GALEN'S
DE DIFFERENTIIS FEBRIUM
&
DE TEMPERAMENTIS.

Translation & introduction

by

John Ware.





INTRODUCTION.

From the days of Thales of Miletus (640 . 550 B.C.) first of Hellenic men to predict an eclipse of the sun, the seaboard and islands of Asia Minor have bulked large in the history of philosophy and medicine. At Cos in the southern third of this area, about the year 460 B.C. Hippocrates, the Father of Medicine, was born: at Pergamum, in the northern third, almost six centuries afterwards, Galen, not the least distinguished of her sons. In the interval between the two men the free states of Greece had fallen under the domination of Macedonia, and a curious blight seems to have settled on the intellect that had blossomed so freely in the fearless speculations of the Ionian school. Even earlier than Philip of Macedonia natural philosophy was to Socrates, who saw the downfall of Athens before Sparta, no more than a rational recreation; and though Aristotle, preeminent in biology as in philosophy was still to come, men's eyes were turning inwards, and metaphysics rather than physics occupied the intellectual energies of the Greeks. Platonists, Sceptics, Epicureans, Stoics in turn captured the allegiance of their generations and influenced deeply contemporary schools of medical thought; but the method of Hippocrates, careful, detached, passionless observation of phenomena, was not to fructify among his own people. Primus quidem ex omnibus memoria dignis ab sapientiae disciplinam hanc separavit. (Celsus) "Hippocrates first separated medicine from philosophy". It was not to the advantage of medicine that the two were reunited.

With the establishment of Macedonian supremacy a great physical as well as a mental change came over the Hellenic world. The menace of the East that had for a century and a half confronted the West was now removed. With Alexander the tide of invasion turned and rolled eastward. The eastern world was opened up and much of it was permanently if partially Hellenized. Oriental doctrines to some degree had their repercussions on western thought and in the smaller sphere of medicine a host of new drugs became available.

Under the early Ptolemies Alexandria was the Vienna of the ancient world. This was the era of the great anatomists Herophilus and Erasistratus (fl.300 B.C.), when it is probable that human as distinct from animal anatomy was practised; and though the school was declining by 100 B.C. its reputation was still great enough for Galen to study there himself two and a half centuries later, and to advise his pupils to go there also.

One by one the successors of Alexander fell before the advancing power of Rome and with the accession

of Augustus to the principate the centre of gravity of medicine as of all else had shifted to Rome. With the provision first of lecture halls and later of paid professors by the Emperors Rome became a teaching centre; and hither, attracted by the rewards of practice, flocked a crowd of physicians, mostly Greek in blood, but in doctrine diverse.

We have said above that the various philosophic schools profoundly affected medical theory; and it is impossible to understand the world into which Galen was born without at least a summary consideration of both.

The first body of Greek medical and quasi-medical writings is comprised in the Hippocratic Corpus. Now whatever else the Hippocratic Corpus may be it is certainly not entirely or even largely the work of a corporeal Hippocrates. In fact by some Hippocrates, like Homer before him, has been elevated to the dignity of a myth. However that be it is undeniable that the Corpus as a whole is the work of different men, different ages, and different schools. Jones, his latest editor, has suggested that the Corpus is the library of the Hippocratic school at Cos and that the authentic Hippocrates is to be found in such works as Prognostic, Regimen in Acute Diseases, Epidemics I & III, and, more doubtfully, in Aphorisms, Fractures and Wounds in the Head.

In these works what strikes one is the comparative absence of theory and the earnest search for an accurate recording of facts. Like an Edinburgh teacher of our own day the physician seems to be always saying "What we want is accuracy, accuracy is essential". Much of this work is case taking: progress notes in which everything important is jotted down without one superfluous word. Theory there is bound to be in any system of medicine but what medicine chiefly needed in the age of Hippocrates was facts and more facts on which to test the philosophic hypotheses. These are present but not prominent. The doctrine of the four elements earth, air, fire and water, had been a common-place since the days of the early Ionic School. The doctrine of the four humours, blood, yellow and black bile, and phlegm was no doubt in the air, but though Hippocrates is credited with limiting the number of the humours to these four Jones states that he cannot trace this limitation in any treatise earlier than the one on the "Nature of Man", which is not generally considered authentic.

Health was held to depend on the due blending of the four elements and their qualities, dryness, coldness,

heat and moisture, in the human body. Life depended on the innate heat, which was greatest in youth, waned in old age, and whose extinction caused death. Disease was caused by a disturbance in the proportion of the elements, but there was in nature a natural tendency to cure, and this was affected by the process of "coction" or digestion of the "crude" humours of the body while the physician waited on nature, whom he assisted by regimen and appropriate measures, mainly physical, and at the "crisis" either "coction" took place or the patient died. The importance of the "critical days" is a borrowing from the Pythagorean pholosophy of numbers. Climatic and meteorological factors were also of great importance. Such seems to have been the theory of Hippocrates; his actual achievement was to set Greek medicine on the pathway of the inductive method. We have now to see how his followers walked on it.

His followers, then, if they can be called followers of Hippocrates who diverged so far from the master's method, were termed by Galen "Dogmatists". Moon suggests that "Theorists" would better express their mental attitude. They adopted the humoral pathology but it has occurred to no one to dub as "Humorists" people who took themselves with such entire seriousness. Taking to heart a remark in the Corpus that the philosophic physician was the peer of God the Dogmatists turned to philosophy, and their choise fell on the "Timaeus" of Plato as their text book. Of this work, one which has at least the merit of attempting to view all phenomena as a connected, inter-dependent whole, Jowett says that it is of all the writings of Plato "the most obscure and repulsive to the modern reader, and has nevertheless had the greatest influence over the ancient and mediaeval world. The obscurity arises in the infancy of physical science, out of the confusion of theological, mathematical, and physiological notions, out of the desire to conceive the whole of nature without an adequate knowledge of the parts, and from a greater perception of similarities which lie on the surface than of differences which are hidden from view" .

