effect of the convulsion is to produce CO_2 and lactic acid. In all these conditions therefore, one has to try to estimate their special significance in relation to the life-style of the individual, and also in relation to the background. It is possible, for instance, that some of the ordinary clinical states of acidosis in children may be aggravated by rigorous parental control.

The various processes that lead to disturbances of the acid-base equilibrium have been summarised (1) as follows:-

Acidosis.

Tendency toward, or actual reduction of $\frac{H_2CO_3}{BHCO_3}$ ratio.

1). Non-gaseous. Where the pathological factor chiefly affects the denominator.

a). Reduction of $BHCO_3$ due to neutralisation of acids due to:-

i). Increased acid formation, e.g. ketone bodies in diabetic acidosis, or lactic acid in exercise.

ii). Administration of acid-producing substances, e.g. HCl , NH_4Cl , $CaCl_2$, high fat diet (ketogenic) leading to the production of ketones.

iii). Impaired urinary excretion of acid, e.g. phosphates in interstitial nephritis.

b). Loss of fixed base - excessive excretion.

i). By the intestinal tract - diarrhea.

ii). By the urine - when ammonia formation is impaired in the kidney.

2). Gaseous. Where the pathological factor chiefly affects the numerator.

a). Increase of H_2CO_3 .

i). Depression of the respiratory centre.

ii). Impairment of the circulation.

iii). Pulmonary impairment.

Alkalosis.

Tendency toward, or actual rise of $\frac{H_2CO_3}{BHCO_3}$ ratio.

1). Non-gaseous. Where the pathological factors chiefly affect the denominator.

a). Increase of bicarbonate.

i). Administration of alkali in some cases.

ii). Deficit of acid and its replacement by H_2CO_3 .

1). Loss of chlorine by vomiting.

2). Oxidation of ketone acids after insulin in diabetes.

2). Gaseous. Where the pathological factors chiefly affect the numerator.

a). Decrease in H_2CO_3 .

i). Hyperventilation.

The complexity of the subject is brought out by the tabulation quoted from Van Slyke (2):-

There are nine possible variations in the relationship of the three variables pH , H_2CO_3 and $BHCO_3$, of which only one may be considered normal.

1). Uncompensated Alkali Excess. (Alkalaemic Alkalosis)

The $BHCO_3$ is increased, the H_2CO_3 increased to a

less extent, and the pH increased. i.e.

$$\frac{H_2CO_3+}{BHCO_3++} = pH+$$

2 & 3). Uncompensated CO_2 Deficit. (Alkalaemic Acidosis)

The H_2CO_3 is decreased, $BHCO_3$ decreased to a less

extent, and the pH is increased. i.e.

$$\frac{H_2CO_3-}{BHCO_3-} = pH+$$

4). Compensated Alkali Excess. The BHCO_3 is increased, the H_2CO_3 is increased to the same extent, and the pH is normal. i.e. $\frac{\text{H}_2\text{CO}_{3++}}{\text{BHCO}_{3++}} = \text{pH (n)}$.

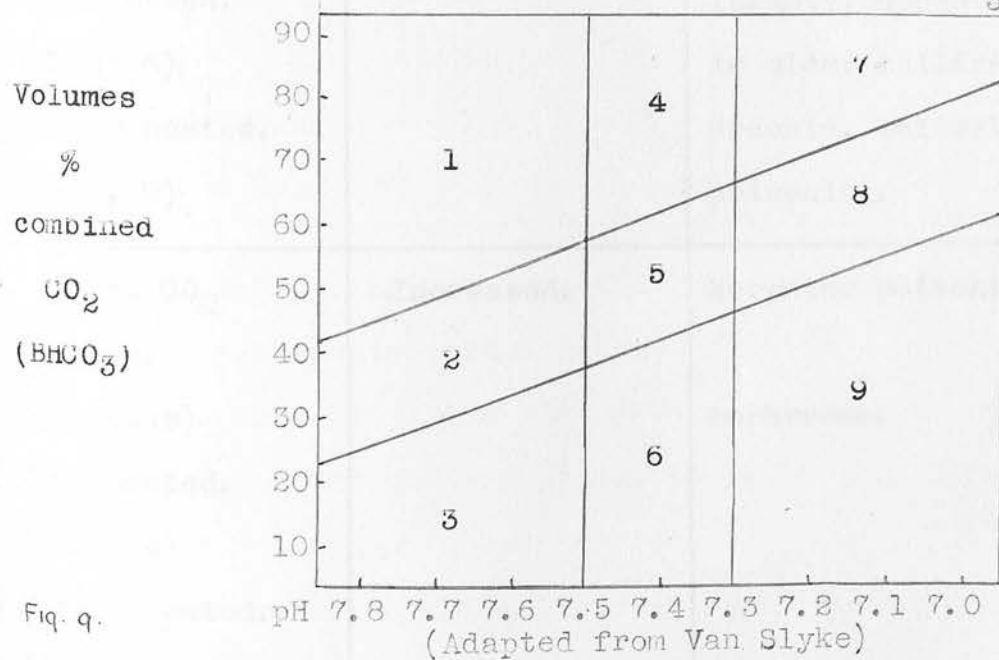
5). Normal Acid-Base Equilibrium. All 3 variables are normal. i.e. $\frac{\text{H}_2\text{CO}_3 (n)}{\text{BHCO}_3 (n)} = \text{pH (n)}$

6). Compensated Alkali Deficit. The BHCO_3 is diminished, the H_2CO_3 is diminished to the same extent, and the pH is normal. i.e. $\frac{\text{H}_2\text{CO}_{3-}}{\text{BHCO}_{3-}} = \text{pH (n)}$

7 & 8). Uncompensated H_2CO_3 Excess. (Acidaemic Alkalosis)
The H_2CO_3 is increased, the BHCO_3 is increased to a less degree, and the pH is diminished. i.e. $\frac{\text{H}_2\text{CO}_{3++}}{\text{BHCO}_{3+}} = \text{pH-}$

9). Uncompensated Alkali Deficit. (Acidaemic Acidosis)

The BHCO_3 is diminished, the H_2CO_3 is diminished to a less degree, and the pH is diminished. i.e. $\frac{\text{H}_2\text{CO}_{3-}}{\text{BHCO}_3-} = \text{pH-}$



Showing normal and abnormal variations of the Bicarbonate (BHCO_2) and pH of the plasma of arterial blood.

Group 6 represents a form of compensated acidosis in which the bicarbonate is lowered but the pH remains unaltered.

Group 9 represents a further stage in which the pH is lowered and the condition becomes uncompensated.

Haldane (3 & 4) has classified the states according to the following table:-

Type of Disturbance.	Total CO ₂ Content or Alkali Reserve.	Occurs in.
<u>Acidosis.</u>		
1). Due to Bicarb. deficit. (non-gaseous)	Decreased.	Diabetic coma, cyclical vomiting, gastro-enteritis of infants, dysentery in older children, uraemia, salicylate poisoning.
a) Compensated. (Group 6)		
b) Uncompensated. (group 9)		
2). Due to CO ₂ excess. (gaseous)	Increased.	Morphine poisoning. emphysema.
a) Compensated. (Group 4)		
b) Uncompensated. (Groups 7 & 8)		

Type of Disturbance.	Total CO ₂ Content or Alkali Reserve.	Occurs in.
<u>Alkalosis:-</u>		
1). Due to Bicarb. excess. (non-gaseous)	Increased.	Administration of Sodium bicarbonate.
a) Compensated. (Group 4)		High intestinal obstruction.
b) Uncompensated. (Group 1)		
2). Due to CO ₂ deficit. (gaseous)	Decreased.	Anoxaemic cond- itions, high altitudes, hyperpnoea.
a) Compensated. (Group 6)		
b) Uncompensated. (Groups 2 & 3)		

Another subtlety arises from the fact that where an abnormal CO₂ curve exists it may be:-

1). Hypocapnic, in which the curve is shifted to the right, when the total content of CO₂ is lower than normal,
or

2). Hypercapnic, in which it is shifted to the left, when the total content of CO₂ is greater than normal.

But the presence of alkalosis or acidosis is determined by the pH of the blood and in the hypocapnic curve this

may be either acid or alkaline due either to over-production of acid substances (as in diabetic coma), with diminution of available alkali (non-gaseous acidosis), or to the over-stimulation of the respiratory centre with "washing-out" of CO_2 by over-ventilation (gaseous alkalosis).

Similarly in the hypercapnic curve it might be due either to a diminution of the acid radicles (non-gaseous alkalosis) or to depression of the respiratory centre with decreased output of CO_2 (gaseous acidosis).

The importance of changes in the acid-base equilibrium on cardiac function has been suggested by the work of Barker (5) and his co-workers. Noting a pronounced flattening of the T-wave in the electro-cardiograph of a patient with hyper-ventilation tetany, they found by getting 7 volunteers to over-breathe that this feature was common to all, and that ingestion of ammonium chloride, and acidosis produced by exercise was accompanied by an increase in the amplitude of the T-wave.

THE TREATMENT OF ACID-BASE BALANCE.

"Some of us", said Jackson, "have been in the past

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"In this respect your father resembles my grandfather....

because I believe in Adam and Eve" answered the son of

Michael....

"I believe in Adam," she said, "though I am sure quite

thoroughly convinced that he was the serpent.

"I never thought you were the serpent", he answered in

the same new tone of surprise, that was almost apologetic; "but I

thought you were the Angel of the Electric sword".

"I have thrown away the sword", said Edith Winthrop.

"And left only the angel", he answered, and she re-

sponded "that's only the woman"....

All it seemed to both of them that something had broken

in their lives, a last bond with death and the night, a last

strand of the net of some invisible spider that stretched

between them and God had made a new order and they stood alive

in the first illumination of the world.

THE INFLUENCE OF SEX ON DIATHESIS.

"Some of us", said Judson, "have been in the sort of delirium in which men see snakes. But I think we are all cured now, and there are other things to see."

"I suppose you would say", said Windrush dreamily, "that we have evolved into a higher condition and can see something nicer. Well, don't misunderstand me; I'm not against anybody evolving, if he does it quietly, in a gentlemanly way, and without all this fuss. It wouldn't matter much, if we had begun by climbing about in trees. But I still think that even monkeys would have been wise to leave one taboo tree; one sacred tree they did not climb".....

"In one respect your father underrates my orthodoxy.... Because I believe in Adam and Eve" answered the man of science.....

"I believe in Adam," she said, "though I was once quite firmly convinced that he was the Serpent."

"I never thought you were the Serpent", he answered in the same new tone of musing, that was almost mystical; "but I thought you were the Angel of the flaming sword".

"I have thrown away the sword", said Enid Windrush.

"And left only the angel", he answered; and she rejoined: "Left only the woman".....

And it seemed to both of them that something had broken or been loosened, a last bond with chaos and the night, a last strand of the net of some resisting Nothing that obstructs creation: and God had made a new garden and they stood alive on the first foundations of the world.

Synopsis.

Diathesis represents the potentiality of sexual ambivalence.

This is considered in relation to:-

1. Embryological foundations.
2. The Nature of the Hormones.
3. Sex and Disease Predisposition.
4. Instinctual Drives and Hormones.
5. Sex and Metabolism.
6. Symbolism.
7. Psychological Aspects.

Diathesis represents potentiality rather than actuality and to that extent may be said to deal with that which is relatively undifferentiated rather than that which is differentiated, i.e. actually realised. It is quite evident that in some diseases there is a much more one-sided sex incidence than in others, for which at first sight there would seem to be little or no apparent reason. How are we, for instance, to regard the greater male preponderance in gout or the greater female preponderance in hyperthyroidism? Assuming for the moment that health is an equilibrium about an ideal axis, it would appear that in the diseases mentioned there is a lack of differentiation at work which precipitates gout in the one case and hyperthyroidism in the other. The fact that the conditions appear in typical males and females respectively suggests that in the one case the feminine aspect of the bisexual whole, and in the other the masculine element of the whole is relatively undifferentiated, and therefore that treatment should be directed to these less developed aspects of personality. Let us now consider some general principles in relation to sex and diathesis:-

- 1) The embryological foundations of sex, including genic and endocrine factors.
- 2) Nature of Hormones.
- 3) Sex and Disease Predisposition.
- 4) Instinctual Drives and Hormones.
- 5) Sex and Metabolism.
- 6) The sexual symbolism underlying such states as alkalosis, acidosis, sympatheticotonia, vagotonia, sleep and wakefulness, dominance and recessiveness in heredity and sex-linkage.

7) Some psychological aspects.

Sex of the gametes and sex in bodily structure are two radically different things, though they can be understood in terms of each other; that is to say, the genes may be seen as means to the somatic differentiation that is involved in personal integration, and the somatic differentiation may be visualised as an adaptation on the part of nature to ensure the normal functioning of the gametes by providing for its normal storing. Which comes first, the hen or the egg - the soma or the germ cell?

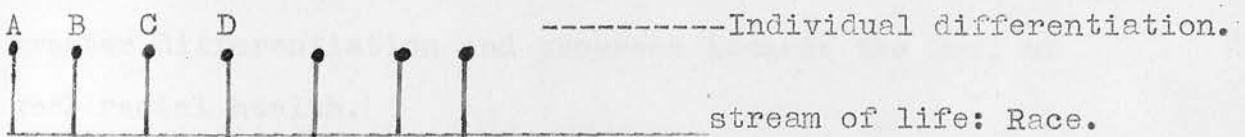


Diagram. 32

There is a stream of life involved in Weismann's conception of the continuity of the germ-plasm, which determines racial evolution, but there is also this process of differentiation at work which makes people, persons, and folk, individuals. The egg, therefore, stands for the unit of race, the link between A and B, while the hen stands for the unit of individuation. The egg came first in time, but to assume its priority in importance is a mis-placement of emphasis.

It is quite likely that there is a social organism similar to the body politic, with its own organisation, but this organism cannot be mature unless the individual components of it are also mature. This is at once a fallacy of such social philosophies as communism, fascism, nazism, social democracy or mass religious movements. They are, as it were, representative of the stream of life at its racial

level, and though individuation may and does take place out of it, this may be an accident and not necessarily an inevitable consequence. The state exists for the individual - not because the individual is in need of state help - he cannot get away from that, so much as that the state is in need of individuals for its own differentiation. This is, of course, never a final process, but changes from generation to generation, and it seems likely that now we are in a position where more people will be able to attain their selfhood than at any previous time, and we may see in this state and others greater differentiation and progress towards the goal of real racial health.

In the process of evolution some sort of differentiation of sex in the germ-cells is attained relatively early, it being found in such elemental structures as algae and other forms of plant life as well as in most forms of animal life.

Somatic sexuality, however, probably occurs later, for in the volvocineae the same mother cell ordinarily gives rise to both female and male gametes (1). With greater specialisation of gametes, there comes a specialisation of the gamete-producing cells and organs, indicating the general truth just suggested, that the trend of evolution is towards greater and greater differentiation, and that the process is interconnected with each unitary step both forwards and backwards in the evolutionary chain of :-

either a) gametes: gamete-producing cells: soma: personal individuation and integration at psycho-physical levels: racial progress.

OR b) Race: persons: somatic sexuality: gonads: gametes.

When we try, then, to define the embryological foundations of sex, we are to bear in mind the dual aspect of a) soma and b) germ-plasm. At the time of fertilisation the sex is determined by the distribution of the chromosomes in the sperm, an x x sperm producing a male and an x y sperm a female, but the actual differentiation of sex does not take place until the embryo is 5 - 7 mm long when the genital ridge first makes its appearance. This goes to form a mass of germ-cells that are intermingled with mesoderm cells and covered with coelomic epithelium. This goes to form the germinal epithelium or cortex, while the medulla is formed from the mesonephric blastema and enters the gonad rudiment through its mesentery; so that even in the very formation of the gonad organ one can symbolise its differentiation as an invasion by the potential medulla of the potential cortex - a male process accompanying a female one. The analogy may be pursued both backwards and forwards, backwards to the differentiation of the genital ridge from splanchnic mesoderm to its derivation from gut entoderm, i.e. from the development of the more specialised (male) tissue of the mesoderm to its more basic (female) entoderm, and forwards to the relatively greater specialisation and advance in distance for its ultimate localisation outside the pelvis in the scrotum, in the testicles, while the more basic and more stable ovary assumes its position inside the pelvis.

Although Loeb (2) in 1916 suggested that the cortex and medulla function as inductors of female and male differentiation

it was established by Spemann in 1918 (3) that differentiation proceeds under the direction of so-called organisers which induce organ formation through an activating principle that spreads from distinctly localised centres into the adjoining tissues. A fact of clinical importance emerged from further work done by Spemann and Mangold (4) in 1924 which led to the suggestion that teratomata developed from the activation in one situation of cells that would normally have produced, say, skin, from a misplacement of other cells that would normally have produced ovarian tissue. This potent tissue was called, therefore, an organiser or inductor and is of the nature of a growth-controlling hormone. As well as this local organising influence, it is evident that both cortex and medulla also have organising properties, thus the cortex activates the differentiation of the germ-cells it includes into ova, and at the same time sends out 'messengers' that inhibit the masculine type of medullary development, as well as other 'messengers' that stimulate the development of the Mullerian ducts and other female secondary sex characters. Similarly the medulla controls the male differentiation of the germ-cells that it encloses, but also emits 'messengers' inhibiting ovarian differentiation in the cortex, causing sex cord formation and development of male secondary sex characters (5).

Thus it is becoming evident that there is a general specificity of hormone action originating from the gonads which is probably blood-borne, but also a much more localised

morpho-genetic substance that spreads from distinctly localised centres with the ability for further organisation.

Another fact of importance that emerges is that in both cortical and medulla induction there is both an inhibitive and a stimulating action, which raises the further question - not yet solved - as to whether these represent two different hormones or whether their action is determined by the nature of the receptive tissue. It seems almost certain however, as Langdon-Brown (6) has indicated, that hormone activity is controlled by anti-hormones, and that this whole system of endocrine relations is built up of two main functions, that of activator and that of inhibitor - that of male and that of female, and that the most promising lines of endocrine therapy are those which help the individual to control from within his own male and female functions.

But the development of the embryo is affected by the pituitary-gonad axis of the parent, as well as by that of its own.

"The mechanism of sex differentiation is initiated by the spermatozoon, but is later taken over by the extracellular agents, the male and female hormones, though the endocrine cells producing them are first determined by the nuclear mechanism. Evidence indicates however, that individuals entirely deprived of sex endocrines tend to be the same, subject to irreversible conditions prior to the operation in question, whether their original determination be male or female." (7).

It seems likely therefore, that the relatively undifferentiated female and the relatively more differentiated male, represent generic and specific attributes respectively, out of which spring individuality. This parallel is one that runs through the whole subject we are discussing.

It begins in the germ-plasm, is involved in the fertilisation of the ovum, and in the differentiation of ectoderm, mesoderm and entoderm. It is reiterated pre-eminently in the action of the pituitary, but is not absent from the action of the other endocrines, for they each have generic and specific actions, dependent on the receptivity and nature of the stimulated tissue. It is carried on further in the development of the psyche, where the generic is synonymous with the relatively undifferentiated, and the specific, the more differentiated attributes of the psyche.

The evidence seems to indicate that the differentiation of maleness is a more specialised function than that of femaleness for castration of the male leads to the development of female characters, which must be regarded as some sort of regression, while in the female castration only produces hypoplasia. Maleness, and femaleness cannot therefore, be regarded as absolute qualities in themselves, but represent an aggregate, for as Weismann suggested it is probable that every organism is a composite of male and female elements.

The ambivalent nature of sex is still more recently confirmed by our knowledge of the hormones. Thus testosterone produces mammary gland development in the rat, similar to that induced by the oestrogens. The androgens similarly,

manifest the progestation phenomena associated with progesterone. Testosterone maintains pregnancy in ovariectomised rats, and deoxycorticosterone becomes oestrogenic in females. Testosterone in eunuchoids increases both the androgens and the oestrogens. Progesterone is androgenic stimulating the prostate and the seminal vesicles.

The pathological effects of these hormones suggest that disease in some of its forms at any rate may be brought on by a disturbance of the male-female hormone balance, thus oestrogens are carcinogenic in males and produce prostatic enlargement, while in females they may produce menorrhagia.

Koranchevsky and Ross (8) report that androsterone and testosterone esters produced renal hypertrophy, and that oestrogens produce degenerative cysts between the renal cortex and medulla.

These facts throw new light on the question of sex incidence in disease.

If we take as a criterion of physical maturity the height to span index which normally should be round about 100%, in most of the disease groups in which the present writer applied the method of anthropometry there was evidence of underdevelopment. This is attributed by Wolf (9) to a malfunctioning of the gonad and pituitary axis.

A series of cases of different disease groups shows on the average an excess of some inches in the span as compared to the height signifying delayed closure of the epiphyses.

	<u>Male</u>	<u>Female.</u>
Osteo-Arthritis of the knees.	(O.A.) 12 cm.	OA. 4.7 cm
Gastric Ulcer	(GU) 9 cm.	GU 4.7 cm
Hyperthyroidism.	(H) 9 cm.	A. 4.3 cm
Duodenal Ulcer.	(DU) 8.3cm	GS. 2.7 cm
Gallstones.	(GS) 8 cm.	CIN 2.4 cm
Pulmonary Tuberculosis.	(TB) 7.3 cm.	Viscerop-tosis. (V) 2.2 cm
Enlarged Prostate.	(EP) 6.3 cm.	BUDU. 1.1 cm
Achlorhydria & Pernicious Anaemia.	(A) 6.cm.	H. 1.1 cm
Diabetes Mellitus.	(DM) 5.7 cm.	DM. 0.6 cm
Chronic Interstitial Nephritis.	(CIN) 2.6 cm.	TB. 0.04 cm.
		Toxic Adenoma. TA. -1.3 cm.

Another principle is that the upper measurements should equal the lower as measured from the pubic eminence upwards to the vertex and down to the ground. From our series of measurements we may take the index trunk length to lower extremity as an expression of this. As a result of the activity of gonads and pituitary in causing extension of the limb bones, the lower measurement increases more than the upper so that we may take as a mark of physical underdevelopment the higher figures:-

Males.

GU 56.6 cm

TB 59.4

H 60.0

DU 60.9

A 62.4

EP 63.4

DM 63.5

GS 64.6

CIN 66.0

OA 66.9

Females.

TB 57.2 cm

DM 60.3

GU 61.6

TA 62.3

H 64.1

DU 65.9

GS 67.9

OA 71.4

CIN 75.6

It is open to question whether such simple criteria of physical maturity are as satisfactory as they ^{are supposed} ~~used~~ to be, because use as in industry develops limbs relatively more than the trunk and as these measurements were taken in industrial Lancashire an excess of span over height might indicate the operation of such a factor. It could, however, be legitimately argued that such an intense preoccupation with objectivity must inevitably mean some retardation of psychological maturity, and probably also of physical maturity, and speaking geberally I believe that principle must be conceded which would explain the comparatively high incidence of eunuchoid traits in the diseases we have considered.

I can find no explanation for the considerable discrepancy between male and female groups, but we may note in this connection that hyperthyroidism in the males shows much more indication of physical immaturity than in the females, while the thyro-adenoma group show a compensatory increase of

height over span, as though the probably pre-existing latent hyperthyroidism had produced an increase in growth.

Marks of eunuchoidism are fairly well marked in both sexes in OA, GU and A groups. In the males this is well marked in H, DU, GS, TB and EP groups.

Taking the criteria of growth of upper and lower parts, marks of physical underdevelopment are common to GS, CIN and OA groups.

To what extent are we to regard these associations as accidental, and therefore lacking in real significance? The answer must depend upon the importance we attach to sexual maturity in relation to general health and well-being. If our standard of health merely consists in the absence of symptoms, or in fitness for work, we must in fairness admit that in the obsessional type work will be undertaken even when physical health demands rest, but if we see as a mark of maturity some development of cultural interests, we shall give much less importance to fitness for work, and learn to encourage the obsessional type to take his work less seriously.

Benedek and Rubenstein (10) have found it possible to relate the instinctual drives to the specific hormone function of the ovaries. Thus they relate a heterosexual tendency with oestrone activity, and a passive receptive and narcissistic attitude with progesterone activity, as indicated in the following tables.

Table I.

<u>Hormone.</u>	<u>Instinctual Tendency.</u>	<u>Neurotic Elaborations of Tendency.</u>
Oestrone. Follicular Hormone.	Active object libido on genital level. Heterosexual desire.	1. Aggressive, incorporate, penis envy, castration wish. 2. Masochistic concept of female sex. 3. Defence reactions. a. fear of attack. b. masculine protest.
Progesterone dominant. Corpus luteum hormone.	Passive receptive tendency on genital level. desire to be loved and wish for impregnation.	Passive receptive tendency on repressive level. Oral receptive tendency and oral dependent wishes towards a. mother b. homosexual object c. heterosexual object.

Table II.

<u>Phase of Cycle.</u>	<u>Hormone State.</u>	<u>Psychological Material.</u>
Follicle ripening.	Initial oestrone function.	Heterosexual tendency, usually pleasant. Feeling of well-being.
Late preovulative.	Increasing oestrone and minimal progesterone.	Relief by sex gratification or increasing tension. Conflicting tendencies. v. Table I.
Ovulative (immediately after ovulation).	Diminishing oestrone and increasing progesterone.	Relaxation of conflict tension. Erotisation of female body, passive-receptive. Pleasant emotional state.
Post-ovulative, luteal.	Progesterone dominance.	v. Table I. especially passive receptive tendencies and object libido to mother or homosexual object.
Late luteal, early menstrual.	Diminishing progesterone and resultant appearance (unmasking) of oestrone effects.	Recurrence of heterosexual level and pregnancy fancies.

Riddle (11) presents evidence that the universal differential of germ-cells is one of metabolic level, and going back to x x and x y spermatozoa it seems as though they were differently geared. In the fully grown, however, that the percentage excess of basal metabolism in human males was assessed by Benedict and Emmes (12) in 1915 but subsequently revised by Harris and Benedict (13) in 1919 to give the figure 6.2. Gephart and Dubois (14) in 1916 returned a figure of 7% excess.

Other related data comprise the facts that increased cellular oxidation is affected by thyroid and adrenal medulla, which are also quite probably affected by both gonad and anterior pituitary, the latter in mammals and birds being larger in females. Its relationship to posterior pituitary from the standpoint of water metabolism and heat loss is also important, while this must be linked up with the newest work on the diencephalon, which indicates that the nuclei may be activated by the discharge of the posterior pituitary secretion giving rise to parasympathetic stimulation, which Cushing compares to the sympathetic stimulation associated with the discharge of adrenalin.

Now health is oscillation about an ideal axis and consists in the ability to swing from one extreme to the other, from, say, sleep to waking, or from contraction to relaxation, from facilitation to inhibition, or from the sanity of waking life to the insanity of one's dreams. It is impossible to be

absolute in any of these states, however, for even the putrefaction of death represents some biological change, and all kinds of mixed states are met, for example, in Guillaume's conception of neurotonia in which sympatheticotonia and vagotonia co-exist. Perhaps even more characteristic are the activity of delirium along with sleep, or the catatonia of the schizophrenic, which is a kind of sleep state of waking life. Thus in some observations on the effect of adrenalin on 34 cases of dementia praecox, every case gave a curve typical of vagotonia, the degree of which depended on the degree of emotional indifference. On the other hand, 5 cases of either maniacal excitement or depressive agitation yielded typical sympatheticotonic curves. (15) When we have pneumonia, if we are wise, we go to bed. That simple attitude is of profound importance for recovery: it consists in allowing sympathetic functions to have more opportunity of fighting the disease. It is not, therefore, a mere cessation of activity, but a facilitation of that kind of activity which is going to be remedial. The adrenal medulla has been spoken of as the endocrine of fight and flight, but that figure tends to make us forget that there is an internal fight and flight to which the adrenal medulla is also sensitive. And so when we come to view the whole problem of sexuality in relation to disease we can see some significance in the male-female axis by representing the following functions as more characteristic of one sex than the other:-

<u>Male.</u>	<u>Female.</u>
Waking life.	Sleep.
Activity.	Passivity.
Sympatheticotonia.	Vagotonia.
Contraction.	Relaxation.
Cyclothymia.	Schizophrenia.
Systole.	Diastole.
Catabolism.	Anabolism.
Acid phases.	Alakline phases.
Excitement.	Depression.
Dominance.	Recessiveness.
Power complexes.	Love complexes.
Extraversion.	Introversion.
Positive phases.	Negative phases.

One's health, therefore, consists in the adjustment within oneself of both male and female elements, and all the dysrhythmias, from epilepsy to auricular fibrillation, from hyperthyroidism to hyperchlorhydria, and from cardiac achalasia to ureteric achalasia, represent phases in which the two elements are not at peace with each other.

Speaking generally, the pituitary and gonads reconcile these two main functions, though each of them has its own maleness and femaleness like the duality which runs through all our life, while their inter-relations with the rest of the endocrine system are of considerable importance.

We may note here, however, some commonly associated factors:-

1). Persistent or recurring pain, as in the neuralgias, for instance, is frequently due to a repression of male elements, occurring in either sex.

2). Insomnia in women is frequently due to a repression of male elements, though in men it is more commonly due to a repression of female elements.

3). Hurry and 'busyness' are due to a repression of female elements, which have their repercussions on thyroid and parathyroid activities predominantly, with their liability in the main for facilitating sympatheticotonia and inhibiting vagotonia, though this may also be heightened. This tends to produce calcium subutilisation with the effects outlined, as given by Timme (16):-

Vegetative level.	Smooth muscle spasticity; spastic colon; tenseness; pyloric spasm; pharyngeal spasm; singultus; laryngeal spasm with cough; uterine spasm; blood vessel tenseness with claudication; high B.P.; high blood sugar; accentuation of vagotonia and particularly sympatheticotonia; slowness of growth; loss of weight.
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Sensory motor level.	Increased reflexes; myotatic irritability and myoidema; constant muscular tension; therefore fatigability; increased speed of nerve reaction, therefore quickness of motion and alertness; lack of sleep; general low threshold for stimuli.
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Cortico-psyhic level. Increased speed of perception; and rapid association of ideas, therefore witty; but also because of rapidity of reaction, compulsive acts caused through instinctive, protective and ass^dlative reactions without necessary time for inhibition and controlled judgment; incorrigibility; basis for some criminal conduct disorders.

The importance of sex on diathesis, important as it is on the physical side, is supremely important on the psychological side, for the sexes need each other in order that their own ambivalence may be appropriately differentiated. But this is no easy task, involving as it does the satisfactory adjustment of the whole self with its own bisexuality, and of the whole self with the bisexuality of other men and other women. It involves accepting the tension of the bipolarity principle in its most acute phases, for not only is the self so constituted that it needs physical differentiation, which is a quality deep-rooted in the germplasm itself, but it involves the coming of age of the self when responsibility for personal differentiation is voluntarily undertaken.

It is, I believe, a mistake of emphasis to say like the hymn-writer, that 'the solemn shadow of the cross is better than the sun', for it is a confusion of the end with the means, but I think I know what he meant when he wrote it, for its language conveys the poignant impression that springs

out of the acceptance of the inverse phase of experience that follows a previously one-sided sort of outlook. It is a mistake to think that this dark side is better than that bright side, just as it is a mistake to think that optimism is the only justifiable philosophy of life, and in this connection we must see the aptness of the Hegelian triad, which says that truth is a synthesis of thesis and antithesis: sex separates male from female, but wholeness consists in the reconciliation of these opposites. The moralist separates good from evil, but God is both. That does not mean that ^{good} and evil, however, do not matter, because these things do matter. It does mean, however, that we are to be reconciled to the painful process whereby these forces register themselves both in our psyche and in our soma, and this presumably lies primarily in the pituitary-gonad axial relationship.

The pituitary is the activating gland, the seat of power; but we are to be so detached from its compulsiveness and identified with weakness, that we may know wherein lies our real strength. This is how we come to recognise the inter-relationship of the reality-insight-healing mechanism. The maniac in his fury is capable of stupendous feats of strength and endurance, but this is not real strength; it is power gone mad, and it needs all the compensatory effect of depression to tame it and make it serve the really constructive and creative needs of the self. But the depressive phase also is not healthy; for it is too one-sided, and has not found the strength that comes from objectivity, and to that extent

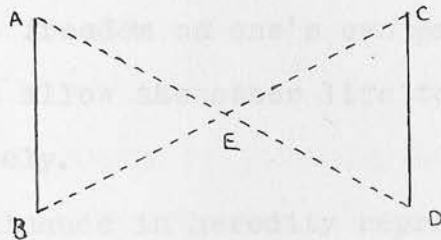
is schizophrenic, for it is 'cut off' in a very real sense from the source of vitality. The factor of time is a vital one in these conditions, and no technique which has not learnt to live in and trust the space-time continuum, really counting on the unseen eventuality, can in itself help that sort of wound to heal. That Fate can take the matter out of our hands and settle the matter is, of course, true, but our insight must include the kind of assurance and alertness that both sees a lack in the patient and can visualise its fulfilment in time.

So far as their expressions go, neither Freud, Adler, nor Jung, seem to have appreciated the importance of the time element, though Freudian analysis in its lengthiness seems to imply it, and no doubt both Jung and Adler by their very patience have taken it for granted. In relation to reductive analysis, however, the time factor assumes an important place, but the underlying assumption is just wrong. I refer to the assumption that fears in middle life take origin from an unrecognised incident in early life, that was associated in time with fear, but not consciously. The empirical validity of reductive analysis does not affect this matter of principle, just as the large demand for patent medicines does not necessarily indicate pharmacological effectiveness, for similar principles underlie both practices, viz., 1) that the agent of cure has less validity than the time factor; 2) that fashion in cure prevails just as much for the upper classes who can afford psycho-analysis, as

for the poor who can only afford patent medicines, 3) that the effectiveness of the former method is more enlightening than that of the second because it so obviously assumes a longer time element, and encourages reflection; and also introduces the personal element into the matter of healing, more consciously; 4) that personal integrity in itself liberates healing forces, either by the facilitation of insight, or, and through, the release of libidinous energy.

So much then for the pituitary or power principle; but correlation has to be made with the gonad or love principle, and as narcissism is self-consuming, so objectively it is necessary both to encourage the projection of love to others, and the introjection of the love of others on to the self.

Expressing it graphically:-



Diag. 33

we may say:-

- 1). A B represents power-love axis of an individual.
- 2). C D the power-love axis of one's neighbour.
- 3). E the principle of mediator, through the analyst.
- 4). The following situations express the various relationships that may ensue between A B and C D.
 - a). A B may be identified with C D too closely, as applies in "folie à deux".

b). A B may be completely cut off from C D as applies in schizophrenia.

c). The mediating principle E may assume either too large or too small an importance, so that contact between A B and C D takes on the form either a) or b) above.

d). The mediating principle may assume too much or too little according to whether the attitude characteristic of general practitioner or traditional psychiatrist is assumed.

e). Both the principles of identification or detachment are necessary to save us from the snare of the obsessional attitude or the conflict of anxiety.

This implies i. that love must be detached.

ii. that power must be identified with the real good of one's neighbour.

iii. that another's good is closely bound up with the freedom on one's own part with which one can allow the other life to express itself freely.

iv. Dominance in heredity represents the persistence of power complexes (i.e. identification).

v. Recessiveness in heredity represents the persistence of a too detached attitude.

Reductive analysis assumes that the backward look is more essential than a forward one. This principle I believe to be fundamentally wrong, for in addition to its reminder of Lot's wife it fails to appreciate the fact that the oedipus complex is of less importance than the discovery that one's mother

may in a very real sense be someone whom one has so far never yet met. (cf. Mark 3.33. and John 19.26-7.)

Freud, Adler and Jung are by way of generalisation of their particular emphasis, concerned with the meanings of the term "love" implied in the three Greek words, eros, philos and agape respectively, where the first implies realisation of love as an instinctual drive, the second as a social claim, and the third as a spiritual principle. It is convenient to recognise homosexuality and heterosexuality as problems, but it is still more important to recognise them as basic to both philanthropy and all romance, which is not to disparage these branches of human life, but to encourage the recognition of the relatedness of crude emotions to civilised and cultured society. Conversely, repressed homosexuality and heterosexuality may motivate misanthropy and misogyny, and yet underlie philanthropy, which is not necessarily thereby invalidated.

The Freudians are wrong in thinking so highly of the oedipus complex, for as Carlyle disparagingly said in another connection, one can have one's attention too closely fixed on one's own navel!

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Chapter 12.

PHYSICS IN RELATION TO THE NERVOUS SYSTEM.

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Charles Dickens. "The Pickwick Papers"

Chapter 15.

PHYSIQUE IN RELATION TO THE ENDOCRINE SYSTEM.

"Damn that boy", said the old gentleman, "he's gone to sleep again".

"Very extraordinary boy that", said Mr. Pickwick; "does he always sleep in this way?"

"Sleep!" said the old gentleman, "he's always asleep. Goes on errands fast asleep, and snores as he waits at table."

"How very odd!" said Mr. Pickwick.

"Ah! odd indeed," returned the old gentleman; "I'm proud of that boy - wouldn't part with him on any account - he's a natural curiosity! Here, Joe - Joe - take these things away, and open another bottle - d'ye hear?"

The fat boy rose, opened his eyes, swallowed the huge piece of pie he had been in the act of masticating when he last fell asleep, and slowly obeyed his master's orders - gloating languidly over the remains of the feast, as he removed the plates, and deposited them in the hamper."

Charles Dickens. "The Pickwick Papers".

Synopsis.

Dwarfism is an extreme deficiency of stature not necessarily accompanied by infantilism.

Infantilism is classified:-

- 1) Primary endocrine anomalies.
- 2) Anomalies secondary to some more general condition:-
 - a) Predominantly associated with physical infantilism,
 - b) Predominantly associated with mental infantilism.

Arachnodactylia and Gargoylism are contrasted.

Precocity is characterised by sexual and somatic hypertrophy. The associated conditions are described.

Gigantism is described as general symmetrical over-growth of the body, usually with precocity.

Some of the effects of the endocrines on physical development after puberty are indicated.

It is customary to distinguish between infantilism, in which an individual past the age of early childhood, presents characteristics normally found in one much younger, and dwarfism, which is an extreme deficiency of stature, but not necessarily infantilism, e.g. spinal caries, severe rickets, osteogenesis imperfecta and achondroplasia.

Wolf (1) distinguishes cases in which 1) the retardation includes every part of the body and mind and 2) when it is only partial, and only certain physical or mental features are retarded, while development in ~~most~~ other respects has progressed normally.

We may note the following types:-

1. Primary Endocrine Anomalies.

Thyroid deficiency: cretinism.

Pituitary deficiency:

- { Fearnside's "pudding-face" type. (Before puberty).
- { Fröhlich's "dystrophia-adiposo-genitalis". (about puberty).
- { Brissaud's type - a variant between these two former.
- { Laurence-Moon}Biedl Syndrome.
- { Schüller-Christian Syndrome.

Mongolism.

Lorain type or ateleiosis.

Gonad deficiency:

Eunuchoid types.

Obese types.

Diabetes Mellitus: giving rise to secondary gonad deficiency.

Persistent thymus: leading to hypoadrenalism.

Progeria, ascribed variously to pituitary, adrenal

and to early thymic involution.

II. Anomalies Secondary to some more general condition.

	(Coeliac Disease.
	(Gargoylism (Hurler's Disease).
	(Arachnodactylia (Marfan's Disease).
	(Tay-Sach's Disease.
	(Batten-Mayou Disease.
Predominantly	(Congenital Syphilis.
associated	(Congenital or acquired heart disease.
with	(Any chronic infection such as malaria,
physical	(hookworm, or tubercle.
infantilism.	(Parental alcoholism.
	(Rickets.
	(Scurvy.
	(Renal infantilism.
	(Achondroplasia.
	(Osteogenesis imperfecta.
	(Spinal caries.
	(Microcephaly
	(Hereditary Ataxias.
Predominantly	(Congenital diplegia and infantile hemiplegia.
associated	(Hydrocephalus.
with	(Oxycephaly.
mental	(Epilepsy.
infantilism.	(Tuberose sclerosis.
	(Mental deficiency following encephalitis,
	(meningitis and trauma.

It remains for us to note the general constitutional characteristics of the more important conditions mentioned.

Cretinism: The main defects due to deficient thyroid secretion in early life are 1) hyperplasia of fibrous connective tissue in the deep layers of the skin and 2) late appearance of the centres of ossification in the small bones of the wrist and ankle and the epiphyses of the long bones. A disproportion between the length of the limbs and the size of the body results. The usual features are large head, usually brachycephalic, short extremities, obesity with infantile genitalia and secondary sex characteristics lacking.

{ Fearnside's "pudding face" type of pituitary deficiency.
 { Brissaud's hypopituitarism.
 { Fröhlich's syndrome.

These three conditions represent variants of under secretion of pituitary which may be due to trauma in the pituitary regions, leading to its compression, syphilitic affections, trauma, or may represent general constitutional types without gross focal lesions.

The main characteristics are increased weight due to adiposity, increased sugar tolerance, lower temperature, infantilism of genitalia and secondary sex characteristics with deficiency of hair in the male, or male distribution of hair in the female, prominence of breasts in the males with tendency to general feminine configuration, slow movement of the body and sluggish mentality. Genu valgum is a frequent accompaniment. Other features that may be found are diabetes insipidus, small accessory nasal sinuses, and faulty dental eruption and distribution.

After puberty anthropometric measurements may show eunuchoid rather than hypopituitary disproportion, with legs and arms comparatively long, lower measurement greater than the upper, and span greater than height. The association of hypopituitarism with hypothyroidism leads to such secondary features as fat deposition on the extremities which otherwise tend to be graceful and tapering.

The Laurence-Moon-Biedl syndrome is another variation of the Fröhlich type in which adiposity and genital dystrophy are combined with polydactylism, retinitis pigmentosa and mental deficiency. Other associations which may be found are waddling gait, optic-atrophy and imperforate anus.

The Schüller-Christian syndrome is probably a less specifically pituitary syndrome than the foregoing, though the presence of diabetes insipidus and exophthalmos links it up with posterior pituitary disorders and the exophthalmos ophthalmoplegias due to excessive thyrotropic hormones from the anterior pituitary on the one hand, while the disturbance of lipid metabolism causing membranous bone defects links it up with such disorders of the reticulo-endothelial system as Niemann-Pick's disease and Gaucher's disease on the other hand. Decalcification of the bones especially of the skull, lower jaw and pelvis is probably the most notable feature of the disease.

Mongolism has been classed by Timme (2) as a pituitary disorder, rather on the strength of improvement with pituitary administration than on definite pathological grounds.

X-rays of the sellar region have however, shown excavation under the anterior clinoid processes, with enlargement or flattening of the pituitary fossa. Benda (3) has claimed to have found definite alterations in the pituitary of thirteen mongols. These were an increase in the eosinophil cells and a deficiency of the basophil cells, without increase in the size of the pituitary. The main clinical features are micro-brachycephalic skull, chubby cheeks, a flat sunken-bridged nose, slanting eye-slits, small mouth with relatively large tongue which is often fissured, narrow nostrils and a skin that may be soft and delicate, but which tends to be dry, mottled and eczematous. Growth is retarded from the beginning, so that the long bones never reach average dimensions. The hands are small with short thick fingers and small metacarpus, while the thumb and little finger are especially short, a noteworthy feature being an incurved little finger. Dentition is usually late, while crowding and malformation of the teeth are common. Genital development is retarded with cryptorchidism in some cases, or delayed secondary sexual development.

Other defects may include congenital heart disease, prognathism, lack of muscle tone, strabismus, cataract and aural malformations. Mental deficiency is an invariable accompaniment, though the musical interest of these children suggests that this might prove of considerable use in their development. Their relative insensitivity to sensory stimuli (heat, cold, pressure and pain) is probably connected with their docility.

Levi-Lorain infantilism is the most typical of the dwarf syndromes in which there is a diminutiveness of all the structures. It is due to a deficiency of the anterior pituitary ~~growth~~^{growth} hormones and though its actual features recall some of those described for mongolism, the general appearances are much more in keeping with normality making differentiation quite easy. As evidence of similar pathology, however, are the small stature, ununited epiphyses, genu valgum, cryptorchidism, sexual infantilism, weak skeletal muscles, malformed crowded teeth, prognathous ~~maxilla~~, weak irritable bladder, giving rise to enuresis, dry skin, low temperature, slow pulse and tendency to epileptic attacks.

The features of gonad deficiency are so liable to be associated with dysfunctions of pituitary, adrenal cortex, thyroid and thymus that many variants may be encountered, but in general we may define two contrasting types and note the features that may be found with other complicating endocrinopathies.

1). The eunuchoid type is characterised anthropometrically by long arms and legs, due to late closure of the epiphyses, the span greater than the height, lower limbs much longer than the upper, rounded body form and drooping shoulders. In the male the testicles may be undescended, small or atrophic. Secondary sex characters are underdeveloped, the voice being high-pitched, hair distribution of feminine type, obesity of girdle form, while in the female sexual infantilism shows itself by under-development of breasts, relative

amenorrhoea, sterility or tendency to abortion, male configuration of pubic hair, obesity of trunk and thighs.

2). The obese type probably represents a later stage than the foregoing, as eunuchoid types tend to put on weight with the years. But there are other types of hypogonadism in which there is marked shortening of the extremities with obesity as in cryptorchidism or pseudohermaphroditism.

In both types mental infantilism is found, though that is not to say that improvement may not be effected by psychotherapeutic educational measures.

The complications or sequelae of hypo-ovarism are arthritis, epilepsy, secondary anaemia along with secondary thyroid or pituitary dysfunctions, while hypogonadism in the male may lead to malignancy (sarcoma or carcinoma) of an undescended testicle, hernia, torsion of the cord, or cirrhosis of the liver. Other sequelae of hypogonadism include homosexuality, diabetes mellitus, and dementia praecox.

The effects of a persistent thymus are to increase growth while sex development is retarded. The somatic effects are as follows:-

1). A soft skin, lanugo growth of hair, some flushing of the cheeks, which owing to their colour have been likened to 'peaches and cream'.

2). Youthful angelic appearance along with scanty or absent growth of hair on the face.

3) Sparse pubic hair, in the male with typical feminine distribution in the shape of an inverted triangle.

4). Bluish-white teeth with large central and small lateral incisors, and the canines shaped like the incisors.

5) Hyper-extension of the joints, especially of the

mandible, shoulder, metacarpus and metatarsus. Owing to the laxity of the ligaments contortions are possible.

6) Maxillary torus.

7) Delayed fusion of the epiphyses.

8) Such indications of vagotonia as a diminution in blood pressure, pulse and temperature. Hyper-acidity and fatiguability, with liability to acidosis, allergic reactions, pyloro-spasm and laryngeal spasm may be present.

9) Lack of genital differentiation, so that in the male hypospadias may be found, but more frequently the penis emerges from a fold of scrotum surrounding its base.

10) Thin small arteries, small suprarenals, small enclosed pituitary, with low resistance to fevers such as diphtheria, scarlatina and influenza with liability to chloroform syncope. Lack of tone in the small muscles, predisposes to visceroptosis and enuresis.

11) Laboratory findings may include low CO_2 tension of the blood, prolonged coagulation time, lymphocytosis, eosinophilia, low specific gravity of urine and orthostatic albuminuria.

12) Egocentricity, imitateness and negativism.

Timme (4) has described a thymic suprarenal pituitary 'compensatory' syndrome in which the previous condition is complicated by a compensatory activity of the endocrine glands, with pituitary enlargement, erosion of clinoid processes and boney abnormalities which may develop into acromegaly or gigantism, this may be associated with increased growth of hair, sexual development, high blood pressure and pituitary headaches.

The thymus has been called the gland of childhood, and there seems to be no doubt that some schizophrenic personalities display many of the features mentioned.

The condition of Progeria was described by Hastings Gilford (5) as the picture of premature senility, its characteristic are:-

- 1) Small height, small lower jaw with defective ear lobules.
- 2) Thin skin through which the cartilages, veins and tendons stand out easily.
- 3) Almost complete baldness except for sparse, fine hair, on the scalp, brows and eyelids.
- 4) Short, flat membranous nails.
- 5) Poor, flabby muscles so that the individual stoops and may add to his senile appearance by using a stick.
- 6) Open anterior fontanelle, persistent milk teeth and high piping voice.
- 7) Sexual infantilism.
- 8) Post mortem appearances may include:-
 - (a) persistent fibrotic thymus gland,
 - (b) atheroma of mitral and aortic valves, and coronary occlusion,
 - (c) thickening of the splenic capsule, senile fibrosis of the kidneys and atrophy of the suprarenals,
 - (d) atrophy of stomach and intestines,
 - (e) atrophy of lymphoid tissue in tonsils and Peyer's patches,
 - (f) long, delicately formed bones with relatively

large ends at the knees and sternal ends of clavicles, with tendency to premature ossification.

Arachnodactylia (Marfan's disease) is a condition that was originally described in 1896 (6 & 7) though not frequently recognised since, and recalls some of the features of persistent thymus, though it was originally attributed to syphilis. Its characteristics are:-

- 1) Long slender extremities, especially at the distal portions of the extremities, giving rise to the description of 'spider digits'.
- 2) Dolichocephaly with a protusion of the upper half of the auricle, and a close-set lower half, highly arched palate, long narrow teeth with receding lower jaw.
- 3) Tendency to such eye complications as ectopia lentis, lenticular myopia and chorioretinitis.
- 4) Such deformities as pigeon-breast, winged scapulae, kyphosis, lordosis, kyphoscoliosis and spinapifida.
- 5) Congenital cardio-vascular lesions such as, patent foramen ovale, incompetent valves and acrocyanosis.
- 6) Abnormal division of the lobes of the lungs.
- 7) Marked relaxation of the joints giving rise to flat feet; webbing of the fingers and toes and contractures.
- 8) Diminution of subcutaneous fat.
- 9) Premature ossification and rarefaction of bones.
- 10) Usually normal mentality.

It is described as being equally distributed among the sexes, familial in origin and as being a disturbance of mesoblastic growth.

As a contrast to this condition which we may describe as typically one of asthenic disproportion, we may note the features of Gargoylism (Hurler's syndrome) (8,9,10) which is equally typical of sthenic disproportion:-

1. Dwarfism with bones of the upper extremities thicker and broader than usual. Micromelia.
2. Brachycephaly with posterior ridging of the skull, enlarged anterior fontanelle, hydrocephalic skull with bulging of the frontal eminences and heavy features. Ears are low set with lobes deflected forwards. Eyebrows are coarse and dark, hair on the head, back and arms fair and coarse, nasal bridge depressed and nasal discharge tends to be profuse.
3. Hypertelorism with orbits large and set widely apart making binocular vision impossible for near objects. Bilateral clouding of the corneae may be present.
4. Such deformities as ventral hernia, flaring of the lower ribs, dorsilumbar kyphosis and chondro-osteodystrophy in the metacarpals and the phalanges, The head of the humerus and the glenoid fossa are irregularly shaped; both acetabulae are poorly developed and deficient in the upper lip. Genu valgum or varum, coxa valga, short cervical spines and wedge-shaped vertebrae may be present.
5. Hepatomegaly and palpable spleen are frequently found.
6. Limitation of extension at the shoulders and elbows and abduction at the hips; fixed flexion deformities of the fingers.

7. The neck is thick, the tongue wide and thick, the teeth broad and short, lower third of the face wide, the gonial angle of the mandible obtuse, chest and abdomen enlarged in circumference, with enlargement of the heart.
8. Delayed^m dentition and in walking and speaking.
9. Hypo-genitalism and mental retardation.
10. X-ray appearances of the sella turcica by the posterior clinoid processes are deformed and deflected backwards.

Infiltration of the parenchymal cells with lipoid material is characteristic of the condition and its involvement of the anterior lobe of the pituitary gland is undoubtedly responsible for many of its features, linking it up with the Schüller-Christian syndrome and Niemann-Pick's disease.

In contrast to infantilism and dwarfism we have to consider precocity and gigantism. Precocity is characterised by sexual hypertrophy and somatic hypertrophy, but just as infantilism includes dwarfism and also sexual and mental underdevelopment without necessarily affecting height, so precocity may occur without gigantism.

Precocity in the form of macrogenitosomia usually arises from three distinct types of pathological lesion.

- I. Premature or rapid atrophying of thymus, with the following features.

Precocious involution of thymus leads to:-

1. Too rapid a differentiation - old-young type.

2. Short stature, early closure of epiphyses.
3. Early eruption (irregular) of permanent teeth.
4. Early sex maturation (menses, hair, breast.)
5. Stocky build; high blood pressure.
6. Adult polymorph count.
7. Mental precocity; cruel, resentful, easily roused to anger, and with little inhibition.

II. Precocious involution of pineal shows itself by:-

1. Pineal shadows in X-ray before 20.
2. Enlarged genitalia.
3. Muscular dystrophy with hypoextension of the joints.
4. Low blood sugar.
5. Mental precocity.

III. Juvenile adreno-genital syndrome. Attributed to hyper-function of the adrenal or cortical cells, or more exactly a hyperplasia of the juxtamedullary or androgenic zone, which normally disappears in the first year of life. Its chief features are:-

1. In young girls, overgrowth and premature appearance of secondary sex characteristics of the male type, hypertrichosis, labial hypertrophy, enlargement of the clitoris and absence of menstruation. In males overgrowth of external genitalia, hypertrichosis and immature testes without spermatogenesis.

2. Pronounced muscular development giving rise to the characterisation of 'infant Hercules'.
 3. Advanced bone development and early fusion of epiphyses.
- IV. Arrhenoblastoma of the ovary gives rise to an exactly similar condition.
- V. Granulosa-cell tumours of the ovary. True sexual precocity occurs when these tumours develop during childhood. It produces hyper-feminisation so that menstruation may occur as early as the first year along with such secondary sex characters as mammary hypertrophy, growth of genital and axillary hair, increased growth, ~~atypical~~ feminine contour and increased size of uterus.
- VI. Precocity from testicular tumours is very rare though cases have been recorded which arose from the interstitial cells.

Gigantism is described as a general symmetrical over-growth of the body of which three types are defined:-

1. Simple hereditary gigantism in which it is believed that the main influence is genetic constitution.
2. Acromegalic or hyperpituitary gigantism due to overactivity of the eosinophil cells of the anterior pituitary. Anthropometrically the main features are, longer lower than upper measurement, span greater than the height and long arms, legs, fingers and toes. As well as skeletal overgrowth there is hypertrophy of the viscera and thymus with atrophy of gonads, adrenals and thyroid.

3. Hypergonadal or Eunuchoid Gigantism which has already been considered under the category of infantilism.

So far we have dealt with the main endocrine influences at work before the onset of puberty. It remains for us to consider the influence of endocrines on physique in relation to post-^{er}pubal life. The most important of these are the pituitary, the thyroid, the parathyroids, the adrenal cortex and the gonads.

The most helpful way of considering these factors is to consider them in the light of axial relationships. Thus the acidophil cells of the anterior pituitary operate antagonistically with the gonads in the production of height, and the basophil cells operate synergically with the adrenal cortex in the production of breadth, the ketogenic hormone of the pituitary operates antagonistically with the thyroid in the deposition of fat and therefore, of depth, while the time factor is served by the operations of the thyroid-parathyroid axis which operates antagonistically on the one hand by facilitating the consumption of oxygen and the breaking down of amino-acids into carbon-dioxide, water and precursors of urea, and on the other by the deposition of calcium in the growth of bone.

In addition to this we have the effect of the pituitary tropic hormones which activate the thyroid, the adrenal and the parathyroids.

As far as the effects of disease conditions of these various mechanisms we may compare:-

1). Simmond's disease with Cushing's pituitary basophilia.

	<u>Simmond's Disease.</u>	<u>Cushing's pituitary basophilia.</u>
Pathology.	Pituitary atrophy.	Basophile adenoma.
Symptoms & Signs.	(Degeneration of thyroid, parathyroids, and adrenal cortex.	(Hypertrophy of thyroid, parathyroids, adrenals, gonads, & islands of Langerhans.
	Emaciation & visceral atrophy.	'Buffalo type of obesity'.
	Low blood pressure.	High blood pressure.
	Premature menopause & senility.	Sexual precocity, later with frigidity & sterility.

2) Acromegaly and Fröhlich's Syndrome; we have already considered some of the features of Frohlich's Syndrome in the discussion of infantilism, but as the condition may occur after puberty it affords us an opportunity of comparing it with acromegaly.