He describes the Timaeus as "conjectural Astronomy, conjectural natural philosophy, conjectural medicine" - not, one would suppose, a reliable groundwork for the practising physician. That Plato himself regarded his work as anything more definite than a poetic fancy is improbable; and it would certainly have been for him a matter of mirth if he could have known that he, no admirer of the profession of medicine, was destined to become for generations the Osler of one of the Hellenic schools. Anatomy, apart

from bones and joints, had never been an absorbing interest of the Hippocratic school, but even so it is odd to read in the "Timaeus" that "the spleen, which is situated on the left side keeps the liver bright and clean, and the evacuations of the liver are received into it and, being a hollow tissue, it is for a time swollen with these impurities; but when the body is purged it returns to its natural size". (Jowett's Analysis) Yet we shall find that Galen himself is still steeped in the language if not the doctrines of the Timaeus.

The heyday of the Dogmatists was from about 360 - 300 B.C. Late in their history they turned from Platonism, their first love, to the pantheistic materialism of the Stoics, thereby originating the sect of the Pneumatists; but throughout they neglected one part at least of Plato's teaching and were more devoted to words than things. Argument replaced observation; the disciples of Hippocrates had reversed his teaching.

About 300 B.C., as we have said above, began the great age of the Alexandrian School, and here about 280 B.C. Philinus of Cos & Serapion of Alexandria, pupils of Herophilus and Erasistratus, taking their philosophic basis from the scepticism of Pyrrho (360-270 B.C.) founded as a very drastic corrective of the windy disputations of the Dogmatists the sect of the Empirics. Its most famous member was Sextus Empiricus, a late contemporary of Galen. Pyrrhonism was a state of philosophic doubt, and suspension of judgment the ideal. This system did away with everything external to the individual but retained all that which goes on within him. Sense perceptions were the interpreters of external phenomena and these were all one had. "We reject in nothing the evidence of the senses. We do not doubt e.g. that honey is sweet, but when it comes to examining the essential nature of sweetness we frankly confess our ignorance and point out the foolhardiness of the Dogmatist".

With these views the Empirics banished to the domain of the unprofitable the search for causes and the essential nature of disease. The thing was nothing; the phenomenon all. A disease according to him, consisted in a group of symptoms which always arranged themselves in the same way If one were permitted to dream of a cause one need never look further back than the immediate cause. Medicine was merely the science of the physical signs assisted by repeated observations and the exact history of the diseases. In treating unknown diseases

the Empirics had recourse to analogy, i.e. reasoning from the known diseases that presented the most similar features to the unknown. Hence the "Empiric Tripod" - observation; history, or the record of the observation of others; analogy.

The faults of the Empirics are obvious. They denied the possibility of a science of medicine based on anatomy and physiology. They refused to recognize, as Galen notes, the utility of a working hypothesis; and incidentally their practical bent and the growing commerce of Alexandria with the East led them away from the vis medicatrix naturae to the drug worship that has persisted ever since. On the other hand they did practise observation and an inductive method of a sort, and as Moon remarks, the Empirical School was more satisfactory in practice than in theory. Allbutt says: "And verily in the midst of later Alexandrian visions many of the sayings of the Empirics were refreshing; such as these, quoted by Celsus, 'A man does not become a ploughman or a pilot by argument but by practice'; 'It is not eloquence but remedies that heal diseases'; and the characteristic 'It is not what causes disease that matters, but what cures'." One who has translated two of the philosophic works of Galen may be permitted to agree.

The third medical sect in the world in which Galen's lot was cast, and his particular aversion, was the Methodists. This school was as closely related to the philosophy of Epicurus as the Empirics to that of Pyrrho. Epicurus, so far as he was a natural philosopher, based himself on the doctrine of atoms - a doctrine that goes, through Democritus and Leucippus, far back in the history of Ionic philosophy. But unlike the metaphysical atoms of Democritus and Leucippus, the atoms of Epicurus had weight, i.e. they fell vertically, and to avoid the consequent necessity of falling perpetually in a straight line Epicurus was driven to invent the "Swerve". Nothing existed but atoms and the void but out of these emerged the universe. In the first century B.C. Epicureanism was becoming popular at Rome, and in his noble poem "De Rerum Natura" Lucretius (who died in the year when Caesar first invaded Britain) preached it with the fervour of a religion. A little earlier in the same century Asclepiades, a Bithynian physician in Rome, first linked atomism with medicine, and thus Methodism may claim to be the one school of medical thought that had its origin at Rome. For Asclepiades the world is formed of irregular atoms divisible and changing; they are in promiscuous movement, collide, and by their friction give secondary origin to smaller particles. Man is a product of a fortuitous concourse of these atoms. Health and disease

arise from the movements of the atoms through the free spaces of an organism which has no inherent force of its own and no sympathies between its various parts. Its functions are performed mechanically. Digestion is merely a dissociation of atoms. Nature often works in vain; the organs are not designed for the functions they perform; chance rules all. The soul is the fine material that we breathe, which pervades the whole body, and which discharges its offices in the sense organs. Disease for Asclepiades depends on the mutual relations of the atoms to the interspaces or pores. His anatomy was rudimentary; his therapy mild; and his success enormous.

Themison, the pupil of Asclepiades, was the actual founder of the Methodist school. He was very little concerned with the causes of disease. What he was concerned with was what they had in common. Asclepiades had regarded the pores as interatomic spaces. Themison concentrated on the pores, which he said he had to postulate in order to explain sweating; and ascribed all diseases to two special causes-"contraction" or "relaxation" of the pores. As he found it difficult to fit all diseases into this Procrustean framework a third or mixed condition was conceded to the weakness of the flesh, though even then it remains obscure how his pathology applies to a broken leg. His classification also admitted of a division into acute and chronic diseases, and he further distinguished the three stages of the advance, the acme, and the decline. Treatment, therefore, for the Methodist was of a beautiful simplicity. First he required to know whether the disease was acute or chronic - most acute diseases resulted from contraction of the pores; chronic from their relaxation - and then for constrictions he gave relaxing remedies and for relaxations astringents. Of the first the principal were warmth, internal and external; venesection, diaphoretics, exercise and sleep: of the latter, cold, internal and external; wine, vinegar, alum, and all astringent applications.

Themison's contempt for the involved profundities of the dogmatists put him near the Empiric standpoint. On the other hand he differed from them in admitting a theory, however rudimentary, of disease.