	<u>Acromegaly.</u>	<u>Fröhlich's Syndrome.</u>
Pathology.	Eosinophile adenoma.	Extrasellar tumours.
Symptoms & Signs.	Excessive growth of acral parts of the body: (predominantly in breadth).	Obesity of girdle distribution: (predominantly in depth.)
	Marked growth of bone.	Retarded bone development.
	Genital hyper-function.	Sexual inadequacy.
	Decreased carbohydrate tolerance.	Increased carbohydrate tolerance.
	Increased size of viscera.	Retention of fluid or diabetes insipidus.
	Overgrowth of skin.	Overgrowth of lymphoid tissue.

3) Hyperthyroidism and Myxoedema.

	<u>Hyperthyroidism.</u>	<u>Myxoedema.</u>
Pathology.	Parenchymatous hypertrophy & hyperplasia.	Connective tissue hyperplasia.
Symptoms & Signs.	Rapid growth in length, slender bones, narrow arched palate, long narrow thorax and neck, narrow head with eyes close together.	Lymphoid infiltration of the skin, generalised obesity.
	Precocity of gonads, secondary sexual characters & mentality.	Retardation of gonad activity & mentality.
	Too rapid differentiation.	Increasing torpor.
	Tachycardia.	Bradycardia.
	Increased temperature & B.M.R.	Decreased temperature & B.M.R.
	Increased excretions & secretions.	Decreased excretions & secretions.
	Increased protein cell destruction.	Decreased protein cell destruction.

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CHAPTER 16

Some General Characteristics of Certain Bodily Types.

"Let me have men about me that are fat;
Sleek-headed men, and such as sleep o' nights:
Yond Cassius has a lean and hungry look;
He thinks too much: such men are dangerous.

.....

Would he were fatter .- But I fear him not:
Yet if my name were liable to fear,
I do not know the man I should avoid
So soon as that spare Cassius. He reads much;
He is a great observer, and he looks
Quite through the deeds of men: he loves no plays,
As thou dost, Antony; He hears no music:
Seldom he smiles; and smiles in such a sort
As if he mock'd himself, and scorn'd his spirit
That could be mov'd to smile at anything,
Such men as he be never at heart's ease
Whiles they behold a greater than themselves;
And therefore are they very dangerous.

Julius Caesar. Act I Sc. II

Synopsis.

The main characteristics of the asthenic and sthenic types are outlined. Some variants of these types are also indicated.

Different observers have from time to time during the last 50 years commented on the various bodily types met with in the study of disease. Some have described two fundamental types, while Sigaud (1) and McAuliffe (2) have detailed four different types. Pende's (3) observations on this matter are probably correct when he states that there are really two fundamental human types, while one might relegate to subordinate positions the "normal" type and various mixed types, spoken of by some as athletic and dyplastic (Kretschmer) (4) or degenerative (Bauer) (5) .

At the outset, therefore, we are considering two extreme varieties which serve to emphasise the distinctive features of each group, while we are to remember nevertheless that just as the typical disease-picture is rarely seen, so the absolutely typical features of one or other of these basic human forms are infrequently met.

The criteria of distinction between these two groups rest upon the law of Viola (6) that the more an organism evolves ponderally the less it evolves morphologically, and vice versa, and this is modified by Bichat (7) into the tenet that the greater the development of the vegetative system, the less is the development of the system of relation. Similarly Bean (8) speaks of the hyperontomorph with excessive development of epithelial structures (brain, lungs, alimentary canal and skin), and the mesontomorph with mesothelial structures (bone, muscle and connective tissues) excessively developed.

One type therefore tends to increase in weight, with trunk preponderating over limbs, "hypervegetative, hypoevolute" (Pende)

mesotomorph, megalosplanchnic, with anabolic functions in the ascendant, and mesenchyme elements more marked than parenchymal.

On the other hand, there is the type with stature more developed than weight, long lanky limbs preponderating over trunk, "hypovegetative, hyperevolute", hyperontomorph, microsplanchnic, with catabolic functions apparently dominant, and parenchymal development more marked, with mesenchyme in regression.

The one has been variously termed the short-thicks ("breitwuchs") sthenic, brachymorphic, abdominal, plethoric, herbivorous, lateral, pyknic or cycloid, while the other has been described as the long-thins, ("hochwuchs") asthenic, dolichomorphic, thoracic, phthisical, carnivorous, lineal, or schizoid.

Both phases of growth take place in every individual, and according to Godin (9) phases of growth in width alternate with phases of growth in length, but in many cases one phase is much more marked than the other, though it is important to recognise that an asthenic individual may present certain features suggestive of the sthenic build.

The asthenic habitus is characterised by a relative increase of height over breadth, so that if not already tall, the individual may appear actually longer than he really is. The head is dolichocephalic, the face is inclined to be long and thin, sometimes described as hatchet-shaped, or egg-shaped. According to Kretschmer (10) the asthenic skull is not always dolichocephalous, but is on an average of small circumference, of medium width, but short and low, and he differentiates the shape of the face of the asthenic type from that of the athletic type (an asthenic variant) by comparing one to a short egg, and the other to a "steep egg-shape." This shape is chiefly made up

by the well-developed frontal and parietal regions with comparative preponderance over the size of the lower jaw. The general profile of face and body is angular, because the skin is thin, the muscles are delicately formed and are not usually covered with fat. The brow may be steep and the supraorbital ridges are well-marked and usually well covered with hair, so that there may be a continuation of the eyebrows at the root of the nose, and to wards the temples. The ears are often long, convoluted, and finely made and may or may not lie fairly flatly against the head, while the eyes lying inside the well-marked orbital cavity may appear bright and glistening, or may on the other hand be more prominent, large and outstanding, - an effect which may be heightened by the comparative laxity of the skin of the eyelids. The interpupillary space is less than average. The nose has usually a prominent bridge, which may nevertheless be rather thin, though the actual length of the nose is greater than the average. On the other hand, sometimes it is much less than usual in some asthenic women. The alae nasi may be collapsed, and open downwards. Frequently septal deviations are found.

The malar bones, in line with other bony prominences, tend to be more noticeable, and this is increased by the general pallor or sallowness of the skin of the face. In older people, however, especially of hyperthyroid build, this pallor may give place to a malar flush, which is surrounded by an olive tinge over the rest of the face. Generally speaking however, the skin may be pigmented, sallow, is often dry and thin. The lower jaw also stands out prominently, and the gonial angle can be clearly seen through the overlying skin. The lips are thin and flabby, and generally manage to hide the teeth, which may be rather crowded and

consequently set rather unevenly. In hyperthyroids, however, fairly big well-formed teeth are very frequently found. The palate is highly arched and narrow, while the tongue is thin, pointed and less in size than the average. Although the chin may stand out fairly definitely, yet this is due rather to the thinness of the skin than to the actual massiveness of the mandible. This thin texture of the skin is noticeable also at the nape of the neck, and in increasing years, leads to marked wrinkling of the face. The occipital region of the skull may be rather "bumpy" sometimes accentuated by the presence of an extra occipital protuberance above the usual one, or on the other hand it may form rather an uninteresting curve as it joins the skin of the neck.

The neck appears long and thin, and both 6th and 7th cervical vertebrae may be prominent, forming a mild kyphosis with the other vertebrae, while the muscles of the neck stand out fairly clearly. The trapezii with the overlying skin stand out to present an obtuse angle. The pomum adami projects outwards and is seen distinctly while the voice is frequently bass.

The suprasternal notch is well-defined along with the bones of the shoulder girdle, and the junction of deltoid with trapezius is usually rectangular. The biacromial diameter is rather long, in proportion to the chest depth. There may be some winging of the scapulae. The chest is long and thin, but the lateral diameter is considerably bigger than the anteroposterior. The costo-vertebral angles are acute, coming sharply away to meet the sternum in front - i.e. in the position of expiration. The subcostal angle is rather acutely fashioned, and the xiphisternum is generally easily palpated. The breasts are not usually well

demarcated in the male. The chest is rather more prominent than the abdomen, which is usually retracted, and there is frequently a well-marked waist, due to the 'funnel shape of the lower thoracic region'. The umbilicus to pubic length is more than the xiphisternum to umbilicus length, consequently the umbilicus is rather more highly situated than usual. The ilia are often flared out, and the lower costal arches may abut closely on to the iliac crests. Along with other bones the innominates are lightly made, and the bi-iliac diameter is usually broad. It will be readily seen that those distinctions are in general those found between the two sexes, and the asthenic habitus is typical of the female sex. In the male members of this type, however, the genitalia are not very well marked, the penis and testicles being of small proportions.

The spinous processes of the vertebrae and the ribs stand out sharply, and often there is a long depression running down the length of the vertebral column, situated a couple of inches from the midline. In addition to the cervical kyphosis mentioned above there is often a very slight kyphosis in the whole thoracic region followed by a well marked lordosis in the lumbar region.

Coming to the extremities, we find the bones long and thin, which accounts for the lanky appearance of the individual. Similarly the fingers are long and tapering. Extension of the joints is well-marked, and frequently hyperextension of the elbows, wrists and phalangeal joints is possible. The carrying angle formed by humerus and ulna is also exaggerated frequently. The finger nails may be long and lunulae may be clearly demonstrated.

As regards hair distribution, one has previously noted the tendency for hair to grow freely on the head, root of nose, eyebrows and temples. According to Kretschmer (11), there is

frequently a 'Furcap' hair, which is very thick, bushy, and very liable to advance into the face and neck. The asthenics are less likely to go bald than other types of men, and if they do their baldness is often of the tonsural type, the vertex being covered, while the circular patch over the parietal areas gradually enlarges.

While the asthenics appear to have fairly well developed facial hair, Kretschmer (12) is of the opinion that this is primary, and that their secondary hair is poorly developed and of comparatively short duration. This is especially noticed in the beard and moustache, which tends to be 'stubbly' and of comparatively poor distribution. Similarly the axillae, pubes and trunk are found to have poor crops of hair. There is occasionally found, however, a lanugo-like growth of hair on the back between the scapulae and this has often been noted as a characteristic of phthisical subjects, along with the frequent finding of long eyelashes. I have not infrequently noted also a fine lanugo-like growth on the face of hyperthyroid women. This is distinct from the coarse hirsutes which are found in masculine women.

Not only are there definite differences between the bodily appearances of these two basic types, but there are distinct qualities in relation to the internal organs.

In the cardio-vascular system, there has often been noted, a 'drop heart', which has been repeatedly confirmed radiographically. It is characterised by its vertical position, its small size, being rather long and narrow, and there is a preponderance of the left side over the right, with a general development of the arterial tree over the lymphatic venous system. Di Giovanni (13),

however, has drawn attention to the not infrequent finding of a preponderance of the right side over the left, and of the pulmonary artery over the aorta. This means that there is a tendency for pulmonary congestion, for habitual low blood pressure, tachycardia and a general excess of development of the lymphatic and venous systems over the arterial. It is not surprising, therefore, to find certain stigmata of lymphatism among this type. This is also associated with a relative lymphocytosis, and a tendency to anaemia of chlorotic type, with low colour index and microcytosis. The lungs are frequently long relatively and accordingly difficult to aerate, while associated with this is a low diaphragmatic vault.

One can understand ^{Mc}Auliffe's (2) designation of this as the respiratory type as this diaphragmatic position gives a preponderance over abdomen. The stomach is found to be long and of asthenic type, of chest/with the characteristics described by Hurst. (14)

The lesser and greater curvatures are below the umbilicus, while the latter may reach the true pelvis. Not infrequently hypochlorhydria is also found. Associated with this low position of the stomach there may be associated kinks, enteroptosis, (Glénard), (15) coloptosis, or low positions of liver, spleen or kidney. The liver is small, rather low and inclined to the vertical.

As early as 1886 Sir Frederick Treves (16) noted the difference in intestinal lengths between the herbivora and carnivora, and acting on that observation Bean (9) recorded the average intestinal length in the hyperontomorph (asthenic) between 12 and 15 feet as against 20-25 in the mesontomorph, while Bryant (17) going a stage further noted that the carnivorous mammals were distinguished from the herbivorous by their long thin bodies and short simple type of intestine, with the small intestine greater than the colon. Thus he stated that the carnivorous (asthenic)

types of man had a ratio of small intestinal length to colonic length of 5 : 1, as distinct from the herbivorous with an even ratio of 1 : 1. These findings corroborated the work of Swaim (19) published in 1912.

This shortness in length of the intestine is one of the reasons for the thinness of these individuals, because their bowel contents must be excreted more quickly than in their antithetic type, and accordingly they are on the whole less liable to constipation.

When we consider the endocrine relationships of these types, we know immediately that the hyperthyroid type is extremely frequently found to be of asthenic build. Similarly, as acromegalics are very tall we can understand Pende's (19 & 20) frequent identification of the hyperpituitary type with the microsplanchnic build, even though the face, hands and feet are more massive, thick and broad than is typical in the asthenic habitus.

As this build is characterised by a preponderance of catabolism over anabolism, we should expect to find the basal metabolic rate rather higher than normal. In these cases where no such increased rate is found, the relative thinness is explained by postulating that the specific dynamic action of food consumed is exaggerated. Similarly this habitus is frequently found to be of sympathicotonic orientation though vagotonic manifestations are not uncommonly met.

From the pathological side one finds distinct tendencies in both groups, of which the chief is phthisis. Among asthenics hyperpiesis may be found, though in the lymphatic members of this habitus low blood pressure is noted. Among those of hyperthyroid build I have repeatedly observed a high systolic with low diastolic

without active hyperthyroidism. In my experience disorderly action of the heart is also found among people of this type. There is a greater liability to cerebral thrombosis than to haemorrhage, and I have observed Mönckeberg's degeneration of arteries with insignificant rise in blood pressure, but with increased pulse pressure in this habitus. Cardio-renal disease is, however, comparatively rare in the pure type. Frequently these individuals complain of "poor circulation" and they are liable to Raynaud's disease.

The long-recognised tendency of those of this build, was to phthisis and this relationship has been explained by the suggestion that in such long lungs the apical bronchi and bronchioles must be almost parallel to the trachea, with the result that dust and bacilli cannot find their way out with expiration because of the consequent deficiency of ventilation. (21) In opposition to Freund and Hart (22) who taught that the apex was constructed by the first rib and was therefore unable to expand freely, Orsós (23) believes that it is the best ventilated part of the lung. By the use of various models, he has convinced himself that on account of the conical shape of the lung, the downward pull of the diaphragm is concentrated chiefly at the apex. Loeschke (24), however, has adduced evidence to suggest that the effect of the diaphragmatic pull varies according to the degree of divergence of the thorax, being felt mostly in the apex in long narrow chests, more typically found in young adults. Taking this in conjunction with the fact that apical lesions are uncommon before puberty, while they are present in most town-dwellers by the age of 25 years, the author concludes that the phthisis of young life is determined by mechanical changes in the form of the thorax. Further, there is a

deficient nutrition of the entire lung resulting from the disproportion between the big lung and the small heart. Pende (25) stresses the importance of localised evidences of dolichomorphy in the chest, even if unassociated with other evidences in the rest of the body.

Evidence for the opinion that gastric ulcer is frequently found among members of this group is given by Draper (26). Similarly atonic dyspepsia, gastroptosis, duodenal ileus, and general visceroptosis, are not infrequently met. A low-placed kidney is often a predisposing factor to pyelitis, as one has repeatedly observed. Functional albuminuria is also met with, in such individuals. Many are the victims of abdominal surgery among this group, - individuals who have had nephro^{pe}xies, gastropexies, colopexies, caecopexies, and unnecessary appendicectomies. Goldthwait (27) draws especial attention to the fact that pain may be caused by pressure of the lower thoracic region on the lower thoracic nerves, or on the ilio-inguinal and ilio-hypogastric. Such cases may complain of pain in the upper femoral region, and after being unrelieved by multiple treatments, including appendicectomy, eventually yield to the form of physiotherapy recommended by Goldthwait. Later on in life, the male individuals may suffer from atrophic prostatic obstruction, while the female sex is most frequently found to suffer from hyperthyroidism, toxic adenoma, and atrophic rheumatoid arthritis. Of nervous disorders, I have seen neurasthenia, anxiety neurosis, and tabes, while Bryant (17) is of the opinion that glaucoma is more common in this type, and that there is frequently hypermetropia.

Davenport (28) found that of 737 persons of slender build, many diseases were found in youth in excess of normal, especially

respiratory diseases, like tuberculosis, tonsillitis, bronchitis and pneumonia, "nervous breakdowns", fevers, appendicitis, anaemia, rheumatism, diphtheria, scarlet^aina and typhoid.

The psychological qualities of the asthenics will be considered later.

The sthenic build is denoted by a relative increase of breadth over height. The head is brachycephalic, the face inclined to be broad, short and round. Sometimes it may be described as pentagonal, with two corners at the top and three corners made by the point of the chin and the two gonial angles, or it may be spoken of as a broad-shield shape (Kretschmer) (29). The general profile of the body is made up of curves, as there is a fairly fatty covering which hides the bony prominences of the body. The brow may be fairly high, but is less gaunt and haggard than is its asthenic counterpart. The supraorbital ridges are not very prominent, and are usually covered with thick wavy hair, except for the outer third, which may be deficient in hair, owing to an underlying hypothyroidism. The ears are thickly made, not usually protruding very much from the side of the head, and do not present the elaborate appearance so often found in the asthenic variety. The eyes do not appear very deeply set in the orbit, while the eyelids may be a little puffy, or thickened, and may contain fat so that when the lower lid is retracted, the conjunctivae clearly appear above the lashes, in a wrinkled fashion. The eyes are not usually very bright, though in some instances they may bulge like the eyes of a codfish. The interpupillary space is more than average. The nose usually has a broad root, which expands into a fairly prominent nose, though its massive proportions are in keeping with the rest of the body. The alae nasi are often wide, and bristly little hairs may

frequently be found at the outlet. The malar bones are not very obvious since the skin contains more than average panniculus adiposus, and usually it is overspread with a dilatation of the capillaries, giving rise to a picture of apparent good health. In fact, complaint may be made especially among women, that they are not given much sympathy in their ailments because they look so well. The skin tends to be oily, and in the scalp this may be associated with seborrhea. As age advances the openings of the sebaceous glands may be clearly seen as little pits. The lower jaw is not usually very conspicuous even though its proportions are longer than usual, because of its fatty covering. The lips are thick, frequently a little everted, with the red margin exposed, while the teeth are evenly distributed in the jaws, and often the four incisors seem to be in a fow rather than in a curve. The palate is broad and not very highly domed, while the tongue is broad, fairly thick and rounded at its end. The tissues covering the chin are often quite fleshy, while in the nape of the neck I have repeatedly been impressed by the difficulty with which one can pick up the skin in the form of a fold, in contrast to the ease which which it is done in the asthenics. The neck appears short and thick and the vertebral spines being well covered, it may be difficult to locate the 7th cervical vertebra. In fact there may be such localised fatty deposits over the vertebrae, beneath the chin ("double-chin"), beneath the gonial angles, above the clavicles, and in the flanks to warrant the term pseudo-lipomats. (Pende) (30) The occipital region of the skull is usually well shaped, presenting a gracious sweep. The trapezii appear more rectangular than is the asthenic group, while the pomum Adami is usually less prominent, and the voice is frequently tenor.

The suprasternal notch is masked by its fatty covering along with the bones of the shoulder girdle, while the angle formed by the trapezius and the deltoid is distinctly obtuse, though in the female it may appear hyperbolic. Although the biacromial diameter appears fairly broad and is actually longer than in the asthenic, yet in proportion to the chest depth it is less than the corresponding ratio of the microsplanchnic. The scapulae are not clearly delineated. The chest is relatively short and thick, so that the anteroposterior diameter may in some cases equal the lateral measurement. The costo-vertebral angles are rectangular, so that the resting position of the chest tends to be in inspiration. The subcostal angle is usually obtuse and xiphisternum may be difficult to palpate. In the male there is frequently a definite bust, while in the female the breasts may be pendulous.

One of the most characteristic features of this habitus is the relative preponderance of abdomen over thorax, consequently termed by Pende (31) the megalosplanchnic, and by ^aMcAuliffe (2) and Sigaud (1) the digestive type. The waist line tends to be obscured by fat, while the umbilicus is low in position, so that the xiphi-umbilical is larger than the umbilicus to pubis measurement. The hips are not very prominent, for the ilia are not usually flared out, and there is a fair distance between the lower costal border and the iliac crest. The pelvis is inclined to be of male proportions even in the female sex, so that the innominate bones are rather heavily made with relative diminution of bi-iliac diameter, while the pelvic cavity itself is ovoid. Usually the male genitalia are well developed, with penis fairly thick and long, and well covered with hair at its proximal end. The ribs and spinous processes of the vertebrae are not very well defined, but there is usually a slight kyphosis in the thoracic region

with a less marked lumbar lordosis.

The bones of the extremities are fairly broad and relatively short which accounts for the pyknic (compact) appearance. The fingers also are short, while the hand may be chubby and stumpy. There is not usually a very wide range of mobility in the joints, and extension is probably most generally limited. The carrying angle at the elbow is not very well defined, and the finger nails may be short and broad, with not very conspicuous lunulae. Xrays frequently show a broad terminal phalanx, well spread out at the tip, while multiple sesamoid bones are not uncommon.

In the distribution of hair, one frequently notices a fine crop of hair which is fairly soft and may be wavy. There is a tendency for it to be rather thin at the temples, giving rise to the "calf-licked" variety commonly spoken of. Baldness not infrequently comes on fairly early in life, when the temporal bareness gradually seems to extend upwards and backwards, into the vertex, leaving a fringe of hair in the lower temporal, parietal and occipital regions. The bald heads of the sthenic group have a distinctive appearance, frequently calling forth witty remarks from the vulgar, being variously described as "bladders of lard", "flies' skating rink", or like billiard-balls. The pyknics also tend to grey more frequently than their asthenic brothers. The beard and moustache is usually well developed; in fact one can hardly imagine a bearded man without his being of sthenic build (cf Father Christmas). The remaining parts of the body are also rather well covered. In the pubic region the hair may be weak the male genitalia. In the female sex, there is a tendency for the growth of hirsutes and in some cases this may assume the proportions of a definite moustache or beard.

As we consider the internal organs, we note the relative preponderance of the right heart over the left, stressed by Di Giovanni (32) as typical of this habitus, though not by any means strictly confined to this type. There is associated with this preponderance a relative hyperpiesis, an excess development in the venous-lymphatic system over the arterial, and lymphatism is accordingly found. Nevertheless many of these individuals are liable to develop hyperpiesis in mid-life. The heart is usually broad and squat. Generally speaking there is a liability to polycythaemia. The lungs are broad and short, tend to be difficult to deflate and are helped in this attitude by a tonic diaphragm which is placed fairly high. This further serves to give more accommodation for the abdominal organs. The stomach is of the sthenic variety described by Hurst (14) and Holznecht (33) with wellmarked tone, hypersecretion, hypermobility and high in position. It approaches the steer-horn type described by Holznecht. The small intestine as a whole is much longer than normal, while the large intestine approximates to the size of the small bowel.

The following figures have been given for the various

intestinal lengths:-	<u>Small Intestine</u>	<u>Large Intestine</u>
In the megalosplanchnics (Herbivora)	25-39' (Bryant, 17)	5-8½' (Swain, 18)
In the microsplanchnics (Carnivora)	10-15' (Bryant, 17)	3-5

This increased intestinal length is one of the reasons why this type of habitus is so frequently seen to put on weight,

because

the contents of the bowel are given longer time for thorough digestion and absorption calling forth the description of 'greedy colon'. Furthermore, the faeces will be de-hydrated, and of relatively small residue so that constipation may often be expected. Similarly the liver is well developed and occupies a transverse position beneath the diaphragm. The kidneys also are short thick organs.

That there are many representatives of this bodily type among hypothyroids is well known. Their tendency to put on weight, to lose the outer third of their eyebrows and to develop local fatty depositions in the places mentioned are all characteristic of thyroid deficiency. Similarly hypopituitarism is also associated with fat deposit, small chubby hands, with stunted extremities and rounded head. Anabolism is more marked than catabolism; The basal metabolic rate is subnormal, and evidences of vagotonia are found in the alimentary tract, the liability to lymphatism and in depressive tendencies. On the other hand, it would be a mistake to suppose that indications of sympathetic-otonia were never found.

This bodily habitus has been known for a long time and variously spoken of as the arthritic (Bouchard)(1849)(34) or the gouty diathesis, or the sanguine temperament (Laycock) (35). It was for long believed that such individuals had a special liability to arthritis, and this is particularly of the atrophic form, and likely to cause Heberden's nodes, or to give rise to osteo-arthritis, of the knees and shoulders. My own observations indicate that this last situation is very frequently affected in the sthenic type of women. Many of these individuals are predisposed to suffer from disease of the cardio-vascular system, such as myocarditis,

especially of the nature of fatty degeneration, of hyperpiesis which may later on in life produce a fatal first attack of cerebral haemorrhage. Angina pectoris and coronary infarction are also more liable to affect this type of patient than any other. One has often noticed that with a high blood pressure, the pulse pressure may be very low, and on other occasions one has noted that the diastolic pressure is high, yet the systolic may be below normal. In some figures prepared by Bean, (36) of 92 patients suffering from cardio-renal diseases, 80 belonged to the category denominated by him as mesotomorph, while of 35 arterio-sclerotics, 24, and of 17 cases of aneurysm, 15 were mesotomorph. Similarly Ryle (37) found that 62% of individuals presenting themselves for symptoms due to hyperpiesis, were robust, hypersthenic, broad-chested, plethoric and obese.

Dividing men into the 3 categories of thin, medium and stout at the time at which they became insured, Jackson (38) found that the proportions of those dying of apoplexy were 4.9 : 9.2 : 12.3 :, while those dying from other circulatory troubles were found in the proportion of 9.4 : 14.8 : 22.7 .

Davenport (28) found that ⁱⁿ 103 persons of very fleshy build the only outstanding disease of youth is pneumonia. In middle age, "kidney trouble", "dropsy", apoplexy and "heart disease" were noted.

Of 542 of fleshy build, bladder troubles were complained of and kidney trouble was exceptionally frequent; also arterio-sclerosis, apoplexy and paralysis. Hernia was frequent, also ^{appendicitis,} haemorrhoids, liver troubles, gall stones, ^{sibilant} bronchitis, urinary and biliary calculi, and diabetes mellitus.

Such individuals may be liable to repeated attacks of bronchitis, and one has especially noted this at the extremes

of life. As one might expect, the natural position of the chest tends to be in inspiration, so predisposing^{to} the "barrel chest" of emphysema.

Duodenal ulcer is^a frequent finding among young sthenics, whileⁱⁿ later life gall stones are a source of trouble. At a later age still, prostatic enlargement is found. Uric acid calculi are met quite often among people of this habitus, Nacke (39) and Draper (40) have found a preponderance of paretics in this bodily type. Stockard (41) has mentioned the high incidence of myopia, and its high incidence in pyknic Germans is well known, though in this country I have observed myopia in asthenics, who as one would expect in a long head, have a lengthening of the eyeball.

The scheme just outlined raises many interesting questions. As regards growth, for instance, it seems likely that the normal habitus for the new-born is toward the megalosplanchnic type. The mesenchymal tissues are in activity accompanying the development of general bodily growth towards its full attainment, though as puberty is attained the growth of the bodily length seems to exceed that of the organic functions. The life of relation is gaining ascendancy over the development of the vegetative system. It is therefore very easy to mistake a young adult for a member of the asthenic group, when time will show that he is really a true sthenic, though actually one class may be transformed into the other, just as a person with hyperthyroidism may later become a hypothyroid, when the full force of thyroid hyperactivity has spent itself. Similarly from our present point of view we may regard the cure of tuberculosis as largely dependent on the way in which an asthenic assumes sthenic proportions. It does seem, therefore, that none of us are 100% sthenic or 100% asthenic,

just as maleness or femaleness is never an absolute quality, but only relative. In fact the study of body types or disease types is bristling with difficulties because there is no absolute standard, and no matter whether the standard is one of height and width, or of preponderance of vagus over sympathetic, or of blood acidity, the values are only relative, and are capable of variation, so that evidences of both extremes may be present at the same time. An analogy may be offered by certain types of dyathyroidism in which such indications of subthyroidism as increasing weight, fatty depositions above the clavicle, drowsiness, feelings of chilliness and forgetfulness may be found with tachycardia, nervousness and high pulse pressure. We need also to remember that none of us are purely thoroughbred, and that the very process of growth itself is a phasic activity of ~~an~~ alternating tendencies towards sthenic and asthenic proportions.

It is this "bipolarity" found at one time, which has led critics to dismiss the idea of diathesis as mythical, without delving deeply to find an explanation of its variability, but the fundamental truth still remains unshaken, and its workings involve almost every department of life.

Rolleston (42) discussing the question of bodily conformation and longevity, is of the opinion that the long-lived are usually spare, very seldom fat, neither very tall nor very short, neither very heavy nor very light, and quotes Dublin (43) who from insurance statistics found that among those of more than average weight the prospect of life was better among men of short and medium height with relatively short spine lengths and with subnormal chest girths, while among overweight tall men the outlook was best in those with

relatively long spine lengths and with less than average chest girths. Similarly Boldini (44) in studying those soldiers in the war from 1914 - 1918 who seemed specially resistant to infection, came to the conclusion that the greatest resistance was found in those with a predominance of trunk values over limbs, and with rather short lower extremities (hypergenital type).

So far, however, we have not dealt very fully with variants of the main picture, nor is it my intention to go into very great detail, but a little further description is called for.

Probably the chief variants are of the asthenic habitus.

^a McAuliffe's (2) cerebral and respiratory types should properly be included in this group, and although his muscular type has some sthenic proportions, yet it is more probably that this again corresponds with Kretschmer's (45) athletic physique and which is included by him among the asthenic variants.

Taking the athletic type first, which is more normal in proportions than any other habitus we have to delineate, we find a man of more than average height, with a fairly dolichocephalic head, broad shoulders, well-developed chest, but still rather flat, moderately well covered with hair, and well developed muscles. This gives a characteristic appearance, specially noticeable by the angular trapezius, rounded deltoid, and outstanding biceps. The lower chest is typically funnel-shaped, while the extremities are proportionately long. One of the most distinctive qualities of the athletic build is the shoulder breadth to chest ratio. In the athletic this ratio is 39.4 : 90.9 : whereas among pyknics it is 37.9 : 95.7 : and in asthenics 35.9 : 83.9, or 43.34 : 39.4 : 42.7 .

^a
 McAuliffe's cerebral type is represented by a small man with a big head. The body is small in proportions, so that there is no question of relative megalosplanchny. Furthermore the head is of dolichocephalic ratio.

The respiratory type corresponds still more to the asthenic habitus, with the funnel-shaped lower thoracic region, while the chest is described as being broad from side to side and long.

Pende(46) is reluctant to include these three types under the asthenic group, but suggests that the thoracic and digestive should be included in his brachymorphic, hypoevolute, hypervegetative section in which the life of relation is overshadowed by the nutritive system.

Eunuchoids or hypogenitals form an atypical group of asthenics in which the most marked feature is an increase in the length of the limbs in proportion to the bodily height. There are also signs of delayed secondary sexual development in the hair distribution, the high pitched voice and general lack of development of the genitalia and pelvis. The bi-iliac diameter may easily exceed the chest width.

Mumford (47) has made a study of the physique of schoolboys and has grouped them into 3 types. (1) Broad-shouldered, narrow-waisted-of wine-glass shape (2) Broad-shouldered and broad-waisted, of barrel shape, and (3) medium waisted, or narrow-shouldered with long cylindrical bodies, or test-tube shape. It is obvious that these three represent the athletic, the asthenic and sthenic groups we have mentioned.

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Chapter 17.

The Relationship between Bodily Build and Psychological Type.

(Schizoid)

There was a poet whose untimely tomb
No human hands with pious reverence reared,
But the charmed eddies of autumnal winds
Built o'er his mouldering bones a pyramid
Of mouldering leaves in the waste wilderness:-
A lovely youth, - no mourning maiden decked
With weeping flowers, or votive cypress wreath,
The lone couch of his everlasting sleep:-
Gentle, and brave, and generous, - no lorn bard
Breathed o'er his dark fate one melodious sigh:
He lived, he died, he sung, in solitude.
Strangers have wept to hear his passionate notes,
And virgins, as unknown he passed, have pined
And wasted for fond love of his wild eyes.
The fire of those soft orbs has ceased to burn,
And Silence, too enamoured of that voice,
Locks its mute music in her rugged cell.

Shelley, Alastor.

(Cycloid)

Dear cousin! He is one
Of those friendly creatures,
To whom I give the name of summer-waist-coats.
For they really have a something
Like sunshine in their being.
They are the worldly officials,

Financiers and auditors,
Or financial administrators,
Or even sometimes the lords of merchandise,
By no means petit maitres,
They have often fat round bellies,
And the country of their birth is Schw^abia.
Recently upon a journey
I met a summer-waist-coat
Posting off to Besigheim
And we took a meal together.
First we had soup
With red crayfish swimming in it
Some beef with mustard from the French
And lovely little radishes
And with it we had veg.: and much besides.
Snippets from the latest papers
And that at many places
Yesterday the rain came down in sheets.
And while he chatters on, the good old fellow
Pulls a little silver box from out his pocket
So that he can pick his teeth a bit
And finally he pulls his meerschaum pipe
To help along the drinking of his coffee,
And smoking thus he punctuates his speech
With a look out of the window for the horses.

And as I looked upon him from behind

I fell to thinking: 'Ah, that such as these
These dear, bright smiling-summer-waist-coats
These comfortable pourers out of comfort
Eventually must die the death of all men.'

Mörrike, quoted by Kretschmer.

- I). Melancholic.
 - a). Unsociable, quiet, reserved, serious
 - b). Thuid, shy, sensitive, shyly
 - c). Pliable, kindly, modest, self-effaced, silent.
- II). Gaioid.
 - a). Sociable, friendly, genial.
 - b). Cheerful, jolly, hearty
 - c). Quiet, calm, easily depressed, soft-hearted.

Synopsis.

Adopting Kretschmer's broad classification of schizoid types with asthenic habitus and cycloid types with pyknic habitus, the lability of mood in the one is characterised by hyperaesthesia and hypoaesthesia, and in the other between optimism and pessimism. 3 subgroups for each category are defined.

- I). Schizoid. a). Unsociable, quiet, reserved, serious
 (humourless), eccentric.
- b). Timid, shy, sensitive, excitable.
- c). Pliable, kindly, honest, dull-witted,
 silent.
- II). Cycloid. a). Sociable, friendly, genial.
- b). Cheerful, jolly, hasty.
- c). Quiet, calm, easily depressed, soft-
 hearted.

From early times there has been a belief that certain types of habitus are related to various character tendencies. Thus Hippocrates (1) spoke of those with sound and hard heads being liable to burstings (?cerebral haemorrhage), given to eating in excess, inclined to be rather long-lived and being ferocious in disposition.

Laycock (2) also delineated the character of the sanguine temperament, which he described as being typically Anglo-Saxon, and corresponded to the caricatures of John Bull. He was active, hot, hasty, stolid in temper and solid in action. Usually rather generous, he prefers outdoor sports, and in physique he has a well-developed figure, with capacious cranium, biggish nose, broad chin and cheeks, massy well-set teeth, ruddy complexion, oily thickish skin, thick hair, thick limbs, large hands and feet, and with capacious thorax and abdomen.

Opposed to this type is the "nervous, fibrous, choleric or bil~~li~~ary", of whom the Celtic Irish may be taken as characteristic. Of small features and limbs, he is emotional, feminine, rapid in action, ideas and speech, imaginative and affectionate. He is more hopeful and more apprehensive.

The commonly accepted beliefs are typified by the current proverb, "laugh and grow fat", while Shakespeare has depicted the lean, hungry, contemplative Cassius as a dangerous conspirator, suspected by Julius Caesar, who would prefer him fatter!

It is, however, to Kretschmer (3) that we must look for a thoroughly scientific handling of the relationship between physique and character. Basing his observations primarily on the insane, he was able to classify these psychopaths into two main groups. Thus there were the cycloids, who comprised patients suffering from mania or melancholia, or each in rotation, and the schizoids who suffered from schizophrenia (dementia praecox).

Of 260 such patients Kretschmer (4) found that they could be divided among the following groups:-

	Circular.		Schizophrenics.	
Asthenic	4.	4.7%	81.	46.3%
Athletic	3.	3.5%	31.	17.8%
Asthenico-athletic	2.	2.3%	11.	6.3%
Pyknic	58.	68.2%	2.	1.2%
Pyknic mixture	14.	16.5%	3.	1.8%
Dysplastic	-	-	34.	18.9%
Unclassable	4.	4.7%	13.	7.5%
	<u>85.</u>	<u>-----</u>	<u>175.</u>	

That is to say, that of 85 circulars (cycloids) there were definite indications of the sthenic or pyknic configuration in 72, while of 175 schizophrenics, there were only 5 of pyknic features, the remainder being chiefly asthenic, athletic and dysplastic.

Kretschmer carried his analysis of the psychological characteristics of each broad group into the realm of the apparently normal, and found that among those members of

society showing evidences of asthenic and pyknic qualities, schizothymic and cyclothymic traits could be demonstrated and further more, that in genius the same tendencies could be delineated and correlated to physical habitus. These exceedingly well worked out observations have enormously strengthened the hands of those who believe in diathesis and present a mass of data which are repeatedly confirmed by the meetings of every day life.

His results have been confirmed anthropometrically by other observers including Wertheimer (5) and Hesketh (5) and Saxty Good (6) and by K.O. Henckel (7) from a very large series of measurements.

The males of our species incline to be leptosomic or athletic and in mind to be schizothymic; whereas women incline to be pyknic and cyclothymic and are more liable to manic-melancholic disorders. Young children are pyknic and cyclothymic; towards puberty more leptosomic and schizothymic, with liability to schizophrenic psychosis; later in middle life more pyknic and cyclothymic.

The schizoids are so-called because they present a "cleaving" of the personality - a dissociation of the life of thought and the life of feeling. of affection from cognition. There is something enigmatical about them, because they present a superficial exterior, behind which lies a problematical interior, which it is impossible to get to know. This "surface" may be cutting, or brutal, dull or sarcastic, sulky or retiring, but behind that there is a

"dark, hollow-eyed nothing", or a place of "broken pieces, black rubbish heaps, yawning emotional emptiness or the cold breath of an arctic soullessness". It is this unknown internal factor which makes it difficult to approximate to the schizoid, and Bleuler (8) has spoken of it as "autism". There is an isolation, a loneliness, which is brought about because the individual lives in himself, and they may indeed express this by saying that they feel that there is a pane of glass separating them from the world. They are introvert and tend to live a life "poor in deeds and rich in thought", while they "spin themselves into the silk of their own souls". They are quiet and self-sufficient. There is therefore a definite sense of distinctness from the rest of the world, which accounts for the philosophic turn of mind, leading to the consideration of the objectivity of matter.

This separation of the self from the rest of the world may be described as a state of de-realisation, in which objectivity appears completely cut off and isolated from the personal life of the individual. It has a parallel in the "pathetic fallacy" of literature, where the beauty of the outside world seems strangely discordant with the feeling of emptiness which may beset such schizoid personalities. Of an antithetic nature, but still fundamentally schizoid, is the state of de-personalisation, in which the cleavage of mind and body is accompanied by the sense of complete separateness from the body. These

states appear most typically after anaesthetics, or during such forms of intoxication as from narcotics, and may be accompanied by feelings of horror, as though something prevented the personality from fusing normally with the body. The contrasting states, de-realisation and de-personalisation, represent a profound disturbance of the subject-object relationship, for in the former, there is a break in the sense of the continuity and contiguity of objectivity, while in the latter, the objective part of the self appears detached from the subjective. During a ~~per~~sonal experience of mescal intoxication, it seemed as though the objective self swivelled away from the physical body, though in my case the continuity was not completely broken, for the link was consciously localised at the point of insertion of the hypodermic needle.

Kretschmer (19) separated three different sub-groups of schizoid personality, although one must not consider them as too distinct, for not infrequently qualities common to all three, may be found in any given individual. The most usual type is the first, the individual is unsociable, quiet, monosyllabic, cool-natured, reserved, serious (humourless), eccentric and may be rather dreary. This variety is "affectively lame", i.e., he is contorted, and reacts clumsily to the stimulation of society. He may in fact be obstinate, odd, intractable or even actively hostile to the demands or conventions of social life. He is inclined to mistrust people, and from his

propensity to withdraw his tentacles inwards may become a hypochondriac.

The second variety is timid, shy, with fine feelings, sensitive, nervous, excitable and fond of nature and books, because they provide him with an escape from reality, from the life of man. We can see in this picture a parallel to the story of Dauber, given to us by Masefield - a man who, to escape from the life of society, took a subordinate position on a ship, and who was made the butt of the coarse sallies of his fellow-crew. The artistic temperament which took these vulgarities with apparent unconcern was deeply hurt. There was relatively little external register of the depth of emotion-tone within.

"Drop it, in God's name drop it and have done!
 You see you cannot do it. Here's the Mate
 Paints you to frazzles before everyone;
 Paints you a dandy clipper while you wait.
 While you, Lord love us, daub. I tell you straight,
 We've had enough of daubing; drop it; quit.
 You cannot paint so make an end of it."

"That's sense", said all; "you cannot, why pretend?"

The Dauber rose and put his easel by.

"You've said enough", he said, "now let it end.

Who cares how bad my painting may be? I

Mean to go on. and, if I fail, to try.

However much I miss of my intent.

If I have done my best I'll be content."

"You cannot understand that. Let it be.
 You cannot understand, nor know, nor share.
 This is a matter touching only me;
 My sketch may be a daub, for all I care.
 You may be right. But even if you were,
 Your mocking should not stop this work of mine;
 Rot though it be, its prompting is divine."

"You cannot understand that - you, and you,
 And you, you Bosun. You can stand and jeer,
 That is the task your spirit fits you to,
 That you can understand and hold most dear.
 Grin, then, like collars, ear ~~at~~ donkey ear,
 But let me daub. Try, you, to understand
 Which task will bear the light best on God's hand."

Kretschmer describes this delicate nature as "mimosa-like".
 He is inclined to be fidgety, unsteady, restless and
 discontented.

The third sub-group is pliable, kindly, honest, but
 indifferent, dull-witted and silent. If the former were
 nervous and excitable, this individual is lifeless and
 more or less anaesthetic, as the other is hyperanaesthetic,
 though as a matter of fact the schizoid as a class tends
 to range between the two extremes of sensitivity and
 coldness, so that both reactions may be seen to follow
 one another sharply.

There is in general a distaste for society in the

mass, although that will not preclude the individual from mixing with a coterie of like-minded cronies whom he knows to have sympathy with his point of view. It will be readily seen that there is plenty of scope for such a person to be cranky, ascetic and abstruse. Among his fellow schizoids there will be prophets, mystics, philosophers, dietetic fads, religious formalists, elaborate ritualists, tragic dramatists and erect aristocrats.

Mention has been made of the alternating moods of hyperaesthesia and anaesthesia, but a little more must be said of the way in which this variability manifests itself. The hypersensitiveness on the one hand may lead to weakness of purpose, so that pressure from the outside world leads to a deflection of direction, or to an acceptance of policy not really thought advisable, or on the other hand to feelings of depression because circumstances seem adverse, or to ideas of persecution, or to passionate outbursts of violence from some insufficient stimulus. The anaesthesia, however may show itself by callous indifference to the feelings or sufferings of others, by tactlessness or by a lack of reaction to another's need or by an inability to have an uproarious laugh. In fact some writers say that schizoids "can't laugh out loud." They may show an unconcern for their bodily appearance or for their family reputation, so that they become untidy, lazy or even vagrant. The association of sensitivity with absolute dullness may also be met, and this is frequently exemplified by the

aesthetic tastes of the poet in rhyme or of the artist, along with an untidiness of bodily person or surroundings. Or his hypersensitiveness to some innocent remark may provoke a fierce outburst of ill-temper if frequently repeated may lead to a tyrannising over other members of the family, which he is too insensible to appreciate.

This fact is related to the jerky character of his psychic tempo; the individual is liable to be "all or none" in his reactions. Like a hectic temperature chart, he swings about from one extreme to the other, so that if his secret habit is referred to, he becomes snappy and rash, though on the other hand he is capable of great endurance and indefatigable energy. At one time he is tenacious, stubborn, mulish and pedantic, at another unstable, whimsical and incalculable. Generally his reactions to emotional stimuli are disproportioned. He is restrained in his gestures and movements, and is somewhat stiff and hesitant.

Baynes (10) suggests: "This problem of the opposites, and the tendency to be engulfed by either pole, is the essence of the schizophrenic predicament. By clinging to the aloof, often brilliant, but essentially defensive superiority of the conscious function, the world becomes, as it were, covered with ice. Life freezes beneath a glacial pall, because everything which could conceivably stir a deep emotional response is either evaded or repressed. But the natural sequel to a glacial period is a deluge. In other words, when the rigorous conscious control is relaxed, nature is

revenged by releasing an indiscriminate welter of unadapted and unadaptable affects. As a rule, therefore, the intellectual schizophrenic tries to cling to the fate he knows and is accustomed to, because the only alternative he can imagine is to be flooded by uncontrollable affect. Again and again we see the patient being forced into the stream of life by the terrifying chill of isolation, only to recoil in greater dread from the threat of dissolution in the chaos of the unconscious."

As a class the cyclothymes are usually the more attractive. They are circular in bodily habitus and also in their general mood. They alternate between mania and melancholia, or between hypomania and depression or between optimism and pessimism in even waves. They are open like a book, usually fairly easy to understand. The life of activity or conation usually occupies a greater part than the intellectual sphere. They are extravert. Again three sub-groups are described, the first of which being typified by the expansive, sociable, good-natured individual who has got a "heart", that feels for his fellow-men. He is friendly and genial, taking delight in meeting other people. He is sympathetic and therefore "rejoices with them that rejoice and weeps with those who weep". He is philanthropic and capable of feeling the hardships of others, for actually creative comforts mean much to him. He is accordingly rather materialistically minded, taking delight in the good things of life such as

food, drink and home. He is not usually of criminal type, but may be liable to carnal vice because of his sociable traits, which lead to his involvement with wine and women. He is of epicurean tastes. Mörike (11) has written of these men as "summer-waist-coats", which brings before one's mind a picture of a portly man dressed in dapper fashion, of sunny appearance, and of self-satisfied mien.

In the second sub-group is found the cheerful, humourous, jolly, but hasty man who is liable to go red in the face if roused. He tends to get off his chest anything that annoys him without waiting for suitable time or place, so that he may be considered tactless. He does not, however, usually harbour resentment, and soon settles down to placidity after relieving his temporarily outraged personality. He is therefore outspoken and may rise to great heights of eloquence on critical occasions. On the other hand he is governed more by mood than serious reflection, so that he may be superficial in his judgments and do reckless things that he soon regrets. He is consequently liable to change his opinions with fresh influence, and this gives him an appearance of instability.

The third sub-group is of this qualitative type, but does not present such extreme reactions. He is soft-hearted and may therefore be modified in his outlook, but is more likely to compromise. He is less actively jolly, and more calm and quiet, with a tendency to depression if the sordid side of life comes across his path. He may indeed have a

definite aversion to tragedy or ask to be spared unpleasant news. Such individuals will often ask their doctor not to tell them what ails them, as they would rather not know the worst. There is a caution about such men that makes them reliable, dependable and trustworthy. They may do invaluable service as indispensable secretaries who seem to know just what is wanted at the right time. Some of these people are definitely religious, but without the pedantry of bigotry. They are not intolerant but have broad sympathies and seem to be able to appraise the broad details of a situation intuitively, though maybe their judgment in other ways is without depth.

As a class the cyclothyme is energetic, eminently practical, and has good executive ability, with a definite aptitude for handling men and situations.

It will be seen that the cycloid varies between a mood of gaiety and sadness (as opposed to the schizoids variation between sensitiveness and coldness), and instead of being jerky in his variations, is more even and undulating. His reactions are usually rounded and adequate to the circumstances, and generally satisfying.

Sometimes in a fit of depression, he may complain that he is lacking in warmth or cordiality, thus showing that he is conscious of a deficiency in this direction.

When we try to relate these data to the everyday life around us, we can apply them to the different personalities with whom we are acquainted.

Among schizothymes we recognise the polite, sensitive man of aristocratic bearing, the world-hostile idealists as the religious fanatics like Calvin, The cold masterful natures and the egoists with tenacity of purpose like Frederick the Great, the "dried and emotionally lamed" like misers and spies, romantic and pathetic poets like Shelley, exact logicians and metaphysicians like Locke and Kant, pure idealists like Abraham Lincoln and Woodrow Wilson, cold calculators like Lord Snowden, fanatics like Don Quixote, Lenin and Stalin, and philosophic statesmen like Lord Balfour, though at times in the very fulness of personality, in intimate circles coldness may give place to warmth and apparent detachment to real affection.

In some sense, the integrated personality is one in which schizoid and cycloid characteristics are happily blended, and though for purposes of description it is convenient to categorise people who have attained some sort of eminence, such categorisation must not be taken to be either real estimate of personal value, nor one of disapproval. For so often, what is apparent, may not reflect the real man, and what the real man is, may only be known to very few. In general, however, among the schizothymes, we can see the mystics, the ascetics, the aesthetes, the pharisaics, the hypocrites, the stoics, the idealists, the intriguing conspirators, the socialists and the formalistic poets. In sport, we have the hurdler, the wrestler, the hammer-thrower, the wing three quarter and the olympic harrier.

The slender habitus is found in the Nordic races, with schizophrenic types of mind. The athletic of body is characteristic of the heavily-built blond Atlantic race. The Mediterranean race is usually marked by small builds and restless dispositions. Hunting and sea-faring stocks show the roaming traits found in schizophrenics. According to Lenz (12), they are found in immigrant races as in the United States, and in the upper social strata where there is a selection of comparatively mobile racial elements. Stockard (13) considers that his "linear" category (corresponding with the schizoid type here described) is typically distributed along sea-coasts (cf. also Bean (14)), but this must be regarded as a very broad generalisation.

Among the cyclothymes we have the loquacious, gay, chatterbox, who is usually to the front like Falstaff, or the quiet humourist with a fund of good stories, or the silent good-tempered man like Sancho Panza, or the happy enjoyers of life like the epicures and G.K. Chesterton, or the energetic practical men who are exemplified by many of our statesmen like Lloyd George, Stanley Baldwin, Gladstone, Disraeli, John Bright, Hindenburg and Stresemann. Among careful observers and describers we have Darwin and Pasteur, while Dr. Johnson shows typical cyclothymic peculiarities in his sociability, his cyclopaedic mind, his flowing eloquence and melancholic tendencies. Similarly the cycloids gift of sociability and his concern for objectivity fits him for the role of the populariser of

science, like Sir James Jeans and H.G.Wells. Tough wholee hoggers like Lord Birkenhead and Mussolini, the jolly organisers like Lords Beaverbrook and Rothermere, men of the advertising world generally, sociologists and others with a markedly extravert emphasis find their natural classification among those of cycloid temperament.

The pyknic habitus is typical of the Mongoloid race, of the near East. and of certain parts of Germany. They are usually a settled people, making their living as agriculturists and handcraftsmen. It is truly remarkable how farmers assume the typical pyknic characters. This stocky type is found in inland areas(Stockard), backward mountainous regions (Lenz), and among the lower classes of society. Outdoor life, with its distractions, provides such people with their escape from the disturbing influence of reflection.

It may be that progress is maintained by the putting into operation of the ideas and ideals of the schizoids of one generation by the energetic practical cycloids of the following generation. It has been suggested that nature is continually trying to evolve an ideal type by the repeated cross-breeding of sthenic and asthenic. Whether this hybridity is an ideal to attain to, or not, we do see among certain individuals the manitestations of cycloid tendencies in an otherwise schizoid-like habitus. Thus Strauss (15) studied 110 cases of weak-minded males (endogenous oligophrenia) over the age of puberty from the anthropometric and characterological point of view

adopted by Kretschmer, and found that the physique-temperament ratio could not be strictly applied, as the apparently cyclothymic appeared in excess in persons of anomalous physique. Strauss contends that although schizothymic traits may be found in childhood, yet the prevailing impression is superficially cyclothymic, but this is a stage of non-differentiated psychic level.

But this does not help to explain the prevalence of marked schizoid traits in the individuals of definite cycloid physical habitus, whom we meet every day. There is apparent in all of us from early life a conflict between the demands of society (sex and herd instincts) and the development of the personality, as evidenced in the struggle for self-preservation. There is a warring state brought about by the clash of phylogenetic and ontogeneric interests. Miller (16) suggests that these conflicts are represented neurologically by the formation of conditional reflexes which lead to definite endocrine habits, so that future reactions are in part pre-determined by what has happened in the past. There is an original picture on the canvas, whichever though it be painted over, yet is nevertheless vitally related to the more recent one. In this way we can understand how an individual of pyknic appearance may by the force of circumstances be driven into himself so that schizothymic traits become apparent. As examples of this Miller cites Bunyan, who though of cycloid build yet manifested the inner urge of the schizothyme. Locked up in

prison for a long number of years, he was compelled to live within himself, and so resorted to mystical pursuits.

This really leads us to the attitude accepted by the school of individual psychology, who although they recognise frequent correlation between mind and body, yet warn us against falling into the error of assuming that the psychological style is inevitably fixed by the physical character. "An organ inferiority may terminate in either disease or strength. In a word the individual (within limits, it is true, but within wide ones) has the choice of response to his somatic organisation," and so we can recall "deaf musicians like Beethoven, stuttering orators like Demosthenes, myopic painters and charming actresses with facial handicaps". (17)

In conclusion I submit a table modified from that given
(18)
by Mc Auliffe and enlarged by Crookshank (17) but indicating the age-long process of typification and correlation of physical habitus with psychological predisposition.

Table showing Constitutional or Personality Types.

	Eagle.	Lion.	Bull. "Square"	Man.
Egyptian & Apocalyptic Symbolists.				
Ancients.	Phthisic.	-	Apopleptic.	-
Haller. 1750. Swiss.	-	Athletic.	-	-
Hallé. 1797. Fr.	Thoracic.	Muscular.	Abdominal.	Nervous & cephalic.
Cabanis. 1802. Fr.	-	Muscular.	-	Nervous.
Troisvevre. 1821. Fr.	Thoracic.	-	Abdominal.	Cranial.
Rostan. 1826. Fr.	Respiratory.	Muscular.	Digestive.	Cerebral.
Bouchard. 1840. Fr.	-	-	Arthritic.	-
Di Giovanni. 1877. Ital.	First combination (phthisic)	Second combination (athletic) ? P.A	Third combination. (plethoric)	-
Beneke. 1878. German.	Microplastic.	Mesoplastic.	Euryplastic.	-
Virenius. 1904. Russian.	Epithelial type.	Muscular type.	Connective type.	Nervous type.
Stiller. 1907.	Asthenic.	-	-	-
Sigaud. 1908. Fr.	Respiratory	Muscular.	Digestive.	Cerebral.
Bean. 1912. U.S.	Hyperontomorph.	? Hypo- ontomorph.	Mesontomorph.	-
Goldthwait. 1915. U.S.	Narrow-back.	-	Broad-back.	-
Bryant. 1915. U.S.	Carnivorous.	Mesoplastic.	Herbivorous.	Subplastic.
Stockard. 1913. U.S.	Linear.	-	Lateral.	-

	Eagle.	Lion.	Bull. "Square"	Men.
Egyptian & Apocal- ytic Symbolists.	Type plat. Dry. (Also respiratory)	- (muscular)	Type rond. Wet. (digestive)	- (cerebral)
McAuliffe. 1925. Fr.	Asthenic (schizoid)	Athletic.	Pyknic. (cycloid)	-
Kretschmer. 1925. German.	Hyperevolute. Microsplanchnic.	-	Hypoevolute Megalosplanchnic	-
Viola. 1919. Ital.	Dolichomorphie. Hypovegetative.	-	Brachymorphic. Hypervegetative.	-
Pende. 1927. Ital.	Sthenoplastic.	-	Euryplastic.	-
Bounek. Russian. contemp.	"Milkers"	"Workers"	"Feeders"	-
Veterinarians.	Hyperthyroid.	Hyperpituitary.	Hypothyroid.	-
Endocrinologists.	G. Ulcer. Phthisis. Graves disease.	Acromegaly. Duodenal ulcer.	Hypopituitary. Myxoedema. Frölich's syndrome Gall stones.	-
Pathologists.	Schizophrenia.	"Ethiopian Idiocy" Schizophrenia.	Mongolian imbecility. Cyclothymia.	-
Psychiatrists.	Aryan.	Negro.	Mongol.	-
Ethnologists,	Chimpanzee.	Gorilla.	Orang-outang.	-
Anthropologists. (Keith)	Don Quixote, Calvin &c.	Heavy-weights, boxers.	Sancho Panza. Falstaff.	Greek ideal.
Artistic &c.	Introverts.	-	Extraverts.	-
Psychologists. (Jung)				

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CHAPTER 18.