It is to be remembered that for Themison one of our main authorities is Galen, a professed autagonist, and it is probable that in spite of Juvenal's jibe "Quot Themison aegros autumno occiderit uno" - his practice, like the Empirics', was better than his theory. At any rate, if Caelius is correct, they did not always square, for he is reported by that authority to have given cold water to

patients whom he had just bled: thus, on his own principles, applying therapeutic incompatibles. Moreover, for much of ancient medicine our information is either incomplete or prejudiced, and when one has heard Galen on the Methodists one has a purely human desire to know what Asclepiades, for example, who in a keen-edged phrase labelled the expectant treatment of the Hippocratean school as a "meditation upon death", has to say on the other side. As Eymin has well said "archaeologist and palaeontologist will strive in vain. With a frieze, a pediment, a few columns, a tooth or some ribs they reconstruct a temple or an animal: never this temple nor this animal".

Of Thessalus, who flourished under Nero 50 years after Themison, one is content to believe the worst. For Thessalus the aphorisms of Hippocrates were all lies; no one but himself had ever said anything worth listening to; and he would teach medicine to anyone in six months. One is not surprised to hear that he had a crowd of pupils, and was a great success "amongst those lazy and unintelligent souls of whom the bulk of a profession is always composed".

His chief claim to remembrance is that he was the author of the three day fast with which succeeding Methodists initiated the cure of all diseases. On his tomb he had inscribed "Conqueror of Physicians", a title that almost implies that he himself was none.

Lastly the Pneumatists. At least as far back as Heracleitus the notions of fire, air and life had been closely associated. Heracleitus makes no complete separation between the air and the vital flame. Our soul, a spark of the divine fire, is more intelligent the closer it comes to the nature of the divine fire. By respiration we become partakers of the intelligent soul of the world. Later Aristotle described the way in which the pneuma was introduced into the circulation. He, like the Stoics after him, held that this fiery element passed from the exterior to the lungs and thence to the left side of the heart and so by the arteries to all the body. All diseases were due to disturbances of the pneuma. Erasistratus himself had pneumatist leanings. Thus his view of fever, rejected by Galen in "Fevers", is that it is caused by an abnormal entrance of blood into the arteries: thereby troubling the pneuma.

Of the Pneumatists as a medical school Athenaeus of Attalia (c.50 A.D.) was the founder. In addition to the four generally accepted elements they imported the pneuma as a fifth: a sort of fiery air which penetrated,

animated, and preserved all things, and whose variations were the cause of disease. The pulse, entirely ignored by Hippocrates, was much studied by the Pneumatists, who ascribed pulsation to the dilatation of the pneuma. Notable among them is Archigenes, who, like Themison, lives in the satires of Juvenal.

The Pneumatists are, in some ways a late development of the Dogmatist school, and their philosophic parent is Stoicism then becoming popular at Rome.

Pergamum was an important city on the Caicus in the N.W. of Asia Minor, in the district once known as Mysia, and at the time at which we have now arrived, as the Roman province of Asia. It was important, populous - probably of over 200,000 inhabitants - and wealthy in a province proverbial for its opulent cities. With Nicomedia in the adjacent province of Bithynia it had shared the privilege of first offering worship as a god to the Caesar Octavianus who was soon to become the first emperor of Rome (B.C. 29).

Its medical school was second only to that of Alexandria. Here, about the year 130 A.D. in the principate of Hadrian, Galen was born. His father, Nikon, was an architect, a man of wealth and culture, and of him Galen speaks in terms of affection. He was less fortunate in his mother, who was "more quarrelsome than Xanthippe" and sometimes so far forgot herself as to bite the female slaves. More than one modern commentator has suspected a strain of the maternal heredity in the son's robust controversial style. Possibly it was a prompting of Greek euphemism that made his father call him Galen, Tranquillus, the Calm One.

He "counts himself blessed in not having been designed for a physician from the cradle". He saw no clearer sign of the intellectual decay that had set in in his day than the tendency to premature specialisation. People take to medicine "almost before they can read or write; long before they can reason."

At the age of fourteen Galen began what may be called his university education, studying under the best masters of the Stoics, Academic, Epicurean, and Peripatetie schools; then warned by a dream of his father's he specialised in medicine at the age of 17. For four years he worked at Pergamum under Satyrus a pupil of the famous Quintus: Satyrus, he says, knew his Hippocrates better than Quintus, but for an anatomist like Quintus that might well be. When Galen was about twenty his father died and Galen pursued his studies at Smyrna with

Pelops, at Corinth with Numisianus, and lastly at Alexandria. He then returned to Pergamum to practice, and when twenty-nine was appointed surgeon to the gladiators by five successive pontiffs, and is credited with a new method of suturing tendons, for which no doubt his office provided plenty of scope.

In his early thirties Galen went to Rome "at the beginning of the reign of Marcus Aurelius". Marcus Aurelius assumed the principate in the 161 A.D. and the date of Galen's settlement at Rome is given by different authorities as 162 or 164. In Rome, as was the custom, he gave anatomical and medical demonstrations and began speedily to build up a practice, though as was usual at Rome, he had to abandon surgery to the surgical specialists. He also abandoned his lectures, and devoting himself to practice, in five years had made his name and been called in to attend Marcus Aurelius himself. Marcus Aurelius had poor health and it is interesting to note that the occasion of Galen's visit was a stomach ache brought on by eating cream-cheese. The philosopher emperor seems to have been attracted to the philosopher physician. At any rate it is recorded that his verdict was "I have only one physician and he is a gentleman".

Probably in 168 A.D. Galen suddenly left Rome. He gives two distinct reasons. In "De Prognosticatione" he says he was disgusted with the envy and malice of his professional brethren; in "De Libris Propriis" he says "when the great plague broke out there I hurriedly departed from the city for my native land". It may be remarked that in 166 A.D. Rome had just completed a campaign against the Parthians, and the plague had been imported to the capital by the legions returning from the Tigris, and was probably epidemic in Rome by 168 A.D.

He was soon called from his retirement to join the emperor and L. Verus, the emperor designate, at Aquileia on their way to the Marcomannic war. Plague broke out at the front; the emperors and Galen with them hurried back to Rome, though Verus died on the way, and when Aurelius returned again to the army Galen pleaded to be left at Rome as being more useful there. It is to these two incidents that Daremberg alludes when he speaks of Galen's lack of patriotic and professional spirit.

This is the time of Galen's greatest literary activity. In 192 a fire on the Via Sacra destroyed not only the temple of Peace but some of Galen's works. He

probably lived on at Rome under Commodus and Pertinax, and died about 200 A.D.