THE CORRELATION BETWEEN PSYCHOLOGICAL AND PHYSICAL GROWTH.

"Soon her eye fell on a little glass box that was lying under the table: she opened it, and found in it a very small cake, on which the words "EAT ME" were beautifully marked in currants. "Well, I'll eat it," said Alice, "and if it makes me grow larger, I can reach the key; and if it makes me grow smaller, I can creep under the door; so either way I'll get into the garden, and I don't care which happens!".....

"Curiouser and curiouser!" cried Alice (she was so much surprised that for the moment she quite forgot how to speak good English); "now I'm opening out like the largest telescope that ever was! Good-bye, feet!" (for when she looked down at her feet, they seemed to be almost out of sight, they were getting so far off). "Oh, my poor little feet, I wonder who will put on your shoes and stockings for you now, dears? I'm sure I sha'n't be able! I shall be a great deal too far off to trouble myself about you: you must manage the best way you can - but I must be kind to them," thought Alice, "or perhaps they won't walk the way I want to go! Let me see: I'll give them a new pair of boots every Christmas".

Lewis Carroll. "Alice's Adventures in Wonderland".

The Correlation between Psychological and Physical
Growth.

Synopsis.

A relationship is suggested between physical habitus, temperamental disposition, and predisposition to disease.

The following facts are considered:-

- a). The relation of growth to depth of soil.
- b). Variability in environmental conditions.
- c). In relation to differentiation.
- d). The process of renewal.

Some of the factors of growth are considered.

The relationship between cell differentiation and personal synthesis is indicated. A relationship is suggested between this and cancer formation: similarly between the needs of the cycloid and the schizoid.

The inter-relationship between the pituitary and the gonads is indicated. Also that between thymus and pineal.

Some of the gaps in our knowledge on the subject are indicated.

Broad principles of treatment for infantilism are suggested.

Significant deductions as to the nature of brachymorphy and dolichomorphy, and between subjectivity and objectivity are outlined.

As this work began to shape itself, it became evident that one of its central themes was the whole problem of growth. Physical habitus and temperamental disposition with constitutional liability to disease are quite definitely correlated in some way, though we know that there is no universal law that seems to include all the facts, but, as yet, only pointers.

Growth is spontaneous. The impulse to grow is in the germ plasm and though this may be modified positively or negatively by altering the environment, yet there is none the less in the germ plasm itself, this primary irritability or sensitiveness to stimulus that allows for its expansion and development, and whether we are vitalists, behaviourists or materialists, does not affect our belief in this fundamental principle.

We may note the following broad principles:-

a). Growth may be inhibited by too great a depth of soil; or it may be temporarily facilitated by shallowness of soil, which in itself may produce a weak sort of growth that cannot long withstand the exigencies of climate. Facilitation of growth in length may therefore not conduce to growth in breadth, and growth in breadth may be produced by inhibiting growth in length.

b). Variability in environmental conditions will produce a spasmodic sort of growth that gives rise to changes of both a temporal and spatial nature: temporal, in that inhibitions due to adverse conditions may produce

notable alterations in the subsequent speed of growth, and spatial in the sense that inhibitions to growth in height will lead to corresponding changes in breadth, with subsequent facilitation of growth in height when the inhibiting influence is removed.

c). As growth proceeds, differentiation proceeds, which on the one hand means that cells of a mesoblastic nature have a different rate of growth from those of an epiblastic, and on the other, that some forms of growth are doomed to early fixation and that others have much greater liability to extensions in height and breadth.

d). The process of renewal varies inversely with the degree of specialisation inherent in the tissue. Once the stage of differentiation has evolved to a point of more or less concentrated function, the ability for reproduction of the cells making up that function is more or less indefinite: e.g. liver cells and all gland cells have marked qualities of renewal.

When, however, one considers the ability for renewal that takes place after injury, marked differences are found in the various organs, Thus gland cells have indefinite qualities of reproduction, while those of the special senses seem able to reproduce themselves.

The corollary of this would seem to be that where groups of cells in multiplication without differentiation occur, the principle of function has in some way been overlooked. It is obvious, therefore, that unless function and form are correlated, structure is lost at the expense

of speed. Does this involve as one factor in cancer-formation, that hurry produces faulty differentiation, and that where differentiation is faulty, the cells are reproduced more quickly and amorphously?

What is there, then, about growth that is spontaneous and involuntary, which is balanced in function and form, and that which causes the sort of inbalance between function and form that leads to wrong kinds of growth?

Tentatively about general growth we may suggest:-

a). That physical growth is a composite of general and special factors, which are continually acting and reacting, and that they are determined by:-

I. Hereditary factors.

II. Nutritional factors, including such environmental factors as climate, conditions of life, and

III. The emotional inter-actions of parents, and family with the growing individual, probably mediated through the autonomic nervous system.

IV. The emergence from the growing organism of of endocrine factors, first still dependant on maternal endocrine influences before birth, then on the inter-actions between the somatic tissues and more definitely gonadal, with gradual emergence of thymic, anterior pituitary and adrenal cortex principles, with the additional influences of thyroid, post-pituitary, parathyroid and pancreas.

V. Such external influences mediated through the nervous system as those of use, but including tendencies to use one part of the body in preference to another because of organ inferiorities, brought about through deformity, previous illness and special aptitude, as well as the general stimulus to growth through sensory experience.

VI. The very definite stimulus to growth associated with acute illness in childhood.

VII. A very definite time-factor.

Just as one gene may have effects on a number of qualities, and one quality may be dependant on a number of genes, so growth in general is a composite of many different factors, and also growth of a particular organ or of one kind of tissue.

According to Viola (1) inbalance between the growth forces directing somatic mass and those producing cell differentiation may be due to:-

- a). causes intrinsic to the evolutionary impulse,
- b). causes extrinsic related to the degree of ease with which the germ plasm is nourished and the quality of the nutriment furnished by the environment in which it is developing.

According to him, the degree of morphological development varies inversely with the degree of growth in the mass.

We may note that the form of growth depends upon the

resultant of tensions set up by the following antithetical forces:-

- 1). Those between nature and nurture, or heredity and environment.
- 2). Those between the enteroceptive system and the exteroceptive system.
- 3). Growth in height depends upon open epiphyses, growth in breadth and depth on the capacity of cavities to enlarge, and growth in time on the general metabolic rate, especially through the influence of the thyroid.

The relationship between cell differentiation and personal synthesis. "Germ-cells owe their capacity of development to the fact that they are the unspecialised descendants of the parental fertilized ovum - custodians of the characteristic germ-cells." (2) It appears therefore that in the evolution of the human organism there is this dual process:- a) that of differentiating cells - which are being integrated to form the organic whole of man, and b) that of the conservative non-differentiating 'germ-cells', some of which are going to form the next generation. Let us then note in a little detail some of the characteristics of these different kinds of cells:-

First of all, there is the fertilized ovum, which at its beginning, suggests the nature of our synthetic goal, in its fusion of the round ovum with its large amount of cytoplasm, and the long thin activating spermatozoon. This is the fusion of elements - both

legitimately characterised as germ-cells, yet each with some differentiation of function - the relatively inactive and more undifferentiated ovum, the pursuing and active more differentiated spermatozoon. The unfertilized egg of the sea-urchin contains all the essential elements for production, but it lacks the ions necessary for the mechanics of cell-division (Mg. K. OH &c), or contains large quantities of Ca, Na, &c., or perhaps both. All the spermatozoon needs to carry into the egg for fertilization are ions to supplement the lack of the one or to counteract the effects of the other classes of ions in the sea-water or both. It may carry a number of enzymes, but it appears likely that ions and not nucleins are the essentials of fertilization. If this is true, the most differentiated unit is the male sperm.

The basic types - the asthenic and the sthenic - have their counterparts in the sperm and the ovum, and probably this in itself gives us an early clue to the significance of the type problem. Both types represent only partial differentiation - the one dolichomorphy, the other brachymorphy.

In the fertilization of the mature ovum it has been suggested that there are at least two more or less distinct processes at work:- on the one hand there is the complete identification of the spermatozoon with the ovum, and on the other, the stimulus provided by the spermatozoon to make the fertilized ovum divide. There are then, 1) the

coming together of two gametes, which are in some way complementary to each other, ^{ultimately} to form a new 'mature ovum' and, 2) the division within the ovum producing differentiation and growth. This alternate process of identification and detachment is necessary for the process of mental integration as well as for somatic integration, and just as the two processes of amphimixis which is supposed to initiate the process of variation with the germ plasm, and mitotic stimulus are basic for such somatic development, so for psychological growth is this surrender of mind to mind with its necessary separation. The 'pure introvert' does not know the meaning of this self-giving: the extravert does not know the meaning of this self-receiving: the one knows not the meaning of identification of the self with another, the other knows not the meaning of detachment. One may speak of them both as being fixated, the one to his own theory and the other to his own practice. It was T. Huxley who compared the growth of the organism to a web, of which the warp is derived from the female and the woof from the male, the basic substance of which resides in the chromosomes, while the centrosome of the spermatozoon provides the original framework for the process, but our personal synthesis has its similar structure and follows similar principles.

By this we visualise the emergence of specificity of personal function, by which is meant rather the awareness of vocation than of its actual realisation. This in itself

is not one single process but something that involves converging to a particular goal, and perhaps later a further divergence for some new but as yet undefined purpose.

The differentiation of cellular tissues is dependent upon what J.A. Thomson (3) calls the 'Sieves of Life', and personal synthesis is a process in which the action of the sieves has been conspicuous. While it is doubtful if one can ever say 'now I am through them all,' it is at any rate possible to say as a matter of analytical experience, that one has reached a point where changes that lie ahead cease to be of preoccupying importance, and that not because life ceases to present any hazard, but because of the increased awareness of hazard, and one's relatively adequate adaptation thereto.

As the fertilized egg-cell differentiates, there is again this dual development of i) the differentiating somatic cells and ii) the less differentiated, - but at any rate - increasing division of germ-cells, so that it is important to note that cell activity can go on without differentiation. Eventually, of course, the germ-cells come to have their own peculiar location in the gonads, while the differentiating elements carry on their vital processes around them and beyond them, but this localisation does not take place immediately, and there is some indication in the mytotic figures of cancerous growths, that even somatic cells can take on some of the properties of the germ-cells. Surely this is regression.

What has happened to set up this sort of back-firing process? It is possible that this has its origin in the wrong choice taken by the individual. If so how are we to account for the localisation of the carcinomatous process? In the insufficiency of our knowledge we must leave the question unanswered.

It is unlikely that the attempt to find some localisation in the structure of the arrangement of the genes to account for the phenomena of insanity, will be successful, because the psychoses represent reactions to stress on the part of the whole organism.

One of the central problems of psychiatry is that of unity in diversity, for its solution is the clue to the problem of maturity. My sanity consists in the discovery of my unity amid life's conflicting choices. The schizophrenic usually fails to find maturity because he tries to do it in isolation, while at the other end of the scale the cyclothymic fails, because he tries to project his responsibility on to someone else, but each needs something of the other - the schizophrenic with his preoccupation with his phantasies needs extraverting, and the cycloid with his intense activity needs the quiet detachment of the schizophrenic. These are, however, only general statements - broad indications of difference; in actual cases the problem of unity and diversity works itself out in all sorts of different ways, and this schizophrenic is seen to have his own peculiar outbursts

of katatonic excitement, alternating cyclothymically with his passivity. Similarly this roaring cycloid shows quite unmistakably schizoid features that make the exact classification impossible. It is so frequently just a question of some of this and some of that, and the mature person is one who has assimilated the meaning of his different experiences. What do hallucinations and mood-swings mean? There is a continuity of experience as well as of the germ plasm, for if the cosmos is one and indivisible, and the macrocosm is mirrored in the microcosm, then the telescopic is continuous with the microscopic, and the stars are in some sort of relationship with our experience.

Such phenomena as Lilliputian hallucinations and the apparitions of monsters in delirium tremens and general paralysis are distortions, but in either case we are dealing with phenomena that are significant. It is true in a sense that these are projections, but that is more or less true of so much of our experience. Hallucinations are cosmic experiences; they arise from that part of the self which is undifferentiated, for just as the cells of the body are divisible into the relatively non-differentiated germ-cells, and the more definitely somatogenic with their special differentiation, so the self in its totality is an organism for experiencing that which is particulate and definite. The process of analysis is a different experience for different people, but generally speaking it is concerned

with the contacting of the self with this comparatively undifferentiated part of the self, and the refusal of the self to make this kind of contact is a regression which may express itself in physical processes. It seems likely that we are justified in saying that lack of cellular differentiation is an index of a failure of synthesis in the individual. This covers on the one hand hypoplasia and hypoevolution, and on the other carcinomatous and sarcomatous formations.

Through its growth hormone the pituitary acts as a general activator, but through its other hormones it is a more specific activator.

The ability of an organ to respond to stimulation is as important as the amount of hormone poured out from the gland, and while the growth hormone is in general an activator, it is an antagonist to the gonadotropic hormones, which hastens sexual maturity and the closing of the epiphyses. Other restraining influences to the pituitary hormones are derived from the antihormones, and though it has been suggested that these are only reactions to abnormal injected products others believe that they are secreted by the original hormone cells to counteract the effects of the hormones when their optimum point is reached. As far as growth is concerned, however, from the anthropometric point of view (Wolf.(4)) it is important to note that:-

- 1). In childhood the height may exceed the span by one inch.

- 2). The span approximates to the height normally between 20 and 25.
- 3). In hyperpituitarism and hypogonadism there is a superiority of span to height.
- 4). In hypergonadism there is a superiority of height to span, though this is only relative, as hypergonadism in general, causing early closure of the epiphyses, leads to stocky build.
- 5). In hypergonadism - as also in hypopituitarism - upper measurements are greater than lower, accounting for the relative increase of height to span. (2)
- 6). In hyperpituitarism and hypogonadism lower measurements are greater than upper.

The fact that there is a marked increase of height before puberty in hyperpituitarism which gives place to the characteristic general increase of acromegaly after puberty, suggests that the maturation principle from the gonads is related to growth in width, though Cushing's basophil syndrome and its association with adrenal cortex hypertrophy indicates a further possible factor.

It is customary to regard growth as mainly concerned with skeletal development, but it is related to the whole problem of protein fat, and carbohydrate metabolism, which involve the functions of the endocrine glands, as well as liver, intestine and stomach.

Here are some random observations anent this:-

- 1). In the fatty diarrhea due to coeliac disease, there is dwarfing, with relative growth of width over height.
- 2). In osteomalacia not associated with fatty diarrhea, a similar state of affairs prevails.
- 3). The distribution of fat over the body would appear to be much more concerned with ovarian function than testicular, owing to this being such a more particularly female phenomenon.
- 4). The more muscular development of the male, however, is probably more dependant on a gonad-adrenal cortex balance than a primary pituitary one.
- 5). Thyroid control of amino-acid metabolism acts along with thyrotropic hormones in regulating the speed of cell oxidation which in turn determines whether anabolic functions shall preponderate over catabolic, or vagotonic over sympathicotonic.
- 6). While carbohydrate metabolism is primarily related to the pituitary-pancreas balance, it is also controlled by adrenal medulla-liver reactions, to say nothing of possible ovarian interactions.

Timme(5) suggests, however, that in the first period of life - from birth to puberty - the most important endocrines to do with growth are the thymus and the pineal.

Thus tadpoles fed on thymus were not checked in growth but were delayed in differentiation, while the

pineal feeding has led to growth and strength.

Thymic subinvolution is dependent on retarded differentiation and upon continuous skeletal growth. Briefly the signs are:-

- 1). Sparse pubic hair - with female distribution in the male scanty beard growth, and lanugo hair on the body.
- 2). Delayed joining of epiphyses.
- 3). Lack of sexual differentiation in the male: large clitoris in the female.
- 4). Thin small arteries, small suprarenals, small enclosed pituitary with poor resistance to fevers and vagotonia.

While pineal subinvolution leads to:-

- 1). Retarded sexual and mental development.
- 2). Undue muscle development.
- 3). Possible hypopituitarism.

We may summarise the effects of positive or negative phasic variations in the pineal-thymus axis as follows:-

Thymus+ weakness, avirilism, thin arteries, growth in height at expense of width.

Pineal+ retarded growth with muscular strength.

Thymus- too rapid differentiation at the expense of growth, - progeria type.

Pineal- mental and sexual precocity.

We can, however go one step further and say that:-

Growth is a function dependent on 1) general (pituitary) factors, but is modified in extent by 2) early closure of epiphyses (counteracted by thymus), by 3). somatic muscular

development (facilitated by pineal and adrenal cortex),
 by 4) genital development which appears to lead to growth
 in width (counteracted by pineal, facilitated by gonads,
 and adrenal cortex) by 5) the metabolic functions of thyroid,
 and 6) on calcium metabolism by the parathyroids.

But growth is essentially a function of time, and for
 its understanding we need to know more about the following
 problems:-

1). The relationship of experience to the 4-dimensional
 conception of space-time.

2). The relationship of the endocrines to the following
 periodic functions:-

a). Sleep-wakefulness.

b). Contraction - relaxation of muscle (voluntary
 and involuntary.

c). Systole - diastole of circulation.

d). Inspiration - expiration of respiration.

e). Menstruation.

f). Metabolism.

g). Digestion.

h). Osteo-blast - osteo-clast activity.

i). Necrosis - regeneration.

So many of the diseases of general medicine may be
 regarded as disturbances of the timing mechanism, such,
 for instance, as the spasticity of striped and unstriped
 muscle, giving rise to abnormal gaits or tics achalasia
 of sphincters dysmenorrhea, tremors, amenorrhea, menorrhagia,

sleep disturbances in trance, fugue, epilepsy or catalepsy, syncopal attacks, fibrillation, heart-block, extrasystoles, tachycardia, bradycardia, asthma, stenosis of various orifices, regurgitations of all kinds, hypertrophies and dilatations, atrophies and obliterative conditions.

So far we have tried to present the features of endocrinopathy in relation to physical growth, sexual activity and mental development, where these fall into categories of dwarfism, infantilism, precocity or gigantism, but it is equally important to realise that disease-processes in general have a dwarfing effect upon the whole personality, and that in some sense even precocity and gigantism are forms of immaturity. At present it is difficult to define in precise terms where the two categories meet, but of endocrinopathy and the somatic effects of ill-health we may suggest the following broad principles:-

- 1). Infantilism in general is a reflex of infantile attitudes in the parental environment.
- 2). Adequate treatment must deal both with the patients endocrine deficiencies and his own emotional immaturity, but also with that of the most offending members of the family. These attitudes usually include too much supervision, too much restraint along with too much indulgence.
- 3). Though too intense sexual instruction can be very harmful, yet the right sort and amount can be stimulating to growth of both mind and body.

4). Neurotic attitudes to illness have a general stunting effect on both those who are physically well (e.g. the parents), but more especially on those who are the victims of it (e.g. the patients).

5). In both categories outlined above, the principles here defined generally apply, but the amount of recovery that is possible varies with individual cases that cannot be categorically laid down for any particular group.

6). Precocity in general represents the too early attainment of powers that normally should be held in abeyance.

7). Regard for the metaphysical structure of the personality in terms of:-

- a) The Subject-Object relationship (v.chap.10).
- b) Awareness of Sex to Symbolism relationship (v.chaps. 13&14).
- c) The orientation of the individual in the space-time continuum (v.chaps. 4 & 5).
- d) The problem of Personal Responsibilities (v.chap.20).

will provide us with a convenient yard-stick for measuring the personality deficiencies of any type.

It may be dangerous to speculate on the relationship between the metaphysical aspects of personality and physical structure, but I believe the risk to be worth taking and so I suggest the following correlations.

1). Dolichomorphism in itself is an expression of anterior pituitary activity in which libido is internalised, and probably to some extent dissociated from gonad functions.

2). Brachymorphism is an expression of the self's extraversion, where objective values are considered greater than subjective values, where heteronomy is more characteristic than autonomy, and where activity is considered of greater importance than passivity.

Libido is externalised and impression counts for less than expression. The pituitary-gonad axis is more harmonious than in dolichomorphic expressions.

3). Angularity of contour represents dominantly aggressive activities; rotundity far more recessive, quiescent inner attitudes.

4). Hyperthyroid activities are an indication of hurry on the part of the self to the space-time continuum.

5). Hyperthymia represents too easy attempts at solving life's problems, and usually involves a dissociation between psyche and sexual spheres.

6). Sympathicotonia is in general an expression of aggressiveness which leads to preponderant adrenal medullary activities. In so far as this leads to a strong emphasis on objective values, it tends to be accompanied by adrenal cortical hyperactivities with resulting increase of virilism and genito-somatic growth, with an increase in brachymorphism.

7). Vagotonia may in part be due to an action-reaction manifestation from "effort syndrome", but is very often due to relaxation, imposed on the patient by his invalidism. It is nature's attempt at compensating for unproductive activity and bringing about the equilibrium necessary for health. Its inception is closely bound up with the law

of reversed effort' and is similarly related to the 'law of diminishing return'.

8). The association of brachymorphism with objective attitudes (altero-centricity) to reality is characterised by brachycephaly with eyes widely separated from each other, broad noses, broad well formed teeth arranged in a wide half-circle, without considerable vaulting of the palate-dome. The sinuses are well-made, the lower jaw tends to be prognathous (under-shot) and the general features of brachymorphism in the body as described under athenic types are apparent.

9). The association of dolichomorphism with subjective attitudes (ego-centricity) involves a number of different factors. On the psychological side there is the day-dreaming type with receding chin and status hypoplasticus, the rationalising type, of paranoid make-up, slightly florid cheeks, inclined to phthisis but also capable of inventive ingenuity, the thymo-centric type with pale angelic appearance but with hypoadrenal constitution superadded with its susceptibility to infections, syncope and anaemia with lymphocytosis.

10). Subjective attitudes may express themselves in very many clinical conditions. It is essentially a fearful attitude to the nocuous environment, which watches for danger, focalising its interest in a short-sighted way on the object with a view to guarding its own integrity. It tends to take a gloomy view of the universe in consequence.

Its accompaniments are myopia, convergent strabismus, susceptibility to infections, anxiety states, liability to hyperthyroidism, phthisis, gastric ulcer and enteroptosis.

11). Objective attitudes are self-confident, seeking to justify themselves in conquest. There is consequently a breadth of interest, with a tendency to look too far ahead, to see things too optimistically, and to feel things too superficially. Its associated conditions are hypermetropia, divergent strabismus, acromegaly, monarticular arthritis, gall-bladder disease and prostatic hypertrophy.

12). The differences between subjective and objective attitudes may be stated as those between convergence and divergence, where convergence is pre-occupied with its own intensity, and divergence with the extensity of objectivity. The one is Brobdignagian, the other Lilliputian, where Gulliver is the focus of it. Teleologically the one is concerned with detail, the other with things in their wholeness; The one microscopic, the other macroscopic and even telescopic. Art springs out of the one, and science out of the other; and wholeness demands that somehow the one shall be corrective of the other.

13). The way in which this shall be done is bound up with the relation of the individual to the space-time continuum, space being objectified and time subjectified to produce the growing and maturing individual with his roots in a harmonious relationship with life in all its many-sidedness. But this is essentially a matter of time

and experience, while opportunity itself insists on selecting our experience for us. But objectivity is threatening and time seems so short, so the conflict must arise between what is secure and expedient as against that which is dangerous but necessary.

14). The problem of personal responsibility is bound up with the problem of the will which is also related on the somatic side to the pituitary-endocrine system on the one hand, with the diencephalic connections through the autonomic nervous system on the other. The intactness of the endocrine system is intimately related to the sane and healthy use of the self in its active and passive moods - its manic and depressive phases. In one sense the whole system of encephalisation may be interpreted as a rationalisation system, built up as a protective force to the threats of both internal and external milieus. The goal of psychotherapy is both the analysis and the synthesis of the rationalising force - analysis to its primitive levels, synthesis to the harmonious reconciliation of the whole force of racial heredity (collective unconscious) with the demands of the environment in all its complexity and with all its insistence on law and order.

15). The degree of functional integrity of the endocrine-diencephalic-autonomic system is probably an index then of the integrity within the individual of his self-preservation, sex and herd instincts, where there is inherent in all these forms of activity the paradoxes:-

- a) Fight - flight.
- b) Sadistic - masochistic tendencies.
- c) Dependence - independence ambivalence.

16). The only way of achieving the kind of healthy subject-object relationship necessary for sanity is through the realisation in life of symbolic values. This is more than an awareness of motives, but is much more an awareness of teleology - of ends and goals. The importance of sex rests pre-eminently on its capacity for reconciling opposing elements, and for maintaining the equilibrium of antithetic principles. Its symbolism is so much part of the warp and woof of our metaphysical structure, and in actual physical constitution we are so much bisexual, that to neglect the meaning of all this is to do real violence to our highest destinies.

17). Cyclothymia and schizothymia are the emotional states associated with the fundamental attitudes of identification with and detachment from the object. One purpose of analysis is to secure the apparently impossible synthesis of these two attitudes, by providing the link of continuity (association of ideas) to the schizothyme, and by breaking the cycle of cyclothymia by showing the need for dissociation in differentiation.

For purposes of classification we have divided the conditions associated with infantilism into those primarily of endocrine origin, and those secondary to some more general condition, but that must not be taken to indicate

that even here the endocrine factors are not important, for it seems possible that these still represent the forms of growing potentialities even though they may be more obviously at fault in some conditions than in others. The nutritional factors of growth are, of course, of importance, but under-nourishment must have some influence on the activity of the endocrines themselves, as well as representing inadequacy in the raw products necessary for the building of the constitution.

This interplay of endogenous and exogenous factors is part of the subject-object relationship, but our conceptions of growth must be governed by the consideration that primary factors are given primary consideration, and secondary factors are not forgotten, while we ought also to remember that there are intermediary factors linking endogenous and exogenous influences. We may for the moment satisfy ourselves with the generalisation ~~that~~ these are partly nervous and partly visceral. (See chap. 4)

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CHAPTER 19.

DIATHESIS IN RELATION TO CERTAIN ANOMALIES OF MORPHOLOGY
& PHYSIOLOGY.

"Father got his temper up that night, no danger!
He shouted at Mother terrible, saying she'd done very poorly
with her children, for the girl had the devil's mark on her,
and now it seemed as if the boy came from the same smithy.
This I know, because Mother told it to me. All I mind
is that she went to look very small, and being only
little to begin with, she seemed like one of the fairy
folk. And she said - "Could I help it if the hare crossed
my path? Could I help it?"

Mary Webb: "Precious Bane".

Synopsis.

A. Morphological Defects.

- 1) Those present from birth, inherited and stationary:
e.g. club foot, hare-lip, supernumerary digits,
brachydactyly.
- 2) Morbid process superposed on a congenital defect:
e.g. ectoderm defects; fragilitas ossium, inguinal
hernia.
- 3) Inborn maladies in which the tissue defects only
appear late: the Abiotrophies, e.g. Leber's
disease, muscular dystrophies, hereditary
ataxias, amaurotic family idiocy, Huntington's
chorea, dystrophia myotonica. Cataract, arterial
disease and Dupuytren's contraction may be
included here.
- 4) Germ injuries: Blastophthoria: caused by trauma,
roentgen radiation, general metabolic diseases,
infections and poisons.
- 5) Embryo injuries: caused by X-radiation, endogenous
intoxications, infectious diseases, endocrine
disorders and psychic influences.

B. Physiological Defects.

- 1) Inborn Errors of Metabolism.
 - (a) of a positive nature, e.g. cystinuria,
alcaptonuria, pentosuria, porphyrinuria,
gout, Gaucher's & Niemann-Pick's diseases.
 - (b) of a negative character, e.g. albinism,
achlorhydria, periodic paralysis, and

hypoglycaemia.

- 2) Idiosyncrasies.
- 3) Resistance to Infection.

In applying some of the principles we have just considered, to clinical phenomena, it is convenient to divide the morphological and structural defects into the following categories:- 1) those defects which are present from birth, inherited from former generations, but with no characteristics of progressive disease. Although gross injuries such as intra-uterine amputations are obviously excluded from this section, yet it is probable that hereditary influences are at work in such deformities as club-foot which are often held to be caused by the more accidental lie of the foetus in utero. Kochs (1) has published a genealogical tree which indicated that this condition is transmitted as a dominant quality, and in which there were 11 affected individuals in three generations. Similarly Warburton (2) found that of 60 cases of hare-lip a family history was obtained in eleven, giving a percentage of 18.3. This accords with Birkenfeld's (3) investigation of 204 cases, which showed a proportion of 20% with a hereditary history. The observation has been made that the unaffected parent of a child with hare-lip or cleft palate sometimes presents a peculiar flattening of the upper lip, as though in anticipation of the defect in development of the offspring. Interesting morphological anomalies are those of the digits. Sverdrup (4) described a kinship in which 37 persons had superfluous fingers, and in which hereditary could be traced uninterruptedly through six generations. It was never transmitted by normal members, therefore it must have been a dominant quality. Similarly Forabee (5) has

described a family in which 17 out of 29 members had brachydactyly, the fingers having only two phalanges, and the thumb only one, while the brachydactylous females are on the average 12mm shorter than their sisters, and the males, 21cm shorter than their brothers. Part of the family tree is submitted.

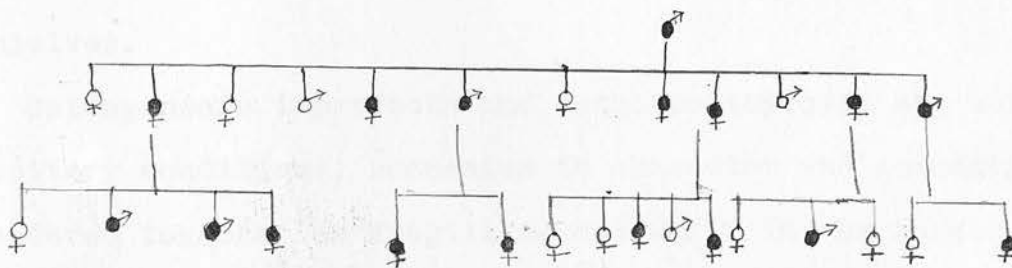


Fig. 8

2) Conditions, where on the top of a congenital defect, there is a progressive morbid process. A good example of this is given by Margaret Rutherford (6), who has described a family in which various ectodermal defects became manifest, especially as regards the skin, teeth and cornea. The great-grandmother had defective eyesight and had no teeth until she was grown up, the grandmother had only two widely spaced teeth, which appeared at the age of 7, in childhood was much troubled with hypertrophy of the gums, and suffered from very defective sight and dense corneal opacities, the father had no erupted teeth at 15, at 23 was still teething and had slight bilateral keratitis, while the patient, an infant, had extreme facial asymmetry, an alternating squint, and double undescended testicles and almost complete absence of the scrotum.

A community in India has been recorded by Thodani (7) where a toothless type of man occurs, who is also bald-headed and extremely sensitive to heat, probably owing to lack of sweat and sebaceous glands, which suggests that the character may be male sex-limited, though the daughters of these people transmit the condition without contracting it themselves.

Osteogenesis imperfecta and osteo-psathyrosis are both hereditary conditions, recessive in character and commonly considered together as fragilitas ossium. In the former, multiple fractures occur in intra-uterine life, while in the latter the most significant causes after birth produce a number of fractures. In both diseases blue sclerotics are found, because the choroid shows through its thin covering. Along with these defects noticeable at birth, there is a third condition associated, otosclerosis, which only supervenes with increasing years.

Hall Stewart (8) has reported a family in which the four eldest had blue sclerotics, the senior of whom had two fractures of the femur at 2 years, and was troubled with partial deafness. The children of the two eldest suffered from fragilitas ossium and blue sclerotics while the children of the third were apparently sound. The fourth sister died unmarried. Crooks (9) has recorded a case in which the mother suffered from osteitis deformans and the only child had osteogenesis imperfecta, and another family with the following genealogy.

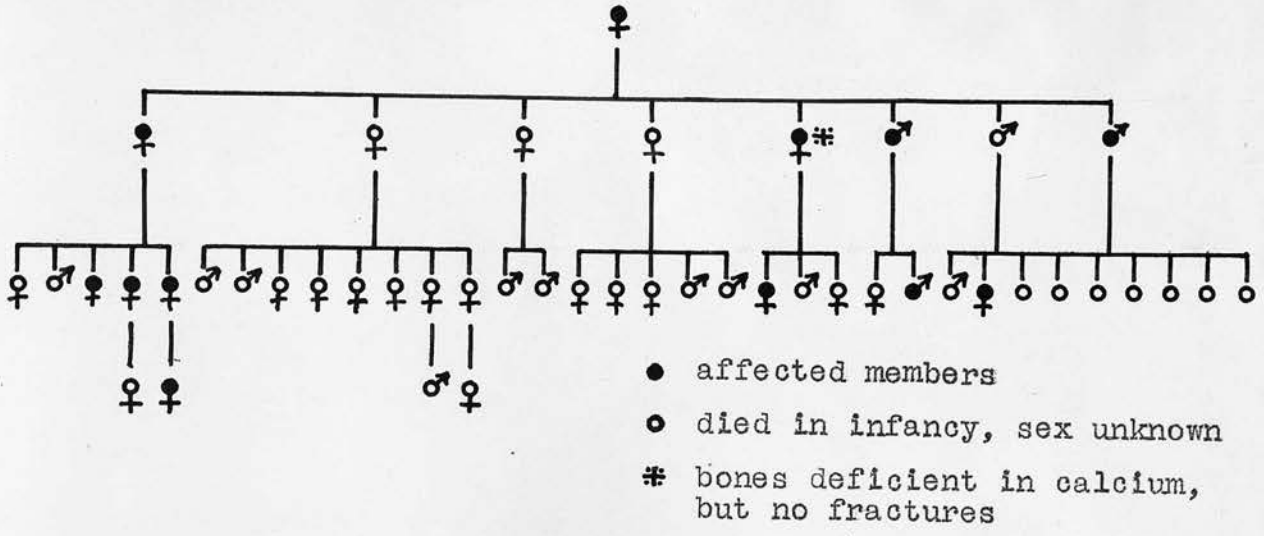


Fig. 9.

Many further examples of the supervention of morbid processes on congenital defects may be given, such as endocardial infections on congenital heart lesions, the development of branchial cysts from vestigial remains, or cysts from a patent throglossal duct, or inflammation in, or strangulation of gut by bands from a Meckel's diverticulum. Garrod (10) has reported the case of a young woman who died suddenly in a uraemic convulsion, due to pressure of an enlarging uterus upon a single small kidney, situated in the hollow of the sacrum, while congenital cystic disease of the kidneys is compatible with normal activity for years, until renal failure arrives. How destiny can hide her secrets!

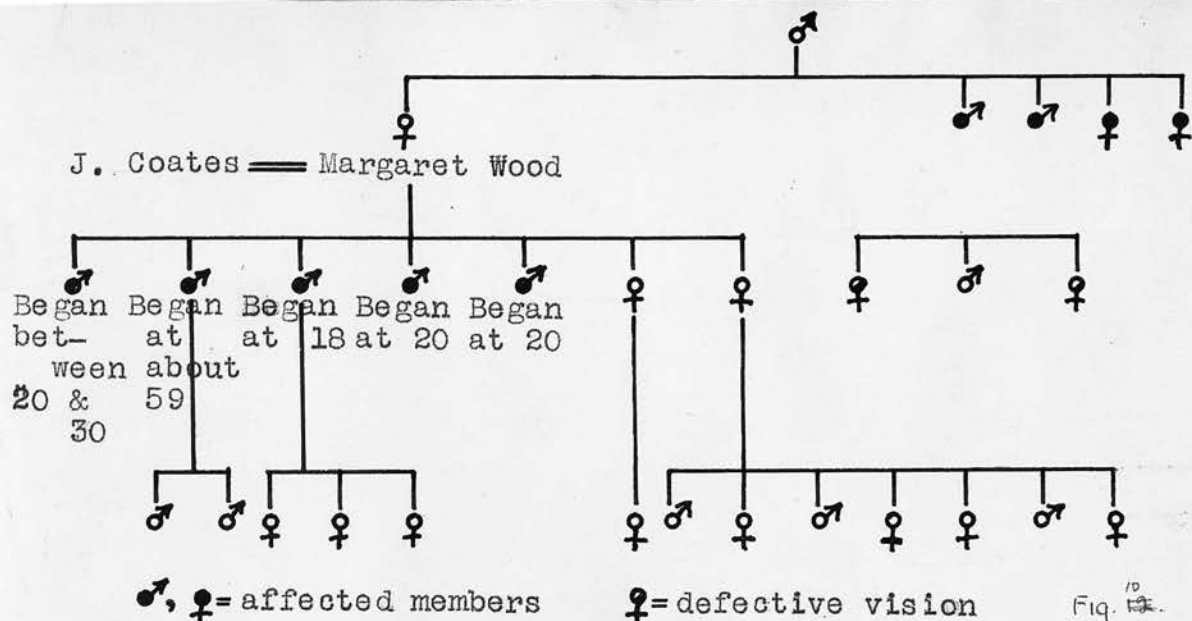
A much commoner example of this group however, is the condition of inguinal hernia in which the preformed sac is a vestigial remnant predisposing to disability later in life.

pedigree of a family in which the disease is present.

From 30 families of unrelated male patients, Draper(11) procured reliable case histories of 253 males, and found that 61 or 24.11% had hernia, as against 5.1% in 16,000 health examinations made by the Life Extension Institute, while of the 30 fathers of the patients, 14 or 46.66% had hernia.

3) The Abiotrophies: the name given by Gowers (12) to a group of inherited inborn maladies, where there are no obvious defects at birth, but where signs of progressive disease develop later. In this group disease seems to be inherent in the special tissues and cells, and yet, so far as we know now, at birth the cells are healthy enough. In no other group of diseases does Langdon-Brown's (13) conception of predestination apply so well as in the abiotrophies. There does seem to be an inevitability about the way in which the disease unfolds itself. For no apparent reason muscles and fibres gradually 'waste away, as of plants without soil', and nerve cells and tracts are replaced by fibrous tissue.

Pende (14) suggests that the abiotrophies arise because there is an ontogenetic imbalance between the mesen^chymal tissue and the parenchymal. Leber's disease is a good example of this type, in which one member seems to be fated to go the way of the rest of the family. I submit the pedigree of a family in which the disease is present.



It is evident that there can be no absolute~~ness~~ about the progress of the disease, for although the twenties is the typical age of onset, one member escaped until he was 59. Julia Bell, (15) from a large series of data, has suggested that the affected families have a generally lowered vitality, and that early deaths among the children are a frequent finding.

The muscular dystrophies are characterised by a primary degeneration of the voluntary muscles, and as we have already noted, the pseudo-hypertrophic form chiefly affects males, and is usually held to be sex-limited, while the facio-scapulo-humeral, the shoulder and pelvic girdle type of Erb, and the distal type in the forearms and legs are fairly equally distributed between the sexes, one form appearing in one member and another form in another member of the same family.

Other diseases included here are the hereditary ataxias, amaurotic family idiocy (Tay-Sach's disease), Huntington's chorea, and dystrophia myotonica (or myotonia atrophica). Tay-Sach's disease occurs predominantly in Jews, and is characterised by (1) mental impairment, coming on in an apparently normal infant of about 6 months and ending in absolute idiocy; (2) progressive paralysis of the whole body;

(3) progressive failure of sight and (4) a fatal termination in the marasmic state before the age of two years.

Huntington's chorea is an abiotrophy in which the typical features do not show themselves until middle life, when the choreiform movements begin, continue for some years until dementia gradually develops, and may terminate in suicide or slowly progress for 5 to 50 years. The familial nature of the disease is strikingly borne out by Davenport & Muncey's (16) series of about 1,000 cases in four great family groups.

Dystrophia myotonica (or myotonia atrophica) usually first appears in adult life. Atrophy appears in the sternomastoids, facial muscles and then in the arms and peronei, but there is associated with it a peculiar difficulty in relaxing the muscles after effort, called myotonia. In addition to these features, such ~~stigmata~~ as cataract, premature baldness, testicular atrophy, loss of sexual power and general wasting appear. The disease is familial, but a very special feature is the fact that early cataract occurs in the otherwise healthy members of the family. Pathological changes have been found in the anterior and middle lobes of the pituitary body, the suprarenal cortex, and the testicles, so that the condition may be a pluriglandular syndrome.

It is quite probable that the abiotrophic phenomena are found in a large number of adult diseases. For example, may not cases of cataract coming on in many members of a family through five generations, as recorded by Galloway (17), fulfil

the conditions? Arterial disease itself with its many manifestations, is probably very often an indication of a "gradual loss of vitality in the tissue cells", and this idea finds support in Osler's(18) words, as to the importance of "the quality of arterial tissue (vital rubber) which the individual has inherited".

Analogous to the fibrous deposits of arterio-sclerosis are those seen in Dupuytren's contraction; for while in the former condition the peculiar distribution in the arteries leads to effects deleterious to the general health, in the latter the hard contraction of the fibrous tissue in the palmar fascia causes an inconvenient, though harmless, deformity. Manson(19) has met a family in which the father, and all three sons were affected, though the three daughters were unaffected. Again it is likely that there is inherited a tissue-weakness which is liable to be activated by years of heavy manual work, though in the cases cited, only one member of the family was a labourer, the others being grocer, baker and clerk respectively. In this condition, however, environmental factors may be more causative than in the other diseases we have noted.

Jelliffe (20) has written a paper on 'Dupuytren's contracture and the Unconscious' which suggests a strong psychological component in the etiology of the condition. He cites as previously imputed factors:-

- Trauma.
- Gout
- Rheumatism
- Arteriosclerosis
- Tuberculosis
- Syphilis
- Alcohol
- Central or peripheral nervous lesions, such as syringomyelia and multiple sclerosis.

- {Heredity
- {Sesamoid bone embryonic rests.
- {Derivation of the palmar aponeurosis from the
- {flexores breves manus **superficiales**. Grafenberg (21)

Krogus (22) would think of the slow contractile process as a register of a tendⁱuous regression of an undeveloped muscle 'anlage' rather than chronic-plastic inflammatory activity, though Jelliffe would accept both processes as operative. Summarising his psychological data he says:-

"It would lead to too great piling up of detail were all of the situations relative to great impatience, at times childish, irritable behaviour when thwarted, even in minor games of backgammon, bridge etc; ever-present persistent and markedly titanic desires to anticipate, to hurry, to get hold of things before it were possible or lest he be thwarted. Jink's and other gestures, oaths, rituals, superstitious observances galore exemplify the infantile stages of libido cathexes

which have had a partial liberation through the grasping, holding activities through the hands but by reason of inadequacy of performance at really creative levels have flowed into the vegetative effectors and old connective-tissue metamorphic products of what were in lower animals tendentious capacities for such holding, grasping, reflex activities."

4). Blastophthoria: Germ injuries.

It is well known that examples are met from time to time of families in which a similar syndrome is present in various members, without any previous affection of the antecedents. Such conditions may of course depend on recessively inherited characters, even though additional cases of the same disease in previous generations are not known, but it is more probable that there has been an impairment of several of the germ-cells affecting the chromosomes. Agents which may effect this injury include trauma, excessive heat, ultra-violet and roentgen radiations, infections, intoxications and lipid deficiency.

It is well known that diseases of liver and heart, and the toxins of infectious diseases such as tuberculosis, and the fevers, have a blastophthoric effect on the germ cells, while alcohol and lead have a similar effect. Almost a third of all epileptics, feeble-minded individuals and idiots come from alcohol addicts.

5). Embryophthoria: Embryo injuries. Of the causative agents of these disturbances mention must be made of X-radiation, endogenous intoxications, infectious diseases, endocrine disorders and psychic influences. Radiation of the pregnant uterus has been followed by considerable degrees of inherited

development, such as microphthalmia, microcephalia, and feeble-mindedness.

According to Halstead. Edmunds and R. Hunt (23), after extirpation of the thyroid in the mother, the offspring have hypertrophic thyroids, while Hoskins (24) found that the adrenal glands also were hypertrophic. McCarrison (25) showed the transmission of maternal hypothyroidism to children by the appearance of hereditary cretinism, while according to Fiore (26), the offspring of thymectomised mothers show a hypotrophic thymus. Manfred Frankel (27) demonstrated congenital hypo-ovarism, transmissible by heredity in young guinea-pigs born by mothers whose ovaries had been irradiated. These experiments seem to support the theory of the transmission of acquired characteristics.

Of the endogenous intoxications, Muller (28) mentions eclampsia gravidarum which is liable to be followed by weak, deficient and nervous children. The infectious diseases in pregnant women may lead to special predispositions in the offspring. Schlossmann(29) reports that children born during an influenza epidemic are susceptible to infectious disease while both syphilis and tuberculosis are found to produce diathetic changes in the foetus. Pende (30) believes that syphilis of the parents produces sclerosis with atrophy of the parenchyma and arrested development of the glandular tissue, so that all the endocrine glands may exhibit a condition of more or less advanced sclerosis, while syndromes of hypopituitarism, sometimes along with congenital mitral

stenosis or hypogenitalism, or epilepsy, feeble-mindedness, and idiocy may be frequently met. In the foetuses of guinea-pigs inoculated with tuberculosis during pregnancy Pende found a greater differentiation and histological phenomena of secretory stimulation in the thyroid gland, hypophysis, adrenal cortex and the interstitial gland of the testicle. He found also that feeding pregnant cats with large doses of thyroid substance could produce thymus hyperplasia in the foetuses. Hart and Steenbock (31) showed that the feeding of a diet rich in proteins to pregnant sows alters the maternal thyroid, and the young pigs are born without hair and with signs of hypothyroidism.

Some of the most interesting effects of embryophthoria are those due to psychic influences from the mother. Thus a man with an apparently normal arm, but with a very much shortened forearm from which protruded a very small hand and two rudimentary digits explained the condition as due to his mother having got her hand trapped in the mangling machine while he was still in embryo. She was very disturbed at the thought of the effect her injury might have on her unborn child and was not surprised at the deformity of her son. Warburton (2) found that a number of mothers attributed the production of hare-lip to a fright or shock during pregnancy. One mother, for instance, was much upset in the second month of pregnancy by a man who fell in front of her and cut his lip: while in another case where there was a family history of the condition, the mother secretly worried ~~and~~

and was not surprised at the eventuality. [A mother under my care gave birth to a son and implored me to tell her that the child was all right as she had ^{had} it in mind throughout that he would be defective. He had congenital heart lesion and a flail right thumb. A still more interesting case was that of a baby born with a normal left thumb, but without middle and distal phalanges, on the other four fingers. The nails were substituted by small depressions. About the middle of pregnancy the mother fell downstairs and was aware of having knocked the fingers of the left hand and grasping them to relieve the pain of the blow. In two instances a wife has given birth to a faulty child after a period of prolonged disability of the father, which caused much anxiety; in one case a farmer was hedging and badly gashed his knee with an axe. After being off work for several months his wife was delivered of a very defective child in which the vegetative functions alone were active, and which died in the course of a few days. In another case, a father with very high myopia and retinal detachment, out of work for a long time had a child with a spina bifida which died after a day or two. The laity has long ascribed cavernous haemangiomas to pre-natal shocks, and hitherto the profession has been inclined to ridicule the idea, but in so many cases can explanations be offered that we must open our minds to the possibility. One mother attributed a red naevus the size of a sixpence, on her daughter's neck, to a sudden passion for raspberries during pregnancy which was accompanied

by a movement of the hand to the back of the neck; another ascribed the development of a greyish blue haemangioma on the forehead to being frightened in pregnancy by a mouse; a girl with a haemangioma on the left index finger had been told that her mother cut the corresponding finger while pregnant, while yet another mother telling me of a haemangioma at the back of the head and neck of her small child at first could give no explanation, and then offered the suggestion that in the early months of pregnancy she had her hair permanently waved and got her head scorched in the analogous situation, but added that she did not believe in the association.

How are we to explain these occurrences? Pende(32) believes that they probably arise by the effect of the maternal emotions on the endocrino-sympathetic system of the offspring. He comments, "Up to our own day these facts have been gathered with great skepticism, for the reason that we were unable to explain how the psyche of the mother could influence the fetal organism, since according to the anatomists there were no nervous connections between the mother and the foetus. But now that we know the influence of the psyche upon the hormonal secretions and that of the hormones upon the great sympathetic system we can conceive how a nervous or psychic trauma of the mother might succeed in disturbing the endocrino-sympathetic balance of the foetus and hence its normal development".

Although it is difficult, if not impossible, to keep the distinction clear-cut, we pass from the morphological variations to the more physiological.

(1) The 'inborn errors of metabolism', may be considered from positive or negative aspects. Among the former there is in the body a definite chemical substance which can be isolated, whose presence may not be harmful, but which on the other hand, may very definitely threaten the comfort of the patient. In these disorders there is manifested a strong familial tendency which may show itself in one member of the family by real disability, while in another there is complete freedom from such discomfort, although careful chemical examination may show that this 'healthy' individual is harbouring the substance which leads to the disabling consequences in the former case. This substance may be a normal product of metabolism which causes damage when it accumulates in excessive amount, or possibly it is an intermediate product which does not arrive at the usual termination, or else it is a definitely abnormal product formed by deflection from the usual path of metabolic progress. In any of these events Garrod (33) believes that the real error consists in enzyme-deficiency which gives the metabolic process a harmful tendency.

Cystinuria, to a slight extent, is a normal event, but when marked it probably constitutes an arrest rather than a perversion of metabolism. It is transmitted as a dominant character and its hereditary nature has been illustrated by Cohn (34) in a family in which the father was normal, but in which the mother had cystinuria. Of 12 children, the urine of ten were examined 7 of which contained

cystin. It is a breakdown product of protein containing sulphur, and in acid urine tends to be thrown out of solution, become infected and deposit as a calculus.

Alcaptonuria is an arrest of metabolism by which the tyrosin in the protein molecule is incompletely broken up into homogentisic acid, which appears in the urine, leading to staining of the clothes and in the blood after a period of years produces ochronosis - a condition of blackening of the cartilages - along with brown deposits in ligaments, conjunctivae and sclerotics. Chronic osteo-arthritis is frequently found to develop and gives rise to a typical waddle, like the 'goose-gait'. The quality is transmitted as a recessive factor and many of the cases occur in the children of consanguineous marriages, for of 34 cases, 15 or 44% sprang from the marriage of first cousins.

Pentosuria does not lead to any untoward events in later life, but is due to the inability to deal with the special sugar produced by the break-down of the nucleoproteins. It is a recessive quality and although rare, is mostly found in Jews, thus Cambridge and Howard (35) found three cases who were Jews (two of whom were uncle and nephew), 2 cases who were Greeks (a father and son), and 2 English.

In congenital porphyrinuria a substance is passed in the excreta which is probably a precursor of haematin and haemoglobin and which gives a deep port-wine colour to the urine. The condition is transmitted as a Mendelian

recessive, is sex-linked, with greatest incidence among males, and is characterised by extreme sensitiveness to sunlight. On the skin this is seen in the eruption known as hydroa aestivale or vacciniforme which produces increasing disfigurement every summer and in course of time results in a loss of substance of the ears and nose. Implications of the cornea leads to blindness, and deformities of the hands with stiffness of the fingers or atrophy of the terminal phalanges may be observed. Deep staining of the bones may occur and in one case, which I saw, the teeth presented a pretty bluish-pink colour. Pigmentation and hirsutes appear as compensatory phenomena.

Gout has long been recognised as a diathetic malady, and well illustrates the phenomena of the inborn metabolic errors. Its hereditary nature has been well known, thus A.B.Garrod (36) obtained a family history in 75% of well-to-do patients and in 50% of hospital patients. The disease is usually found in the male sex (90%) and is transmitted as a dominant character, and it is probable that the affected persons have an altered nuclein metabolism which lowers the resistance of the tissue in certain directions and so permits a response to irritants which are scarcely appreciated by those whose metabolism does not exhibit this peculiarity. [The damage is done not so much by the high blood uric acid - so constant a feature, and probably due to renal retention rather than to increased formation - but by the sodium biurate which is so insoluble and is therefore liable to be deposited as tophi.]

There are, however, different grades of the diathesis, as in some people the condition only appears after prolonged exposure to the exciting factors, while in others, an acute attack may come on at 16 without obvious cause. Its liability to afflict statesmen has recently been noted, and suggests a relationship between the condition and positions of great authority.

Llewellyn (37) is of the opinion that the two important factors are the inborn tendency to deal inadequately with the uric acid set free by the breakdown of nucleo-proteins alongside a very chronic and low-grade infection.

Originally considered malignant, Gaucher's disease would seem to qualify for inclusion here. It is essentially a familial disease, recessive in inheritance, although it departs from the usual course by affecting females more than males. It is characterised by a very gradual deterioration of health, so that the earlier descriptions speak of it as scarcely affecting the general health. The fundamental fault appears to be a perversion of metabolism, so that kerasin infiltrates the cells of the reticulo-endothelial system, producing a very gradual but eventually a very considerable splenic enlargement, which is followed in a few years by a similar process in the liver. The victims of this condition may live 50 years with this enlargement, although they tend to develop a secondary anaemia, or later may be troubled by a tendency to bleed from the gums or under the periosteum. The cellular infiltration of the bone-marrow has also led to spontaneous

fractures, while the blood cholesterol is usually normal but may be unduly low. Pick's disease is a similar disturbance of lipid metabolism, but differs in that it affects infants, who usually die at the end of two years, and who have a high blood cholesterol.

Although Garrod (33) considers that the inborn errors are probably due to the lack of enzyme, the states we are to notice here represent still more negative conditions than those we have just mentioned. In albinism there is probably an absence of the melanin-producing enzyme which leads to a complete failure of pigmentation in the skin and other epidermal structures. The hair is white, the irides are pink, and even when exposed to the strongest sun, pigmentation does not ensue. Transmitted as a recessive factor, albinism, though generally rare, in the families of consanguineous marriages of apparently normal people is not very uncommon. While marriages of first cousins number from 1 - 8% of all marriages in this country, the percentage amongst the parents of albinos is about 40. Whether there is an associated endocrine fault, as for example in the adrenal cortex or in the pineal gland, which is said to cause a very definite translucency of the skin when given to 10-day old tadpoles, producing retraction of the pigment cells, has not been proved.

Familial achlorhydria is not usually spoken of as an inborn error of metabolism, though one can see no reason for excluding it from that category. Apperly and Norris (38) found it in 18 members of families comprising 29 individuals,

giving a percentage of 61% as against the normal ratio of 4%. Like cystinuria, this state may be unaccompanied by any disturbances of health, or it may be followed by oxaluria, non-megalocytic anaemia or pernicious anaemia.

A very interesting, though rare defect, is familial periodic paralysis, in which a flaccid condition affecting the muscles of the trunk and extremities ~~occurs~~ recurs with hunger, as for instance after a good night's sleep following an early dinner. The familial nature of the disease is shown by Collier and Adie (39) who traced the malady through 5 generations, with a greater liability for males to be affected than females.

The condition is held to be due to auto-intoxication associated with metabolic processes, brought on by muscular activity and relieved by rest. The gastro-intestinal tract has been incriminated by Edsall (40) who found total achlorhydria during an attack of paralysis along with starch indigestion. Holtzapple (41) noted in 17 cases of the condition, that excessive hunger would come on at night, and that rich and heavy foods would precipitate an attack. My own observations of hypoglycaemia suggest a possible relationship between the two conditions.

(2) Idiosyncrasies: Jonathan Hutchinson (42) used the term in the sense of definite peculiarities of organisation, the consequences of which were liable to occur unexpectedly. Under certain well-known circumstances, results which are peculiar to the individual will occur, without special

proneness to disease. Rolleston (43) defined idiosyncrasy, as an abnormal reaction in an otherwise normal person, which may be either on the one hand, greatly exaggerated, or on the other hand, greatly diminished, or more briefly as an unusual physiological personal equation. This includes the various aspects of immunity, the manifestations of allergic reactions, as well as a psychological group, in which an idea or emotion, such as does not upset the average man or woman, may lead to very unexpected reactions. For our present purpose we shall confine our use of the term to hypersensitiveness to such external stimuli as drugs, foods, the pollens of plants, various kinds of dusts, the toxins of organisms, the emanations of animals or simple mechanical pressure. This property there ore is usually inborn, while the term "allergy" is sometimes used with the meaning of hypersensitiveness that has been acquired, although von Pirquet (44) included in it all forms of altered reactivity of the organism. Generally speaking, however, allergy denotes both inborn hypersensitiveness ness or idiosyncrasy, and anaphylaxis which is an acquired hypersensitiveness. Bray (45) has used the term hypersensitiveness to include all reactions in which a hypersusceptibility to some foreign agent is evidenced, as compared with normals, and subdivides it into anaphylaxis and allergy. By the former, he means the induced manifestations of hypersensitiveness in laboratory animals which according to the manner of production may be subdivided into (a) active when an antigen is responsible, and (b) passive, when brought about by antibodies. In all instances anaphylaxis

is due to an antigen-antibody reaction taking place in special sensitised tissues. By "allergy" is meant

a. the natural or spontaneous manifestations of hypersensitiveness in man which include asthma, hay-fever, eczema, urticaria and migraine; and b. induced states such as serum-sickness and the passive transfer of hypersensitiveness by sensitised serum.