Professionally Galen was an eminently successful man. Without adopting the despairing hypothesis of his out-distanced rivals that his wondrous skill in prognosis, his lightning diagnosis, and his amazing cures were the result of Galenic "divinatio" - magic - (a charge which in "Fevers" in a less complimentary manner he flings back at them), nor forgetting that he is his own reporter, we are readily convinced that Galen was a physician with a quick eye, a quick brain, enormous industry, versatile talent, an equipment of medical knowledge and skill as complete as his age could make them, a high level of general culture, and, at any rate in his dealings with patients, an adequate amount of tact.

The story that shows him as an early practical pyschologist is well known. He was called in to see a young lady with general malaise but no objective symptoms. As he was examining the pulse someone happened to speak of the actor Pylades. Promptly the pulse quickened. At Galen's next visit one of those present mentioned by arrangement the name of another actor. This time the pneuma was untroubled. The same thing happened on the third day. On the fourth some-one a second time spoke of Pylades, and a second time the pulse rebounded.

There are other instances of his clinical acumen. The son of Flavius Boethus, later governor of Syria Palaestina, was ill and feverish at night without obvious cause. Galen prescribed low diet, but the temperature still rose at night. Galen concluded that the little patient was getting dainties on the sly.

In the "Fevers" we note a case which, imperfectly apprehended by the attendant physicians, was promptly and correctly diagnosed by Galen.

His friend, the philosopher Glaucon insisted on taking him to treat a Sicilian physician who was himself ill. With no more than a look he at once diagnosed the malady as dysentery, to the amazement of physician and philosopher alike; though when we know that he had observed the excreta that a slave was carrying in a bed-pan to the dung-heap and the particular medicine that the sick physician had been preparing for himself, as with the mountebank in De Temperamentis who ignited a torch by putting it to a wall that had been previously converted into a sort of sulphur match, "when this was observed there was nothing amazing about it".

Galen's success in practice cannot be doubted. Its pecuniary value in Rome which offered the greatest prizes to the successful man cannot be assessed; but if he had many patients like the wife of Flavius Boethus, for whom he received 400 aurei for an attendance of not more than a fortnight, he would certainly have money to buy his monkeys and leisure to dissect them. An aureus is stated to be worth £1-1-1. Even without the shillings and pence it is a handsome fee.

With his brother physicians Galen's relations were probably far less happy; largely because he would refuse to consider them his brothers. He has been described as an intellectual aristocrat and it is the fate of such to be if not overbearing at any rate difficult to bear. He had had wealth at his back, the best of educations, he had studied medicine profoundly; he had great abilities and a full consciousness of his powers. Many of his competitors were no doubt able men, but many most certainly were not. There was no standard of medical education, no guarantee of competence, the practice of medicine was open to any fluent quack or scoundrel, and as Scribonius Largus notes, quisque volens faciat medicinam. It was easy and justifiable for Galen to condemn the tailors and dyers and smiths who became doctors in six months, but Galen's castigations fell indifferently, like the rain, upon the just and unjust. Many of his works are bitterly controversial even when bitterness was characteristic of the controversies of the time. The "Classification of Fevers" and "Temperaments" are not very polemical; in the former indeed, he expressly states that he is not writing on controversial lines: yet even here the little strokes in which he commiserates the unhappy fate of those patients who fall into the clutches "of the ordinary ruck of physicians" or describes the "pack of wiseacres who though as ignorant as the first, enjoy a reputation for wisdom", and those who "fortifying their ignorance with quackery have reached such a pitch of blindness or effrontery that they do not admit as causes of fevers those grounds which ..... are recognized by all mankind" indicate that Galen's normal relations with the profession were a state of war. One judges that he was adored by his patients, loathed and abominated by his brother consultants, and a terror to the general practitioner. Nikon had called him Galen in vain.

It remains to give a general account of the Galenic system. We have described the doctrines of the four distinct medical schools, but by Galen's time distinctions were tending to become obliterated, the edges

of the clear cut systems were becoming blurred, it was an age of syncretism, a mosaic of beliefs. Eclecticism was a rising force, and for medicine Galen may claim to be the great Eclectic.

Daremberg has stated the paradox that "Galen is at once the most extreme representative of Dogmatism and the chief of the experimental school. His reasoning is as unreasonable as his observations are exact". Tylden puts the same truth in another way: "to his professional brethren he appeared in the light of a physician who interested himself in philosophy; to his literary friends he appeared as a philosopher who had come to take up medicine".

Now this double thread runs through the whole texture of the man. And this conjunction was not fortuitous: it was the deliberate purpose of his life.

He could not forget that before he became a medical student he had been a Varsity man and had taken first class honours in his final schools, and throughout his long and industrious life he retained his devotion to both his mistresses.

Where Hippocrates had been content to rest lightly on theory and pursue the quest for facts, separating as we have seen medicine from philosophy, Galen felt that the hour had come and the man to synthesize the two.

The Galenic system, then, is substantially an attempt to add anatomy to Hippocrates, the method and philosophy of Aristotle to both, and to fuse the mass with the doctrine of the pneuma.

In an introduction to two treatises that are at least as much philosophical as medical it is important to remember that Galen is more than the Dogmatist philosopher spinning cobwebs out of moon shine: he is also one of the foremost anatomists of all time, a man who, realising that medicine as well as surgery must be based on anatomy, most thoroughly "put his own hand to the work". We have seen that in the golden age of Alexandria it is probable that human anatomy was practised. In Galen's time, apart from osteology, it almost certainly was not. Thus Galen describes how, walking by a mountain path he found the carcase of a robber who had been killed, and the birds had cleaned his bones. Again, a torrent had carried down a corpse and deposited it on a sort of dam. The flesh

had macerated and Galen had a very good osteological subject. But for dissection apes were his mainstay. To avoid injury he killed them by drowning and skinned them himself, and was thus able to isolate the plantaris, the palmaris longus, and the muscles of expression. By a series of sections of the cord at different levels he demonstrated the innervation of muscles, the distribution of sensory nerves, and the effect on the organic reflexes. Thus when a patient came to him complaining of numbness in the 5th and 4th digits, and the adjacent sides of the 3rd, Galen ascertained that there had been no injury to his arm but that he had some time previously been flung out of a carriage on to his back and a sharp stone had caused violent pain somewhere between the shoulders. He was able to diagnose that there had been a lesion in the area of what we should call the 8th cervical and 1st, dorsal nerve roots, and by treatment there effected his patient's cure. We may also note that the patient had previously been treated by the Methodists, who applied first relaxants without improvement, then astringents. "All these remaining unprofitable and the trouble getting worse the patient came to me."