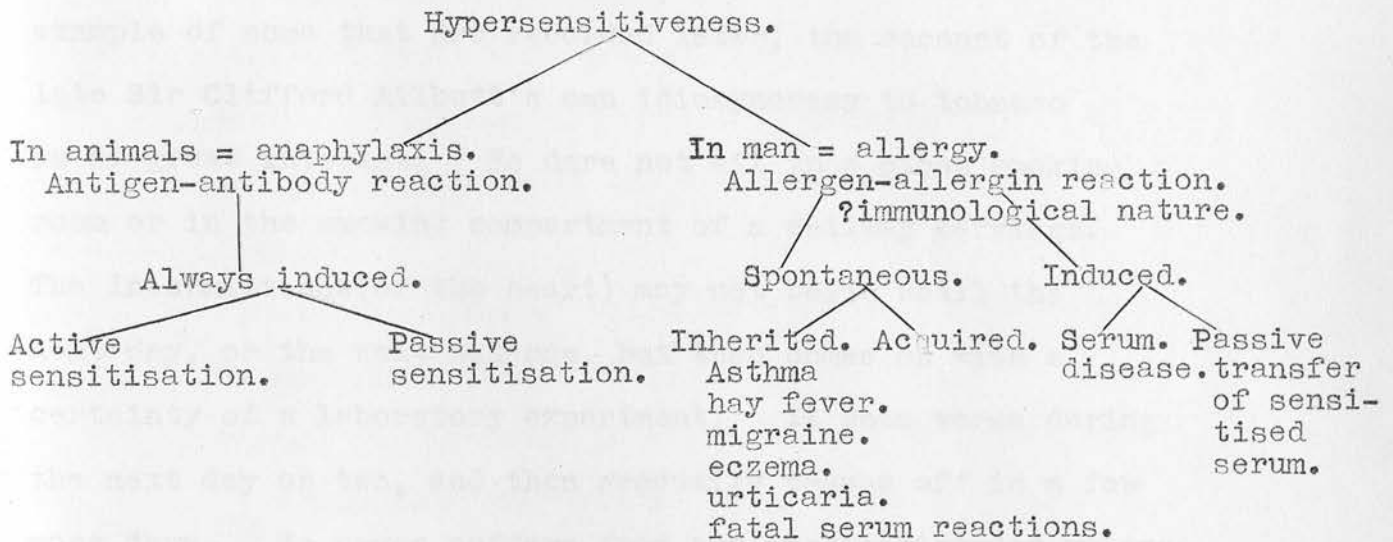


Fig. 13.

Guillaume (46) believes that anaphylaxis is a vago-sympathetic disequilibrium with vagotonic predominance. Langdon-Brown (13) suggests that if inborn errors of metabolism indicate a difficulty in metabolism, idiosyncrasy indicates a difficulty in anabolism. It is a refusal on the part of the individual protoplasm to deal with certain foods and drugs in order to conserve his own identity, and gives a scientific basis for the old saying that 'one man's meat is another man's poison'. Though not as extreme an example of some that are recorded later, the account of the late Sir Clifford Allbutt's own idiosyncrasy to tobacco is of great interest; " He dare not sit in a close smoking room or in the smoking compartment of a railway carriage. The intermittance (of the heart) may not begin until the next day, or the next but one, but then comes on with a certainty of a laboratory experiment; it gets worse during the next day or two, and then gradually passes off in a few more days. He never suffers from any cardiac disorder unless exposed to tobacco, but this practically has hung about him for many years. He has no dislike to the drug, nor does he feel any immediate discomfort from it." (47).

The manifestations of idiosyncrasy in the sense of inborn sensitiveness probably include the following conditions:

1. Skin: urticaria, urticaria papulosa, giant urticaria, eczema of infancy and childhood, some forms of pruritis and dermatographia.

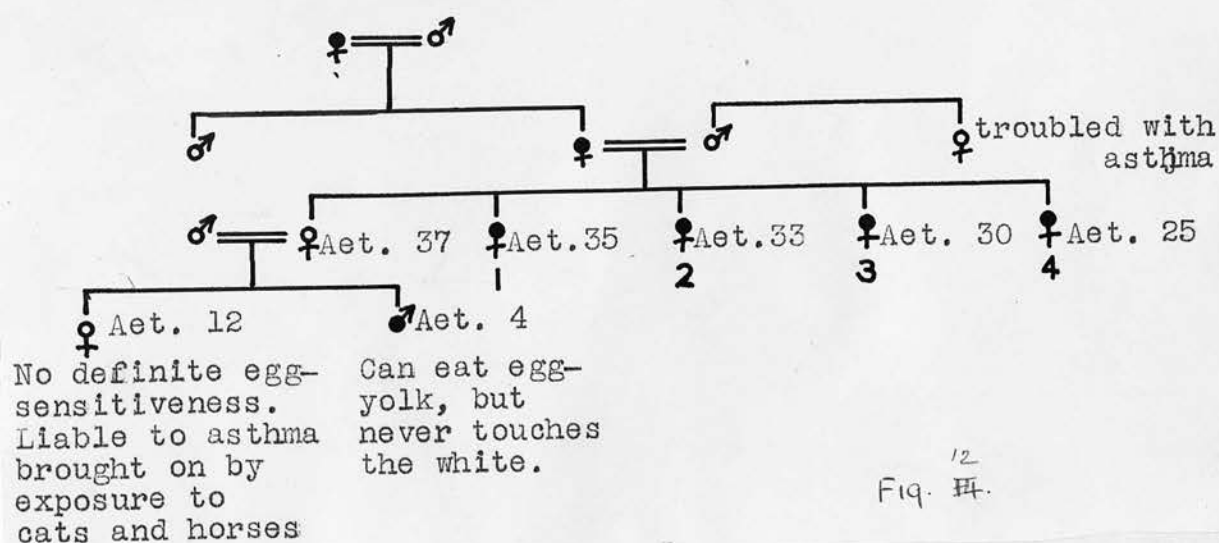
- 2. Subcutaneous: giant urticaria or angio-neurotic oedema.
- 3. Respiratory tract: Paraxysmal rhinitis, such as hay fever and asthma.
- 4. Gastro-intestinal tract: Certain forms of vomiting and diarrhea, mucous colitis and possibly some cases of cholecystitis.
- 5. Nervous systems: Some varieties of migraine, epilepsy has been considered such by some authorities, but this, I believe to be very doubtful.
- 6. Articular system: Intermittent hydrarthrosis, and probably some of the forms of rheumatoid arthritis.
- 7. Blood disorders: Of which some of the purpuras may be included - ? Henoch's.
- [8. Status lymphaticus: in which sudden death has been attributed to anaphylaxis from sensitisation by repeated liberation by nucleo-protein from nicroses in the germinal centres of the lymphatic gland.]

Repeated observers have noticed the hereditary aspects of ^{allergic} ~~these~~ phenomena. Bray (48) for example, speaking from experience gained with the study of hundreds of children, found the hereditary factor present in 2 out of every 3 children with asthma, though the hereditary was rather a history of allergy than asthma alone; parents might have suffered from urticaria or migraine, and they had children with asthma. Among the children at his clinic, he found

that the asthma sufferers included three times as many males as females though the findings of other observers seem to suggest that males improve after puberty, as up to the menopause females become more affected. Spain and Cooke (49) found that of 115 cases of normal people, only 7% could give a positive family history of any of the allergic manifestations, while in 462 cases of asthma and hay fever, a family history was positive in 58.4%.

From these observations it will be seen that the quality that is inherited is the liability to have a peculiar reaction to some foreign substance. That is to say, that in one member of a family such a substance will produce one manifestation and in another, presumably, the same substance will lead to a different manifestation. The specificity is however, transmitted in some families, and the family tree which I submit, shows this, as well as the transmission of the general quality.

Family tree showing egg-sensitiveness



In every case the symptoms in the affected members were the same. Within two and a half hours of taking an egg, a vague feeling of abdominal pain would come on, which would produce a feeling of weakness and prostration. It was unassociated with diarrhea or vomiting. In no. 1. immunity has seemed to develop with the advance of time, though she never takes eggs for breakfast nor a fried egg at any time. In no. 2. the condition is still present and is associated with multilocular rheumatism affecting the joints of hands and knees. In no. 3. at 15 the patient had a violent attack of gastritis, which was brought on by eggs, and made her very ill for some days. No.4. the patient who is a nurse had the idiosyncrasy but contracted scarlatina in hospital and for some reason or other had to take eggs, when she got some sort of immunity to them, but the original discomfort subsequently returned.

A similar specific hypersensitiveness that was hereditary is recorded by Rolleston (50) who tells of four generations in a family who were made ill by taking a few specks of parsley, which brought on abdominal and cutaneous symptoms.

Although the idiosyncrasies do not usually lead to fatal results, that angio-neurotic oedema could prove disastrous by causing oedema glottidis is well known. This was shown by J.R. and T.R.Crowder (51) who reported a family of 5 generations with 63 known descendants, of whom 27 inherited it, and of whom 14 died as a direct result.

That the phenomena at work in the idiosyncrasies are

probably due to chemical action has been repeatedly suggested, with abundant evidence, for Lewis (52) has shewn that wheals like those found in urticaria may be produced by the injection of histamine. Wright (53) has declared that there is a change in the blood in the form of retarded coagulability and deficiency of calcium content.

Barber and Oriel (54) have stated that in the allergic conditions a definite cycle of events takes place from pre-paroxysmal stage to the actual paroxysm and post-paroxysmal stage, which can be correlated with a chemical process. The most striking features are:-

- (a) A rise in the amino-acid content of the blood.
- (b) A rise in the ammonia excretion out of all proportion to the excretion of acid in the urine.
- (c) A lowering of the corpuscle content of chloride, and the retention of chloride during the paroxysm with its subsequent excretion, as in pneumonia.
- (d) A deposition of urates in the pre-paroxysmal or paroxysmal stage.
- (e) A positive "ether reaction" in the urine during the periods of active manifestations → probably along with (d) denoting an alteration in the colloid state of the urine.
- (f) Diuresis with decreasing acidity and sometimes marked alkalinity of the urine in the post-paroxysmal stage.

Barber and Oriel believe that the fault in these conditions rests in the liver and that there is a functional hepatic insufficiency, especially concerning protein metabolism, although a derangement of the antitoxic properties of the liver would also explain some of the other phenomena associated with hypersensitiveness.

Another example of this is the tolerance that certain people have to drugs, which others do not manifest - as for example, of children to belladonna and mercury, or on the other hand, of their intolerance to morphia.

(3) Resistance to infectious diseases must obviously be considered a diathesis, though we know that it is liable to be influenced as in ~~the~~ diathesis in general by both exogenous and endogenous stimuli. J.E.R. McDonagh (55) would attribute this to physico-chemical changes, and Huppert (56) suggested more than 40 years ago that the differences between the species in the respect of varying liability to infectious diseases were due to their chemical build, rendering some better and some less favourable culture media for particular bacteria. The nature of the action of antibodies is probably both chemical and physical, but none the less liable to variations from those endogenous factors best classified as psychological. There seems to be something so absolute in an infection that we forget so readily this inner faculty of tissue - resistance.

Jonathan Hutchinson (42) spoke of syphilis, leprosy and malaria as having diathetic states, and so modern a writer as Pende (57) mentions as 3 out of 6 specified ^{diathetic} states

a) the heredo-syphilitic; b) the heredo-tuberculous and c) the heredo-neoplastic. That he is not implying by this some actual transmission of bacterial or germinal elements is borne out by his statement that syphilis of the parents, through the action of the treponemas localised in the foetal glands, produces phenomena of sclerosis with atrophy of the parenchyma and arrested development of the glandular tissue, while the tuberculous toxins that pass from the blood of the mother into that of the foetus seem capable in some cases of stimulating the function of certain endocrine glands. "In fact, we have been able to find, both in new born children from consumptive mothers and in the foetuses of guinea-pigs inoculated with tuberculosis during pregnancy, a greater differentiation and also histologically phenomena of secretory stimulation in the thyroid glands, hypophysis, adrenal cortex and the interstitial glands of the testicle."

"In heredo-syphilitic new born children, on the other hand, all the endocrine glands exhibit a condition of more or less advanced specific sclerosis." Pende considers that certain cases of congenital mitral stenosis, and hypogenitalism, were due to mild hypopituitarism attributable to heredo-syphilis.

Whether there is a predisposing soil for syphilis, tuberculosis and neoplasms, is a different matter, though its possibility in syphilis is indicated by the fact that a syphilitic father may bear a syphilitic child without infecting his wife.

David Livingstone in 1857 (58) wrote that "syphilis seemed incapable of permanence in any form in persons of pure african blood, but that in individuals of mixed blood its ravages were severe," though on the other hand the ravages of the disease are much greater than usual on virgin soil. Evidence which would appear to confirm the importance of the soil in syphilis is adduced by Power (59) who considers that general paresis develops most often in those with a psychopathic family history and quotes Bolton who found evidence of such hereditary qualities in 81.9% of 72 general paralytcs.

In considering the extent of a diathesis in infectious states it may be that we attribute an inborn immunity to a state that is really acquired, as for example an immunity to small-pox that may have been caused by ~~alaspim~~ varicella that was thought to be ~~VERY~~ varicella, or, as some believe an immunity to tuberculosis that was really brought about by the repeated ingestion of tuberculous milk in childhood. But on the other hand, one who has seen general practice for a period of time, cannot fail to be impressed by the fact that there are some members of a family who seem to refuse to acquire an infection like scarlatina or measles, in spite of every exposure. And with other infectious conditions how often does the profession itself escape? It seems very likely that this is due much more to the objective attitude of the profession to disease in general, than to any changes expressible in terms of antibodies,

though these factors may still have their own peculiar relevance to the whole matter.

H & L. Hirszfeld (60) have carried out investigations as to the immunity and liability to diphtheria. They found that there was a definite relationship between those with positive Schick tests and the blood groups: further, that if one parent be Schick-positive and the other negative, the children with the same blood group as the positive parent are themselves positive, whereas those which share the blood group of the negative parent, are themselves negative for the most part, although some are not so. They concluded further that the positive Schick quality was a Mendelian recessive factor, and followed the laws of such qualities in transmission, being sex-linked, so that more females acquired the qualities than males. It would seem established therefore that there is in diphtheria a definite constitutional basis.

Draper (61) has dealt with the diathetic factors at work in acute anterior poliomyelitis and has described very graphically the way in which men armed with shot guns were told off in 1918, to bar the entrance of children under 16 years of age into the villages so that the epidemic might be kept down. No importance was attached to the sporadic way in which the condition would affect only one member of a large family, until it became recognised that the victims all seemed to present similar features, such as broad faces and had a "large and healthy look". A further feature that was noted was that in 60 - 70% of the afflicted children,

there was a more or less wide separation of the central incisor teeth.

A similar predisposition to pneumonia has been noted in some families. Thus Raymond Pearl (62) records a family history in which there is an obvious lack of resistance to pneumonia, which appears regularly for five generations in the direct line on the father's side. The preponderance of males to females (given by Draper as 5 to 1) who contract the disease also seems to indicate the influence of the constitutional make-up in predisposing to it. Whether this ratio is altogether explained by the greater exposure of males, I should be inclined to doubt. (64)

That bacteria are not so specific^{as} is usually thought has been suggested by Hamer (65) and Crookshank (66 & 67). They agree that conditions usually considered distinct - "the catarrhal group of diseases" which include influenza, cerebral-spinal fever, acute poliomyelitis and encephalitis epidemica are really epidemiological variants of the same morbid process. Writing in 1924 Hamer (68) wrote "Surely we may recognize the protean influenza now merely in mufti but changing from one civilian garb to another under our eyes, and demonstrating unmistakably that the more it changes the more it is the same thing." His attitude, however is more that the organisms themselves vary to produce a changing disease picture.

From a different point of view Knott and Spencer-Payne (69) have suggested the same lack of specificity of organisms, while stressing the local tissue resistance. Working on

streptococcal infections of the roots of teeth, they conclude that the systematic and metastatic infections depend more on diminished local resistance than the actual streptococcal strains. The work of Glover and Griffith (70) seems to suggest the same possibility, for they conclude that an affection of the throat with haemolytic streptococci, may lead to one of several sequelae: → a symptomless state, which is a 'carrier' state; tonsillitis; feverish catarrh or pharyngitis; scarlet fever; while the three latter conditions may be followed by otitis media or acute rheumatism.

Similarly one finds when there is an actual outbreak of scarlatina, that in addition to the definite cases, there are the "formes" frustes" among the typical ones, where a mild fever is associated with a sore throat, but without a characteristic rash and a subsequent peeling, or there may be an odd case of a strawberry tongue and very little else.

Other observations which confirm this view of relative specificity as against an absolute one, are those cases in which a clinical state identical with scarlatina develops after burns or scalds or other infected wounds, in the absence of any epidemic.

The question of immunity is usually considered from the serological side, but it has been suggested that it represents the converse of idiosyncrasy. Idiosyncrasy is a form of chemical intolerance, but immunity is tolerance.

It may be that there is some relation between the failure in resistance to infections and the intensity of inner resistance that one meets in schizoid personalities, for immunity as Morley Roberts has said depends upon ~~the~~ assimilation (72) and this includes the faculty of assimilating both bacterial and psychological injuries.

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Chapter. 20.

THE PROBLEM OF MATURITY.

'Beyond Good and Evil' is the title of a study by Nietzsche. He says that there is neither good or evil, is present within our consciousness. How shall we utilize that power? For good or for evil? That determines health or illness. That our consciousness is very badly conditioned. Yes, it is. It is the source of both good and evil, yet it is neither.

What then is good, or evil? Beyond the matter the question. So long as we cannot deal with ourselves properly, we cannot deal with others. We are not to be judged by our own standards, but by the standards of the world. What is one man's good is another man's poison. We have every possible brand of good and evil, according to culture, to race, to nation, and to fashion. From this point of view my duty is ordinary and your duty is heterodox. Everybody who thinks differently from us will be damned. So the world goes on, getting more and more from certain down, and get climbing himself higher and higher to other down.

S.S. Pfeiffer: 'Nietzsche in Psycho-analytic

Medicine, p. 60.

'Beyond Good and Evil' is the title of a study by Nietzsche. He has seen that force, neither good or evil, is present within our unconscious. How shall we utilise that force ? For good or for evil ? That determines health or illness! Then our unconscious is very badly maligned. Yes, it is. It is the source of both good and evil, yet it is neither.

What then is good, or evil ? Everyone has asked the question. So long as we mankind dealt with conscious psychology anybody could make his own definitions, and everybody did. What is one man's meat is another man's poison, and we have every possible brand of good and evil, according to climate, to race, to custom, and to fashion. From this point of view my doxy is orthodoxy and your doxy is heterodoxy. Everybody who thinks differently from me will be damned. So has mankind come up, getting freer and freer from certain dogma, and yet chaining himself tighter and tighter to other dogma'.

S.E.Jelliffe: 'Sketches in Psycho-somatic
Medicine'. p.60.

Synopsis.

We tend to think of maturity in terms of the standards of our own individual speciality.

The enemies of maturity are various forms of addiction.

The relationship between health and insight.

The guiding principle to maturity is the resolution of the conflict between identification and detachment.

The health of the individual is bound up with that of the body politic, but the individual must even learn to bear responsibility for the deficiencies of society before he can find his own health.

Paranoia and schizophrenia represent psychotic reactions dependent on faulty 'detachment' and 'identification' mechanisms.

An ideal type of human development is assumed in the discussions of the biologist, the sociologist, the eugenicist and the psychologist, and in their different spheres much space is devoted to those factors that make for faulty development of the species. It is very much open to question whether this whole problem of the ideal is not based on quite wrong premises; but, at any rate, it is very obvious that in their several discussions there is implied the narcissistic belief that no man can be anything like ideal (or mature) until he approximates to those standards implied in each speciality; thus to the biologist he must be fertile and prolific, to the sociologist completely adaptable to the herd, to the eugenicist free from all hereditary taint and to the psychologist free from all neurosis. There is something obsessional and neurotic in all this insistence on conformity to an ideal, and no person can conform to all the desiderata laid down; in fact, if Herbert Spencer (1) is right when he suggests that fertility is inversely proportionate to individuation, or the philosophical psychiatrist when he suggests that conformity to reality within, as well as without, is the hall-mark of sanity, or the diathetist when he suggests that disease is implicit in personality, and that neurosis represents a phase of development, we should learn to see in better perspective the right place of the claims of the specialities in our everyday life. It is probable that their individual points of view have their own special validity, but these

must always be considered as a means to the individual's well-being and never as a final judgment as to his goal or destiny. There is so much of this fitting the individual into a scientific framework; it is seen in the undue respect for statistical, laboratory or pathological findings, but it is not absent from the bedside, the operating theatre or the psychoanalyst's consulting room.

When, therefore, we are considering the question of a patient's well-being in relation to a certain disease, say epilepsy or disseminated sclerosis, we may profitably say to ourselves:- 1) Why has this man got this disease? 2) What effect is it really going to have on his fullest well-being? and 3) What treatment is going to be most beneficial to him? In answer to the first question one might quite legitimately attribute causation to faulty germ-plasma injurious environment, but this is not the most fundamental answer that can be given. Disease and personalities are closely inter-related and there are reasons from the personological point of view why epilepsy affects one man, and disseminated sclerosis another. It is our primary business as physicians to help the patient to find out the answer to that problem for himself. As onlooker, I may be able to suggest ways of approaching the problem, but a bald statement of my opinion to the patient is going to have no beneficial effect on his insight, though my comparative inability to give insight will not prevent me from being attentive to his 'discoveries', nor from suggesting either

where they assume too much or too little.

In regard to the second question, it is well for us to realise that the patient's reaction to his illness is far more important than his deliverance from it, though we shall be reluctant to tell him so, for if he does not know this without being told, he will be probably be puzzled and annoyed, and if he does know it, he will not need to be told. The presence of illness does not preclude the manifestations of genius, and in fact, there is much evidence to make us think that there may be some sort of causal relationship between the two. Genius that is repressed may express itself in illness, or genius that is partly expressed may accompany illness, when fuller and more adequate expression of it might have definitely beneficial effects on its course.

This leads on to the third question. There are some medical treatments that have such obviously beneficial results that make their adoption unequivocal. Insulin for diabetics and liver extract for megalocytic anaemics immediately come to mind, but is anything else available for these sufferers? There is no chronic illness which may not be modified by correction of faulty subjective attitudes. It may be that in many diseases, no faulty attitude is apparent, but no patient is able to see himself so completely that he can judge of that without giving thought to the matter, and without the 'mirror-effect' of discussing the matter with an impartial, but trained and sympathetic listener.

Without being dogmatic and final, but tentatively, one would suggest that there is relative immaturity with any kind of drug-addiction whether it be to purgatives, tonics or sedatives. It is difficult to be absolute in these matters, but it seems probable, at any rate, that where the treatment of illness continues over many months, and takes the form pre-eminently of resisting death, that such treatment is not ministering to the patient's fullest welfare. One can think of exceptions to this, such as insulin and liver as mentioned previously, and there are others, but as a general principle I believe it to be true.

'Thou shalt not kill' but need'st not strive
Officiously to keep alive.

What is the relationship between health and insight? There are many disease-processes, such as acute infections, that run their course not entirely apart from influence from subjective attitudes, but at any rate sufficiently distinct from them as to make unnecessary any definite attempts at re-education during their progress, but more chronic infections may be markedly influenced by a re-consideration of attitude to ill-health, and this applies particularly to the vicarious situations where a child's life may be profoundly spoilt by a parent's wrong attitude. There is a very wide margin of error to be met with between the two extremes of neglect and over-anxiety, and no simple advice such as 'take care' or 'don't worry' is going to correct the faulty attitude. It needs primarily a con-

sideration of the two paradoxical attitudes of identification and detachment, before the middle way can be attained. The far-reaching effects of those two tenets cannot be realised without knowing more about danger than most of us are willing to face, involving, as they do, complete stripping of all privilege and defence, as well as the complete acceptance for oneself of all the penalties that may come from our apparent 'irresponsibility'. This is no easy way, though eventually it alone leads us to the goal of our development - our sanity and our health, but it is the way of acquiring insight and the way of avoiding perpetual invalidism, even though it may be the way of suffering.

There is a health of the social organism as well as of the individual, and many of the latter's handicaps are inherent in the social organism. In so far, however, as both the individual and the society are growing organisms, both may find renewed health at deeper levels of integration.

The first requisite for health is individuation; that is to say, the complete acceptance of all that is involved in being an individual. This implies at the beginning a willingness to believe oneself in the wrong. Life has a very strange way of making us wrong, even when we have taken very great pains to put ourselves right. There is no more difficult thing to learn than the willingness to be wrong, and to take all the consequences for being wrong, but bound up with the Socratic maxim to 'know thyself' is

the discovery that insight proves us wrong, and that the chief virtue is self-knowledge. The secondary virtues will follow in their own way and time, but their pursuit at the expense of the primary one, will, of necessity, lead to paranoid reactions of various forms, and also prevent us from appreciating the sweetness of the other virtues. It is part of our social inheritance that makes us suspicious of other's wrong when we should be suspicious of our own right, of other's insanity, when we should suspect our own sanity, of other's vice when we should suspect our own virtue. It is only this realisation of the self's wrongness that can deliver us from the dictator attitude to life, and make co-operation with other people a practical necessity. Dominance and recessiveness are very real qualities in the sphere of genetics, but they have their validity still more in mental attitudes. We can only be individuals by accepting the full responsibility for feeling, thinking and doing all the things that make up our experience, but the effect of this must inevitably be to make us, in some sense, dominators of those around us. It is good for us to find our independence, but it is supremely necessary that we correct this by learning the opposite qualities of recessiveness, subjection to the authority of others, and extreme dependence on the coherence of the whole. We shall probably find the relevance of all this in pituitary syndromes, but for the present we may only note the possible connection, and suggest the relevance of these

genetic conceptions to the field of social behaviour. There are whole spheres of pathogenicity implied in the family attachments of the middle classes, accounting for many dementias, abiotrophies, and familial diseases. Ancestor-worship is as real in the West as in the East though we are less conscious of it in this part of the world than in the Orient, because we are not so avowedly religious about it. The principle of detachment is supremely important for that group of sufferers from epilepsy, diabetes and disseminated sclerosis, but it is also important for the chronic alcoholic, the drug-addict, the doctor-addict, the anxious neurotic and the obsessional.

It is in schizophrenia pre-eminently where we see the need for identification with the material world of people and their coarseness, but there is a scientific form of schizophrenic attitude which can be impressive without being fertile, and its chief effect is therapeutic nihilism, leading to a devotion to the cause of science without a concern for the welfare of the individual sufferer. This is extremely common in some psychiatric schools, but it is not absent from many branches of so-called scientific medicine. Generally speaking, the surgical type of mind is objective and paranoid, while the medical type is dilettante and subjective. It is obvious that we cannot all be surgical or medical specialists, but we need something of both types to make us balanced, and our maturity as physicians depends upon the inter-locking of these two anti-

thetic qualities.

It is characteristic of the embryological development of species that the processes of integration and differentiation proceed *pari passu*, and it is probable that cancer represents a phase of growth in which differentiation proceeds without integration. There is a very close similarity between this process, which probably has its counterpart in the mental development of those sufferers, and the intensive specialisation of today in which there is inadequate integration with increasing knowledge. What are the checks which are imposed on the growing organism, so that differentiation does not outstrip integration? It is partly a relationship between time and potentiality, in the sense that all forms of special function are dependent on the finding of suitable environmental milieus for each successive phase by the hereditary or autogenous functions. The question as to whether acquired characteristics are transmitted is largely one of definition, for there is no environmental influence without its effect on the germ-plasm, but no influence can be exerted by the environment without the plasticity of the germ-plasm, and in that simple embryological situation we can see mirrored all the potentiality of development within the subject-object relationship of time and space. That growing relationship is peculiarly subject to its own inherent restraints so that it is questionable how far external restraints need to be imposed upon it, for we may too consciously direct the sum of our energies to certain ends, and exclude the unconscious factors

so that we achieve a sort of schizophrenia that will eventually prove our undoing.