Where he was content to experiment and observe Galen was masterly, but here too an alien element entered in the teleology that with so much else he borrowed from Aristotle. Teleology as applied to anatomy is the working out of Aristotle's dictum that Nature does nothing in vain. The human frame is the final, perfect work of an all-wise Creator, and all is for the best in the best of all possible bodies. In the "Temperaments" we read that "the hand was devised to be a measure of all sensible things, a tactile instrument peculiarly wrought by nature for the most intelligent of living creatures" A similar passage in the "Use of the Parts" is better known. Galen describes the marvellous mechanism of the hand, its perfect adaptation to its function, so that the Creator could not conceive an instrument of greater perfection; nothing could be added; nothing taken away. Yet we find that after all the hand described is the hand of an ape, which, lacking the opponens pollicis, lacks the very structure that makes the hand human. What is this but, as Moon says, to make the wisdom of God depend on the fallible investigations of man?

From Hippocrates, the "master" the "wondrous" the "divine" Galen's borrowings are many, though even here we do well to note the remark that Eymin applies to his versions of Aristotle and Plato - that he interprets them with a freedom that is sometimes shocking.

He recognizes the importance of such aetiological factors as climatic conditions, the season of the year, age. mode of life, diet, environment, topography in the production of disease. He incorporates the doctrine of the four elements, earth, air, fire and water, the four qualities heat, cold, dryness and moisture, and the four humours, blood, yellow and black bile, and phlegm, the importance of the critical days, and, as the vital principle, the existence of an innate heat, greatest in infancy, lessening with age, and perishing at death.

Health, as with Hippocrates, is due to a proper "crasis" or "temperament", literally a "blending", of the elements and humours; disease to their derangement; but the course of a disease which in Hippocrates is represented as a "coction" or digestion of the crude humours is in Galen replaced by the advance, the fastigium, and the decline, though, in diseases of the humours, the actual process of healing is still effected by their "coction".

A word about the four elements, which to us are somewhat puzzling since, in our sense, they are not elements at all. As stated by Aristotle each element is a combination of two of the primary qualities: fire being a compound of hot and dry; air, of hot and wet; earth, of cold and dry; and water of cold and wet. We shall see that in the "Temperaments" at any rate Galen does not appear to stick to the strict letter of the law. Thus he says on page one "No animal can be absolutely hot like fire; nor absolutely moist like water", words that seem to indicate that fire is pure heat and water pure moisture. On page 13, however, the Aristotelian theory is upheld.

The humours follow the analogy of the elements. Blood is hot and moist, yellow bile hot and dry, phlegm cold and moist, black bile cold and dry. Blood is the vital humour, yellow bile is produced from blood by combustion and of this process black bile is a sort of sediment; phlegm, Galen states in "Temperaments" is derived from food - food presumably that is cold and moist.

The three cardinal constituents of the body are the spirits, the humours, and the solid parts or "habits" of the body. From Galen's statements in the "Temperaments" and from his description of the process of "Flux" in the "Fevers" it is apparent that however profoundly he differed from the medical theories of the Methodists his conception of the solid tissues of the body is atomistic. He clearly indicates that these are composed of minute particles separated by microscopic pores, and when speaking of these

"homogeneous parts" he even uses the word "homoeomerous", a term that goes back to Anaxagoras or even beyond, and implies that the body is made up in all its separate tissues of minute preformed particles identical in nature with that of each separate tissue that they go to build up; bread, wine, meat and so on each containing the tiny elements that, unchanged, are incorporated with the build up bone, liver, skin, spleen, and the rest of the body: a theory that as Allbutt says, Galen's own theory of metabolism as stated in The Natural Faculties entirely abrogates.

Lastly, the "spirits". These are three in number, the "natural" the "vital" the "animal" or "psychic". Food as it leaves the stomach, is converted into blood by the blood forming organs the liver and veins in that region. From the liver, where resides the innate heat, the blood acquires the "natural" spirit. The two pass in the veins from the liver to all parts of the body and back again with a to and fro motion. The "natural" spirit activates the "natural faculties" which subserve the needs of vegetable life, growth, and nutrition, e.g. the conversion of food into blood, nourishment, and body-building material.

For the further wanderings and developments of the pneuma I am indebted to the very clear account of Singer in "Greek Biology". The blood and "natural" spirit left the liver passed by the "hepatic vein". This divided, and one branch, our common vena cava, entered the right side of the heart. The main part of the blood and "natural" spirit passed thence via the pulmonary artery to the lungs. Here its impurities were exhaled in the breath and this part of the blood and "natural" spirit then flowed back to the right ventricle and so to the venous system. But a small amount of the spirit-laden venous blood passed from the right to the left side of the heart through the inter-ventricular septum. Here it mingled with the pneuma that had been inspired by the lungs and had passed from them by the pulmonary vein to the left side of the heart. The combination of the "natural spirit" with the external spirit or "pneuma" formed the higher "vital spirit" which passed in the arteries to all parts of the body and energized the "vital faculties" to which such activities as the movements of involuntary muscle were due. In the arteries as in the veins the movement was one of ebb and flow.

Amongst the vessels thus charged with arterial blood and "vital spirit" some divided into minute branches, passed through the rete mirabile and, reaching the brain, their spirit content was acted on to form the still higher

form of "animal" or "psychic" spirits, which were conducted to the various parts of the body by the nerves (then regarded as hollow) formed the motive power of the "animal faculty" and so were responsible for sensation and voluntary movement.

This physiology, Singer points out, is not based on human anatomy. In the human subject there are two groups of hepatic veins, but no one "hepatic vein"; though such an organ is found in the dog. In the human brain there is no rete mirabile, though such an organ is found in the ~~dog~~ calf. The passage of blood and spirit from the right to the left side of the heart may, Allbutt thinks, be explained by the fact that in the sheep minute openings in the septum do occur. It is to be noted that Galen correctly localised sensation in the brain; Aristotle in the heart.

Such was the framework of the Galenic system. In the hands of its author it met all problems, and solved all difficulties. His premises granted his conclusions follow. As one reads the "Fevers" for example, one feels that the author is giving us a "work of instruction" indeed, but the instruction is that of a geometrical theorem, and to come, in the midst of it, on the masterly description of the hectic state - the sunken eyes, the sordes at the lids, the wasted parched frame, the coma vigil, the retracted abdomen, the inelastic skin - gives one, in the rarefied atmosphere of the main argument, the impression of an almost indecent realism. Unfortunately the premises are not always or often to be relied on, and the argument, closely knit as it may be, is, to reverse one of his own favourite phrases, too often a matter of 'words' not 'things'.

How then is it that Galen ruled the intelligences of men unchallenged for over thirteen centuries? For one thing Galen survived: and in considerable bulk. A literary critic once said that to be a "great" author some bulk of work at any rate is necessary. No doubt the same argument applies to the makers of systems, and however many of his works were burnt with the temple of Peace, enough survived to make a mass at least as large as the Waverley Novels. Again, Galen was felix opportunitate mortis. With his death the intellectual fires burnt very low, and till the day of Vesalius there was no one to question his infallibility, and, as Daremberg remarks, if no one deposed him from his throne it was because the theories of Galen were preferable to those of the magicians and alchemists of the middle ages.

But it was Galen's weakness, not his strength: not his researches but his teleology that set him on his

pinnacle. It was this that, coinciding with the views of Christian, Arab and Jew, perpetuated his reign. Lastly, he did provide a system and there is truth in Moon's unflattering conclusion - "To the vast majority of mankind thinking is an extremely difficult and unpleasant process, and anybody who can provide a decent escape from this painful duty will usually find a ready acceptance".

A word as to Galen's style. Singer says frankly that "as literature he is intolerable". This is perhaps too harsh. Brock, the translator of the "Natural Faculties" says "Galen is a master of language, using a highly polished variety of Attic prose with a precision which can be only very imperfectly reproduced in another tongue. Every word he uses has an exact and definite meaning attached to it". It is to be remembered that Galen's subjects did not lend themselves to the graces of style, that he wrote much and fast. Now and then we find a hurrying paragraph ending with what is little more than a lecture jotting. To-day this driving, energetic, efficient man would no doubt be dictating to a shorthand-typist. But so far at least as the "Fevers" and "Temperaments" are concerned Galen, discursive as he is, handles the supple and precise Greek speech in as workmanlike a fashion as his scalpel.

This is perhaps a fitting point at which to give instances of the correspondence in language and thought between the "Timaeus" and Galen noted earlier. More examples might be quoted but two will suffice. Compare "Now to make a complete blend of these..... is beyond human skill... .. To blend the two completely is a task for God and nature" (Temperaments p. 23) with "For God only has the knowledge and also the power which are able to combine many things into one and again resolve the one into many. But no man either is or ever will be able to accomplish either the one or the other operation" (Timaeus 69; Jowett's translation); and the passage on page 44 of "Temperaments" dealing with the growth of hair, with "Timaeus", 76 - "This skin the divine power pierced all round with fire and out of the punctures thus made the moisture issued forth, and the liquid and heat which was pure came away, and a mixed part which was composed of the same material as the skin, and had a fineness equal to the punctures, was borne up by its own impulse and extended far outside the head, but being too slow to escape, was thrust back by the external air, and rolled up underneath the skin, where it took root. Thus the hair sprang up in the skin, being akin to it because it is like threads of leather but rendered harder and closer through the pressure of the cold, by which each hair, while in process of

separation from the skin, is compressed and cooled". The physiology of the one is an inversion of that of the other but that there is a reflection of the "Timaeus" in the Galenic account is obvious.

With this our account of Galen may close. At this date we need not to concern ourselves with the misplaced enthusiasms of his idolaters; we may forget his vanity, his verbosity, his carpings, his quarrelsomeness, his hunting after shadows.

"These flashes on the surface are not he"

Let us remember that in his day and generation he did good work; and, ending with a word that he has fastened into our language, hold that

"He has a solid base of temperament".

Some notes on fevers in antiquity.

Both in Hippocrates and Galen what most strikes the modern reader is the almost total absence of reference to what we know as the infectious fevers, the diseases that we now indicate when we speak of "fevers". So much is this so that Aristotle states that fevers are non-infectious: contrasting them in this respect with plague and consumption. Galen describes as infectious diseases consumption, scabies, and ophthalmia.

The reason no doubt rightly assigned is that the commonest febrile diseases were pulmonary conditions and malaria. Hippocrates saw that all diseases tended to be either acute or chronic, and so far from wishing, like the Cnidians, to multiply separate concatenations of symptoms and label each as a separate disease, probably hoped to discover one single causation for both acute and chronic diseases.

Yet there is no doubt that some, probably all, of our infectious fevers were present in antiquity. Hippocrates describes an epidemic with swellings at the ears, sometimes complicated with swelling of the testicles, which is certainly mumps.

The "woman with the quinsy, reddish and hard swelling on both sides of neck and chest", whose drink came back by the nose is almost as certainly diphtheria. In later days, e.g. with Archigenes in the first century A.D., diphtheria was known as the "Syrian angina".

The "vesicular fevers, horrible to look at" quoted from Hippocrates by Galen in his "Fevers" might be anything from smallpox to any bullous eruption. The words "horrible to look at" seem to exclude Allbutt's suggestion that the "vesicular" or "pemphigoid" fever was one accompanied by aphthae in the mouth. Rhazes (fl. 850 - 920 A.D.) is credited with having first differentiated measles from smallpox, though Herodotus, a pupil of Agathinus, is stated to have isolated measles 800 years before Rhazes.

The "erysipelas" of Galen's "erysipelatous inflammation or inflammatory erysipelas" (v. "Fevers") may or may not be the modern disease. In Galen's view the erysipelas was bile-generated, the inflammation a disease due to corruption of the blood. Hence perhaps his statement that the colour of erysipelas is more yellowish than the red of an inflammation.

The epidemic of "carbuncles" at Cranon, quoted by Galen from Hippocrates as a dreadful example of the effects of a hot and moist "constitution" - a constitution, be it noted, not of the person, but of the atmosphere - should probably be translated "malignant pustules".

Of other disorders tetanus is mentioned by Hippocrates, with the addendum that if the patient does not die by the fourth day he gets better.