The mature individual is a growing individual: but fixation is immaturity, and so is hurry. There is something inevitable about growth, and if we are too conscious about it, it will take unhealthy forms. It is necessary, therefore, that we accommodate ourselves to this polarity of rest and activity, of permanence and change, of genesis and evolution. In some ways, disease is a manifestation of what we will not allow ourselves to be conscious of: auricular fibrillation is the heart's response to our impatience, rheumatoid arthritis to our need for rest and an indication of our fixation, parkinsonism an indication of our rigidity and epilepsy of our fitfulness. The time-relationship is of supreme importance in these different conditions.

The problem of responsibility is intimately connected with our disease-potentiality. Large sections of the population will accept no responsibility at all for their various ills. The state pays for their medical attention, voluntary hospitals give them surgical and other aid, and the preventive medical services assume responsibility for infectious diseases and other ancillary eventualities. We know, of course, that there is something absolutely right about this assumption by the corporate body of responsibility for the individual, but there is **also something** wrong about it, when it encourages the individual to project his responsibilities away from himself. It belongs to our mat-

urity that we should include within ourselves the antithesis of complete personal responsibility for being all we are, and at the same time the realisation that our destinies are dependent on cosmic forces quite beyond our control.

This problem of responsibility is intimately bound up with what may legitimately be expected of us for others. How responsible am I for another's welfare? I am to be so completely identified with the welfare of my neighbour that I will dress his wounds and take him to a safe place for lodging, but there are obviously many things I cannot do for him, especially that of getting him to accept his responsibility for being as he is. What we are to others depends supremely on what we are to ourselves. If we are too concerned about our own welfare, we shall have no regard for that of others, or if we are not concerned enough about our own welfare, we shall be so full of good works that neither ourselves nor our neighbour will be able to see the necessity for that something more important in attitude that brings sanity and health.

The phases of integration and differentiation in embryological development have their counterpart in the synthesis and analysis of mental experience. Just in the same way that the germ-plasm has in it the potentiality for perpetuating the race by means of the further separation of germ-plasm from that which is gradually going to be the new individual, so in mental life there is this cleavage of that which is racial and that which is personal. It is Jung's

description of the racial unconscious that constitutes his main contribution to psychology. The ascent of man is implicit in the process of synthesis and integration, but it is none the less implicit in the process of analysis and differentiation, for the fullest integration includes differentiation. Similarly, the ascent of man implies a descent to the levels of previous history, where human development recapitulates the history of the race. What evidence have we for the truth of this? Apart from one's own personal experience, which is the most convincing to oneself, there is the whole wealth of evidence from dream, hallucination, fugue, and 'déjà vu' phenomena, as well as the less substantiated, though probably none the less valid, evidence from instances of possession and curse. In the confusional psychoses pre-eminently there is frequently an abundance of phenomena that are to be explained most satisfactorily as instances of racial recapitulation. The terrifying hallucinations of delirium tremens have racial significance, as well as a symbolic one, and many delusional systems may be similarly interpreted. We can also say of them, however, that with assimilation they will be integrated into the groundwork of personality. It is partly the exclusion of such experiences from consciousness that makes them terrifying, for to deny the validity of any super-sensory experience is to lay ourselves open to frightening disillusionment. Many people pass through this experience in the mental hospital and ascribe their experiences to the

Wrath of God, or say that God is angry with them because they have committed the unforgivable sin. These experiences represent a contact with reality that may not be considered normal or sane, but they are none the less expressive of a cosmic awareness that is very real to the person undergoing the experience, and are, at bottom, protests of the deepest aspects of the self against its former puritanical and rigid outlook. Such experiences represent a growing towards a more enlightened maturity, but are in themselves some distance in time from this standard of maturity that we are trying to define. It might be asked 'but is there no sort of physical health without this kind of shattering experience that you describe?' The answer on all sides is 'Yes, of course.' The work of the world is carried on by butchers, bakers and candlestick makers who make no complaint usually of physical ills, and yet who know nothing of the sort of psychotic experience that we are here describing, and further, there are many maladies frequently considered intractable that are capable of complete relief without any of the sort of purgatorial experience here defined. We need to be very careful in our standards of maturity that we do not try to mould others to the pattern of our life, but rather to be ready to stand back in some sort of aloofness from the intensity of our experience, so that even though we may contribute from its store, in order to help others to interpret the events that make up their everyday life, we may avoid fastening on to them

a level of experience that does not in fact belong to them. Maturity for a doctor must inevitably be a very different thing from that for a butcher, and it is not for us to be too rigid in our ideas as to what must constitute another's destiny. This also involves caution in the use of the word 'cure'. If patients choose to say that we have cured them, that is their responsibility, but we ourselves should be very chary in the use of it. We are not all surgeons who can remove an organ and then talk of radical cure of its ills, because illness must always be more and more considered as a focal representation of a faulty attitude to life, and extirpation of tissue makes little or no difference to that, though this is not to say that there may not be a place for such surgical intervention; but we shall, if we are wise, talk less about cure than is customary when such operations or other remedial measures have been carried out.

When we are considering the whole range of illness that is met in the practice of medicine, it seems almost impossible to reduce every disease-entity to a wrong mode of life, and there are so many conflicting facts to account for, but we may notice the following antithetic principles:-

- 1). Similar modes of life seem to produce very different disease-pictures.
- 2). Dissimilar modes of life seem to produce the same disease-picture.

It is true, for instance, that the obsessional neurotic may have few or no physical symptoms, or he may be a drug

addict, or have a duodenal ulcer, but it is only our failure to appreciate the different reactions that may be made to one series of unpleasant afferent stimuli, that prevents us from seeing on the one hand the relatedness of apparently different effects, and on the other hand, the unrelatedness of apparently similar effects. This may be illustrated supremely well from the agitated melancholics: there you have the reaction of agitation to a more fundamental emotional state, and nothing but a new attitude to melancholia is going to change that condition, for agitation prolongs melancholia, and no melancholic can ever get better by mere agitation. If only we would learn to be patient with ourselves and with our patients we should find far more often than we do, where is the through-way. Without laying down hard and fast rules we may suggest some of the following guides to a growing attitude towards maturity:-

- 1). Is suffering making the patient bear more or less responsibility for life ?
- 2). Does he or she tend to expect more or less from the physician in attendance as time goes on ?
- 3). Does the patient's faith in drugs increase or decrease ? and does he know far more than he ought to do about the values of, and indications for, different modes of therapy ?
- 4). Is surgery contemplated too easily and too frequently, or is it shrunk from too much in horror ?
- 5). Are drugs considered too much as normal necessities

for life ?

- 6). Does sex show itself to be too important either in aversion or eagerness or both ?
- 7). To what extent do the patient's sufferings rule the routine of those around him ?
- 8). To what extent is life visualised in material and non-material terms ?
- 9). How far is suffering making the patient's interests widen and deepen - as for example in the appreciation of the arts, literature, music and science ?
- 10). Does the religious attitude become less religiose ?
- 11). Does the patient's attitude see any sort of relevance to its own problems of the facts of the Sovereignty of God, the divine origin of evil, and the inevitability of sin ?

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Chapter. 21.

THE END AND THE MEANS OF TREATMENT.

"To be a member of a crowd is an experience closely akin to alcoholic intoxication. Most human beings feel a craving to escape from the cramping limitations of their ego, to take periodical holidays from their all too familiar, all too squalid little self. As they do not know how to travel upwards from personality into a region of super-personality and as they are unwilling, even if they do know, to fulfil the ethical, psychological and physiological conditions of self-transcendence, they turn naturally to the descending road, the road that leads down from personality to the darkness of sub-human emotionalism and panic animality. Hence the persistent craving for narcotics and stimulants, hence the never-failing attraction of the crowd."

Aldous Huxley. "Ends and Means".

Synopsis.

The healthy physician brings to the sick patient not merely remedies for the treatment of disease, but also insight into the motives underlying its genesis. His treatment should always be subservient to the patient's fullest maturity, and this means greater regard than is usual for the sense of ends and means.

The orthodox medical outlook of today is concerned far less with the treatment of the individual than with his disease. This is the supremely typical medical fallacy which illustrates the prevailing confusion of end with means. What is the point of getting well when we are ill? There is, of course, some meaning in every experience that befalls us, but that is not a sufficient reason for us to continue the same mistake year in and year out, whether as patients or therapists.

Illness is, in general, due to a wrong way of living: that does not commit us to the obsessional attitude that we can avoid illness, any more than it means that illness cannot serve any useful purpose. We can believe that our illnesses arise from faulty attitudes to life, and at the same time realise that our attitudes are evolving things consequent on our experience, and the things that it has to teach us. Insight into one's subconscious motives is no guarantee of perfect physical health, any more than it will safeguard us from the cyclothymia that accompanies pleasure and displeasure, but it will prove to the individual that there is some new reaction to the circumstances, which will thereby become modified. We have ^{hardly} ~~not~~ begun to see the full meaning of this in practice, and I have no intention of suggesting just what measure of health through insight is possible for chronic arthritics, bronchitics, or arteriosclerotics. The main thing we can do, only if the patient is willing, how-

ever, is to help him to see what mistaken outlooks have brought him to his present unwell condition, and to allow him to make the necessary adjustments for himself, without promising anything in the nature of physical amelioration. In other words, the patient's reactions to illness and life generally are of far more significance for his fullest welfare than the mere prescription of drugs for their alleviation. It is, of course, more than likely that many physicians will feel no sort of urge for taking such a view of their responsibilities. This is a matter of individual consci^{ence}ous, and no one can lay down dogmatic rules about it, but unless the physician is going to use his psychiatric eye, and the psychiatrist his 'somatic' eye, we shall not realise the full possibilities that are available for helping the patient. It is quite unnecessary to be moralists in this matter: we are called upon primarily to help our patients, and if we are going to let them use us for their neurotic ends we are not giving them the help they need. It may be argued 'but surely I am here to carry out the patient's wishes, and not to be his mentor'. If the morphomaniac only wants morphia from me, it is my responsibility whether I decide to give it to him or not. I can believe it to be quite legitimate to give it to him if he has the situation explained to him as fully as possible. It seems to me quite legitimate for a patient to have the right to take his life or spoil it if he wishes so to do, though the state will not take that attitude if it

finds that we have been too lax in our supervision, and part of our responsibility is undoubtedly to dispense the prescriptions of the state, as well as to prescribe.

There are different degrees of responsibility that may be expected from a patient, depending partly on his age, but also on his intellectual and emotional development, and the less responsibility the patient will take, the more the physician has to take. This need not allow us, however, to forget the end and the means, for surely our most comprehensive end is to serve the patient's fullest maturity, and let all our treatment be subservient to that end. This imposes on the doctor far greater strains of resource than can be comprehended in terms of text-book medicine, for it is continually calling on him for adaptability, new outlooks and collaboration with colleagues. One man's experience is not sufficiently wide to make him competent for every medical situation, but it usually brings him into some sort of contact with those people who are able to make up for his own particular deficiencies.

Our medical treatment, then, is usually but a means to meet the patient's immediate physical needs: if we would be anything like 'complete physicians' we must know something of the relationship between motives and disease, and according to the patient's ability to respond, help him to differentiate false from true and usually to choose longer rather than shorter ways of 'bettering' himself.

It is not true to say that I can only serve the

patient in the way he wants me to serve him, for he usually does not know what form of service we may give to him, and if our resources include a philosophy that has been taught us by life's adversity we have more to offer him than the newly qualified, fully primed in recent advances. There is a regressive attitude manifested by this thirst for the latest form of treatment. It sounds so modern and competent, as well as being industrious and complete, but it derives really from the physician's own sense of insecurity. The fashions of medicine are as interesting to us as other fashions are to womankind, and probably both as dispensable and indispensable. It is important that we should be alive to new changes in fashion, but let us not so lose our perspective that we see it as an end in itself. What applies to the whole range of medical fashions applies with equal validity to specialised forms of treatment. There is no sphere of medicine which may not be enlarged and enriched by the specialist approach, but we are very easily led to a wrong sense of the fitness of things, if, in our specialism, we forsake the humanitarian considerations and lose the patient in our detailed examinations. It is very necessary to emphasise just now that radiological examinations may do harm, as well as laparotomies, hysterectomies, oophorectomies, nasal resections, sympathectomies, and amputations, not merely because they do not relieve the symptoms for which they were carried out, but because they have confirmed in error what was already in error before the examination or

operation was performed. It is not necessary to go into details about actual cases, but any physician of experience can tell of this sort of confusion of end with means which makes such procedures possible.

In the lifetime of any one individual there are many crucial events which lead on to new phases of experience, but there is one most vital that enables the individual to find his selfhood. It is related to sex, but is more a metaphysical problem than a physical one. Its importance cannot be adequately defined, though one can say of it that in the intensity of the experience of which I am speaking, it represents the most hellish kind of happening that can be imagined. It is the reality of this that leads Freud to speak of the 'death instinct', but its very reality has a horrible fascination for us, and its very inevitability has an irresistibility that makes argument and struggle futile. But this is not an end in itself, as Freud might encourage us to believe: it is only a means to new sanity and new health. The crossing of that abyss holds within it tremendous potentialities for our own welfare, but also for the welfare of others. At that point in our pilgrimage the metaphysical is reconciled to the reality of earth, heaven and hell, and hallucination fuses with thought. Before that gulf is crossed there is cyclothymia, schizophrenia, confusional psychosis, and hysteria, but the integration of that experience within the psyche makes up the whole. It is quite wrong to think, as the Freudians tend to make us think, that sex is

everything, but it is supremely important to include it within the entirety of our scheme of things. It is in our exclusiveness that we show our partiality and our schizophrenia. We are condemned by what we leave out of our scheme of things rather than by our wantonness.

According to the catechism 'the chief end of man is to love God and enjoy Him for ever', but that does not mean only the enjoyment of positive experiences, but also negative ones. It might be considered neurotic to speak of enjoying suffering, but one can enjoy it in retrospect, even though its presence at the time makes all enjoyment impossible. The chief end of man is to enter into the totality of experience so that his life may be most enriched. This involves the reality of ~~change~~^{change}, the polarity of experience, the antithesis of paradox and the reconciliation of creatureliness with perfection. We do ourselves and our patients a great wrong when we minimise the gravity of life, but we do both a greater wrong when we seek to alleviate the ills of our patients too cheaply, and one of the biggest things we have to ask of them is to accept responsibility for being ill and getting better. We can help them most, only when they have accepted that responsibility. This is quite different from telling them that they must pull themselves together and snap out of it! It is much more subjective and passive than that, though it will have objective and active consequences.

The chief end of man is enjoyment, but he cannot

really enjoy, until he has known sorrow. As Heracleitus (1) said, "Men would not have known the name of justice if there were no injustice". "It is not good for men to get all they wish. It is disease that makes health pleasant and good; hunger, plenty; and weariness, rest." He cannot really enjoy virtue until he has loathed vice and found both these in himself. The pursuit of the dowager virtues of truth, beauty and goodness only becomes real when we have known their opposites.

The chief end of man is to love, but he cannot do this until he has found through hate the detachment of mature love.

Does the end justify the means? The answer to that age-long question is 'Yes, if the end is big enough', but so often it is used by the aggressor to justify his tyranny, and by the ambitious to justify their acquisitiveness where personal gain is sought at the expense of another's loss. It is never real justification to explain or excuse, but only to accept all the consequences for any evil in which it may fall to our lot to take part, in order that vindication may establish itself apart from any effort of our own. The development of the individual life in its fullest expression demands the sacrifice of every ambition and every natural desire, but their death is followed by the natural resurrection in time and space of every legitimate impulse and lofty aspiration.

Summary of Conclusions.

There is a continuity in all life, connecting species with species and genera with genera. Out of the struggle for personal integration emerge different types of personality, with their varying disease-potentiality. Some of this expresses itself in overt disease, but much of it remains latent in the organism as in the recessive characteristics of Mendelian heredity, appearing only where it is reinforced in the germ-plasm after fertilisation with another strain carrying the same latent potentiality.

The ascent of man from the primeval slime involves a basic differentiation into the sexes, a differentiation of function, which is an index of psychological maturity, and a social differentiation implying his capacity for life in organised society.

Diathesis is a conception of disease-potentiality that has run through the history of medicine for many centuries, but in the light of present day genetics and psychiatry may be said to comprise all that is latent in personality for good or ill, for disease or health, for insanity or genius, for high destiny or ignoble fate. Between the emergence of the individual from the fusion of male and female gametes up to the formation of a person of one specific sex, there are countless actions and reactions involving endocrine influence from the parent, ectoderm, mesoderm and endoderm differentiation in the blastula, with the gradual emergence of specific

organs with specific functions, most important of which are the individual's own endocrine glands which in their various actions and reactions with each other and the rest of the body, to some extent determine our disease-potentiality.

The emergence of individuality from this gradually increasing somatic differentiation is largely determined by the kind of sexual differentiation which underlies types of attitude. That is to say that on the somatic side, tissue response, acid-base equilibrium, dysrhythmias of all kinds, proliferations, and inflammations may be regarded as instances of partial dysfunctions of male and female elements, while on the psychological side these changes have also their significance: growth being regarded not so much as a constant increase of tissue in all directions, as a phasic process in which male and female elements are not always in equilibrium.

Perhaps the most conspicuous example of this is to be found in the activation of vagotonic properties during the analysis of sympathicotonic individuals, though in *and the partial vagotonia of the depressed phase of cyclothymia* the vagotonia of schizophrenia, *as by over-balancing the visceri-vagus mechanism or* sympathicotonic measures, *or* by convulsion therapy, is known to be of tremendous value.

The fullest measure of health is to be obtained by the smooth cooperation and the healthy tension of antagonism of the parts of the autonomic nervous system, which both depends and is dependent on the coordination of the endocrine system and can only be attained by the individual's

proper use of the self. It is to this task that the medicine of the future will increasingly be called.

In philosophical language this may only be secured by that correlation of ends with means, which is reconciled to conflict; by that learning of the truth of the paradox of identification and detachment, and lastly by the full reconciliation of the subjective with the objective self. This may be expressed in psychiatric language by likening ego-centric (subjective) individuals to schizoid, introvert types and altero-centric (objective) individuals to cycloid extravert types, but these types stand pre-eminently for the partiality of schizophrenia and the thorough-goingness of the cyclothymic. Health and sanity consist in the reconciliation of these two apparently opposed ways of life.

On the somatic side, schizoid types are characterised by such under-developed physical types as those of thymic subinvolution, eunuchoidism, hypoadrenalism (with lymphatism) and hyperinsulinism, while cycloid types may be found in hyperthyroidism, hyperpituitarism, hypergonadism and hyperadrenalism. At the same time one should bear in mind that a preponderance of one glandular function will in time be followed by other preponderances due to the inevitable law of action and reaction.

On the psychological side, the basic characterisation of these two types may be further categorised into
I. Introvert, a) sensation, b) thinking, c) affective,

emotional or feeling, and d) intuitive types, and
II. Extravert, a) sensation, b) thinking, c) affective,
emotional or feeling, and d) intuitive types. The former
tends to undershoot the mark, and the latter to overshoot
it, though in both cases the law of action and reaction
makes it sometimes difficult to decide whether a certain
kind of conduct is more typical of one basic character-
type than of another. As an example of this may be cited
the catatonic stupor followed by excitement in the
schizophrenic, which can be closely paralleled by the
depressive and manic phases of cyclothymia.

The importance of the study of diathesis to the
problem of neurosis, is largely determined by the somatic
effects through the vegetative nervous system of
unwillingness to accept the negative phases of depression
in the basic cyclothymia of normal life - which is so
closely related to the periodicity of most functions,
and is probably reflected through diencephalic mechanisms
through the pituitary and thus through the whole endocrine
system. It is by some such mode of action that one has
to explain the somatic effects of mental attitudes.

Coming to the manifestations of diathesis in actual
disease-states, one has rather to work from effect to cause,
and bearing in mind the following data, to apply them
seriatim to each disease group:-

- 1). Relation to acid-base equilibrium.
- 2). Relation to sympathetic-parasympathetic axis.

- 3). Relation to endocrine ^Ycorrelations, through anthropometry and ^Ycorrelation of actual endocrinopathies with somatic disease.
- 4). ^YCorrelation of mental attitudes with disease-manifestation.
- 5). Investigation of hereditary factors.

From the anthropometric examination important deductions may be inferred from the following data:-

- 1). Growth in length or height is an expression of dolichomorphy, in which the differentiating principles of adrenal cortex and gonad are relatively under-active, though similar pictures may be derived from thymic subinvolution.

This is found pre-eminently in the asthenic habitus, which is associated with the schizoid type of mind, and on the somatic side, with tuberculosis, gastric ulcer, hyperthyroidism, visceroptosis, Addison's disease, eunuchoidism and Simmond's disease.

- 2). Growth in breadth is an expression of brachymorphy, which is marked by increased differentiation. This is apparently facilitated by precocious pineal involution which allows hypergonadism to assert itself along with increased adrenal cortex activity. It is found pre-eminently in the sthenic habitus along with the cycloid temperament, and probably represents a greater potential maturity than that of the schizoid asthenic habitus. On the whole it is found in persons actually older than

those representative of the former type, though expressions of both phases of growth may show themselves in any individual through the years. Cycloid types are found pre-eminently in hypertension-nephritis groups, some osteo-arthritic groups, especially associated with the menopause, gout, myxoedema, acromegaly and pituitary basophilism. Part of the difficulty of believing in the validity of any doctrine of diathesis has resided in the fact that the subject defies exact definition, and as clinical medicine so often fails to produce the "classical case", still more does the conception of diathesis disappoint those who want neat tabulation and scientific exactitude.

It is difficult to escape the conclusion that schizoid types are predisposed to schizophrenia chiefly by virtue of their exclusion from consciousness of certain disagreeable forms of experience, and that the cyclothymia of cycloid types represents a phase of experience which of itself, if given suitable environment, will even itself into the more normal equilibrium of the mature individual. In this view then, schizoid types and cycloid types tend to show the following differences:-

Because schizoid types have much greater reservation to life in its entirety than the cycloids, they are more prone to allergic phenomena and infections because the essence of maturity is assimilation, and that is pre-eminently what the schizoid type of person is unwilling

to risk. Such individuals are prone to pituitary disturbances, with roofed-in sellae turcicae, symbolic of their fundamental attitudes, seeking the sort of protection that prevents their growth. This may be compensated by all sorts of "rational" activities, such as philosophical speculation, or mathematics, or law.

The cycloid on the other hand, while he retains something of the spontaneity of feeling, may by his own energy come up against the kind of embarrassing situation which either gives him no retreat and puts him in disgrace, or else forces him to put on the brake of his libidinous outlets, which eventually may lead to high blood pressure, chronic interstitial nephritis, cardiac hypertrophy, cerebral haemorrhage, and other vascular accidents. Other conditions brought on by a similar mechanism are Parkinson's disease, Paget's disease (osteitis deformans), epilepsy associated with arterio-sclerosis and other convulsive episodes of later life. Gall-stones and menopausal osteoarthritis occur in similar types of individuals but at earlier stages in life, than those mentioned. While pernicious anaemia occurs in those of sthenic build, there is usually a marked difference between them and the more typical cycloids. They are people whose attention is so fixed on the means of livelihood that they are neither so able to enter life with all the energy of the cycloid, nor so fixed in their own inner security as to prevent them from coming into fairly normal contact with objectivity.

Duodenal ulcer individuals usually find themselves compelled to throw themselves into life in an objective kind of way, just because they are not aware of their own inner need for rest, poise, relaxation or idleness. Gastric ulcer individuals, however, fail in that there is much more inward sense of anxiety than that found in duodenal types.

Mention has been made of the thymo-lymphatic habitus and of its association with hypo-adrenalism, visceroptosis, and hyperthyroidism, but another important axial relationship is that between thyroid and parathyroid. Of all the philosophical conceptions related to endocrinology, none is more important than that which is connected with time. We know, for instance, that thyroid hyperfunction is associated with an increased rate of cell metabolism and oxidation, and that parathyroid insufficiency is accompanied by slow growth of bony structures, a positive calcium balance along with the deposition of calcium in arterio-sclerotic plaques, calcified nodes in lung and glands, and in the calcification of encysted deposits. There is an antagonistic relationship between the acute hyperthyroidism of fever and the chronic hypoparathyroidism of such long-standing diseases as pulmonary tuberculosis and any condition leading to cachexia, with the accompaniments of myotatic irritability, poor calcification of bones, increased reflexes, asthenia, tendency to spastic contractions, increased sensitiveness to stimuli and increased rapidity of response. Putting it another way

one might say that the cell oxidation provoked by thyroxin was to some extent restrained by the retarded transmission of impulses through calcium mobilisation affected by parathormone. It seems as though the thyroid-parathyroid axis was very intimately concerned with the facilitation-inhibition periodicity of normal muscular activity, which is associated on the one hand through thyroid activity with shift of acid-base equilibrium to the acid side and through parathormone to the alkaline side, the one being associated with the breakdown of amino-acids to CO_2 , H_2O , and $(\text{NH}_2)_2\text{CO}_3$, which latter is transformed through parathyroid activity into urea. Thyroid therefore leads to the destruction of cell-proteins, while parathyroid secures the elimination of such breakdown products. Thyroid facilitates oxidation, while parathyroid facilitates calcium deposition. These represent both the conserving functions of the organism, and their destructive ones, their anabolic and their catabolic ones.

The vegetative nervous system, through the sympathetic also serves the catabolic function, and the parasympathetic the anabolic.

Maturity represents the synthesis of these contradictory functions, that run through all life, like maleness and femaleness, conservation and energy, or sleep and wakefulness.

Medicine over the last 30 years has undergone a tremendous transformation. No longer is it the mere description of the disease in terms of pathology, diagnosis and treatment, but it is rapidly becoming so interwoven with everyday life that as Sir Robert Hutchison has suggested, we should call a halt to this endless preoccupation with the minutiae of disease and try to stand back, as it were, to regain our perspective. For the greater part of 5 years the present writer has by force of circumstances had to change his busy life of looking after sick people, for the much less immediately satisfying one of quiet reflection on medicine in relation to life as a whole. In many ways this has led to a reconsideration of the theory of medicine, as apart from its practice; its philosophy, as apart from its science, and though such formulations are not so concrete as clinical descriptions, he believes that they will prove of interest to all those who want to know what lies "beyond the looking-glass." The study, then, has brought the writer to the following conclusions:-

- 1). Disease has significance for the patient, greater than the study of its pathology has for the physician.
- 2). Such significance resides in the past history, but has also something to say about the future.
- 3). Psychiatric modes of examination will be of increasing value to those who are interested in

the relation of effect to cause.

- 4). Our present increase of knowledge of hormones is providing us with the link between physiology and pathology.
- 5). Treatment in the future is going to be much more a concern for the psychiatrically trained than appears at present.
- 6). A more dynamic approach to illness is emerging, in which our attention will be devoted more to the evolution of health and sanity, than with the static preoccupation with a diseased person.
- 7). This will involve, therefore, a concern for the following desiderata :-
 - a). Psychiatric History.
 - b). Growth History.
 - c). Developmental indicators.
 - d). Family History.
 - e). Clinical History.
 - f). Clinical examination.
 - g). The attempted orientation of nature and nurture to endocrine factors.
 - h). A definite policy of follow-up over some years.
 - i). An attempt at evaluation of the illness in terms of the personality of the patient.
 - j). The successful application by psychotherapy to meet the patient's need, both as a social unit and as an individual.

k). As far as chronic ill-health is concerned,
 at any rate, an attempt to reduce drug
 treatment to a minimum, and to foster in the
 patient more self-reliance, *and greater insight.*

The present work began as a clinical and anthropometric
based study largely on actual observations made during the years
 1928-1932, but as the full significance of those facts has
 not yet made itself apparent, the writer has omitted any
 detailed reference to them in order that the more general
 and philosophical aspects, which have assumed for the
 present greater preoccupation, might be elaborated.

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The chief defect of the work, of which I am conscious, is its length, and for this I feel apologetic, though for the sake of clarity and consistency, I have not seen how to remedy many of the repetitions which abound in these pages. To its readers I crave indulgence!