Dysenteries and lienteries and diarrhoeas were common, and, as noted already, all varieties of pulmonary disease. Many of the cases noted by Hippocrates seem to have passed into the "typhoid state" before death; but typhoid fever itself may possibly be represented by "phrenitis".

But the great bulk of febrile illness was due to some form or other of malaria, either alone or complicating other diseases. The quotidian, tertian and quartan forms were perfectly recognized by the ancients; also double infections. According to Galen the quotidian was due to a corruption of the phlegmatic humour, the tertian to the bilious, and the quartan to the atrabilious or melancholic An account of his masterly diagnosis of a double infection will be found in "Fevers".

It is interesting to note the mention of what seems undoubtedly to be a Parkinsonian tremor. Galen describes it as a rigor without fever. I take the tremor to be a Parkinsonian rather than an intention tremor because Galen gives it a phlegmatic origin, i.e. it is cold and moist, the humour of old age, and says that if a fever supervenes it is quotidian in type - i.e. phlegmatic and hard to cure. Paralysis agitans is a disease of later life: disseminated sclerosis is not. The statement that if fever does supervene it is hard to cure recalls to my mind that of the first four cases of paralysis agitans that I followed to their termination - three died with acute mania.

For the pathologist the theory of flux at the end of fevers is to be recommended.

. . . . . .

The treatise on "Temperaments" if the translator has done his duty should explain itself. The question that many may ask, and it is one which Galen has not troubled to answer, is that if a man's nose can be of one temperament

and his stomach of another, one eye of a third, the other of a fourth, and so on up to the nine that Galen has most convincingly demonstrated, who but Galen can say what that man's temperament is, and what is the virtue of saying it?

A word may be said about the references in "Temperaments" to the practice of dissection. Discussing the curious abnormality by which bile is conducted from the liver by a second duct directly into the stomach above the pylorus, he asks how is one to diagnose this - "for I do not claim - I do not propose - to dissect living men". Now the word underlined, as it were, by the particle is not the word "living" - "I do not dissect living men, though I do practise human dissection" - but the word "dissect" - "I do not dissect living men, though I attain the same ends by a study of their whole temperament and the dejecta".

The "sacrificial animal that you may propose to eat or dissect" is of course the "victima" of Latin - the "meat offered to idols" of the apostle. These animals were of course dead.

We know, however, from the "Natural Faculties" that Galen practised vivisection, e.g. the experiments in ligaturing the ureters to prove that the bladder was filled from the kidneys. The only hint of vivisection in the "Temperaments" is the statement that if during a dissection you put your fingers on the left ventricle you will find that that is the hottest part. The left ventricle was, of course, full of the vivifying pneuma and the passage indicates that Galen, like others, was able to find what he thought he ought to find. One has sometimes seen a similar process illustrated in the percussion of the left border of the heart in what Galen would call the fleshy man.

For the bile duct abnormality I consulted a vetinary surgeon, but he was unable to tell me of any animal that displayed a bile duct entering the stomach direct. Abnormalities of the bile or pancreatic ducts in man will not explain the difficulty, for it is practically certain that it was not on the human abdomen that Galen made his discovery.

THE CLASSIFICATION OF FEVERS.

The most appropriate and valid differentiae of fevers are those based on the essential nature of fevers: the rest are based on accidentals. Since the accidentals are of more sorts than one - some being more akin and appropriate to the essence that is the subject of classification, while others are more remote and alien - it follows that the differentiae assumed from these accidentals are also of more than one class.

Their error is, therefore, greatest who deviate from the differentiae which are most appropriate and valid, and next come those who while enumerating these mix up indiscriminately with them all the differentiae arising from accidentals, without distinguishing such as are of value from such as are of none.

And it is not merely in the classes of their differentiae that the bulk of physicians go astray (either by formulating too many and so including the valueless, or too few and so omitting some that are of value), but even in the distribution of the main classes into their appropriate species they make the same mistake. For example, though the principal and the most fundamental class of differentiae is assumed from the essence of the thing in process of subdivision you will find some physicians omitting this class altogether, and others either over subtle or not subtle enough in their classification; and this in spite of the excellent one given by Hipprocrates in the sixth book of his "Epidemic Diseases". The passage runs as follows:-

> "Of fevers, some are biting to the touch, others mild. Some are not biting but increase more and more; some are acute, but lessen to the touch. Some blaze up at once; others throughout their course are feeble and dry. Some are saltish; others vesicular, horrible to behold. Some are damp to the touch; some red as fire; some deadly pale; some livid" - and so on.

Now it is most obvious that in this passage Hippocrates has framed his classification both from the subject's essence and from his differentiation of it into its appropriate species. For the essence of fevers lies generically in their unnatural heat: the species of that heat lie in the question of more or less, the material in which the unnatural heat is present, and in the manner of its movement.

All these Hippocrates has enumerated, grouping them together with the method of differentiating each, as we shall show in the course of our argument.

As for the differentiae which arise from the greater or less amount of heat these are obvious, and has long been customary for physicians in the case of this class of differentiae to use the terms "great fever" and "small fever"; and though they are not justified in applying a quantitative name to a qualitative thing, still it has been the practice to do so not in the case of fever merely, but of a hundred other things whose property is one of quality, but whose names are "great" or "small". The differentiae of the unnatural heat which arise in respect of the material in which this unnatural heat originates are appropriate in the highest degree:- i.e. whether it has occupied the very substance of the heart or the humours contained in the heart's cavities.

There is still a third differentia wherein the airy essence is alone fully heated, the liquid and solid substances though in process of growing hot, being not yet completely heated. For there is no small difference between the process of a thing growing warm and the completed state. You may take my meaning very clearly from the following illustrations. Suppose that hot water has been put into a cold pan, and that then the substance of the pan grows hot with it through contact, but that it has not become completely hot in its entirety. Then again suppose cold water has been poured into a hot and glowing pan, and that then it grows hot, but that this too has not yet become hot. To the second of these examples corresponds the first species of fevers, those which we described as having occupied the very substance of the heart; to the first example the species of those fevers which are kindled in the humours contained within the heart. The remaining third species does not admit of a similar illustration, but for the sake of clarity imagine a pair of blacksmith's bellows which sucks in heated air, and that then this grows hot in consequence, but is not yet completely heated. Or the illustration will better show the nature of the thing I am trying to explain if you suppose that liquid is contained in the bellows, or better still if you make the holes in the bellows through which it sucks in and puffs out the air so narrow as to impermeable to liquids, but permeable to air. True that herein there is a vast difference between the works of nature and the inventions

of man; for the airy element is mingled with the blood in all the airways (arteriae) which breathe simultaneously through many holes, and throughout the heart as well, so as to be confluent with them all.

This unnatural heat, then, which we call fever arises sometimes from one, sometimes from another of the above-named sources. It attacks and reduces the remaining two kinds to the condition of the one first affected.

Transference of the heat is easiest from the liquid parts to the spirit; less readily do the liquid parts become inflamed from the spirit, and solid tissue imparts its heat more readily to the liquid and airy parts, than it receives it itself from them; for the finer substance all undergoes change more easily than the coarser. The airy element has the finest substance; solid tissues the coarsest; midway between these is that of liquids. As far as the present study is concerned it is indifferent whether we speak of "spirit" or "air", for we have distinguished more accurately between these elsewhere. For the present it suffices to recognize no more than what I fancy Hippocrates indicates when he speaks of "things containing, things contained, and things motive"; by "things containing" denoting the solid portions of the body; by "things contained" the liquid portions, and by "the motive" the spirit.

The feverish state then has its origin sometimes in one, sometimes in another of these three, but it does not remain in the element first injured, but attacks the remaining two, and if it be not speedily resolved, in course of time it reduces them also to a similar condition.

These, then, are the main heads of this treatise. It is, however, necessary alike to prove what I have advanced and to discuss the differentiation of each class of fever; and in the first place it is necessary to say something about their origin.

All men, convinced by the evidence of facts, are fully aware that certain persons become feverish on account of exhaustion, passion, grief, exposure to heat and cold, sleeplessness, indigestion, drunkenness, and gluttony. Furthermore, all people of intelligence recognise that a pestilential constitution of the atmos-

phere causes fever; as also that contact with the plague-stricken is dangerous; for just as in the case of itch or ophthalmia, there is the risk of infection. It is dangerous, too, to associate with those suffering from phthisis; and in a word with all those whose exhalations are putrid, and render noisome the very houses in which they lie sick. It is established, too, by long experience that those who have given up the habit of exercise become subject to certain diseases, and in especial to fevers.

Furthermore that fevers arise from what we call plethora, from certain noxious foods and drugs, from the heats of the dog days and other like causes, this I may say is recognized by all mankind. But the state that ensues in our own bodies as a result of these causes, and in virtue of which we become feverish, of this the bulk of mankind is ignorant, as well as some physicians. Those ignorant on these points are of two kinds; the first base themselves on pure empiricism, and maintain that the nature of nothing on earth can be investigated by reason; the others are a pack of wiseacres, who, though as ignorant as the first, enjoy a reputation for science. Their ignorance is due to the lack of a preliminary education in the methods of logic, thanks to which we discover and separate from demonstrative assumptions hypotheses which though probable are incapable of proving or demonstrating anything as actual fact. Certain of these, fortifying their ignorance with quackery, have reached such a pitch of blindness or effrontery that they do not admit as causes of fever those grounds which, under the teaching of experience, are recognized by all mankind. But as I have fully discussed these points in my book on what are termed the "Immediate Causes" I have no need at the moment to dwell on their foolish nonsense. This book I have framed not on controversial lines, nor as a touch stone for sophistries, but as a work of science and instruction. It contains the hypotheses I have demonstrated elsewhere, and it teaches the differentiae of the fevers. My hypotheses are these:- heat and cold dryness and moisture are the corporeal elements; the first stages of disease arise from a distemperature of these elements, and of these diseases one is fever, occurring whenever a certain unnatural heat arises in the heart.

The distinctions in respect of the class of heat with which the present work deals are assumed from

the difference of the material which receives the feverish heat. This material may be one of three kinds; for we said that fever is first lighted up either in the substance of the heart, or in the humours, or in the spirit; also that the origin of all fever must be preceded by the establishment of those obvious and commonly recognized causes, which we have just described.

From the observation of these the empiric is much helped in regard to treatment, while the scientific physician, devoting himself to the actual nature of the condition, is thereby demonstrably profited both as regards prognosis, and the devising of a treatment; for he avails himself of all the points brought to light by experience, and to this adds much help derived from the methods of science. The points revealed in either sphere - i.e. in empiricism and in science-we indicate elsewhere; it now falls to us to describe what state exists in the body and lights up a fever, as the result of each of the immediate causes.

Since we see that heat, like fire itself, originates and increases in more than one way, and that either through movement, or corruption, or through association with external heat, or through suppression of heat dissipation, or through admixture with a hot substance boiling up as it were from a spring it is engendered (as far, that is, as our senses can determine) or augmented, it is necessary that all the causes of fevers too must be referred to the same means. Take burning for example, whether it is the action of the sun that is so termed, or the condition of burning that is coming or has come into being in the body. This is, I presume, itself an unnatural heat; but it is not yet fever unless it heats the heart as well. All this class of cause originates from association with the heating agent, whether that be the sun or a drug, attacking from without, or approaching closely, or associating, or however you like to term it.

Passion again is as it were a boiling and violent motion of the passionate faculty, which has its seat in the substance of the heart itself. Sometimes the element of the spirit grows hot with it; sometimes that of the blood; and if the receiving parts happen to be in a suitable state to retain the heat for a season, even if the involvement of the heart is arrested, these remain unnaturally hot, and at this

point the patient becomes of necessity feverish.

Such fever as this has for its starting point the movement and boiling up of the native heat: that which arises in cases of grief, is not a boiling up, but a movement merely. In cases of exhaustion the fever likewise has its origin in the excessive movement of the muscles, sinews, ligaments and joints which first become hot, and thence the heat is spread by continuity to the heart, and at this point the patient becomes feverish.

The fever which is lighted up through density of the skin, and which is the usual fate of those who are astringed and chilled, is due to a collection in the body of the acrid efflux; for the bodies of animals are always being ventilated in two ways, the vaporous and misty excretions daily passing to the exterior, and the airy element being sucked in to cool and fan the unnatural heat. When therefore any potent cause densifies the skin and obstructs the indicated passages it often induces the plethoris state. This is when the efflux is vaporous and healthy. Sometimes it causes fever. This is when the efflux is acrid and biting and particularly when the heat is increased by the non admission of the cooling principle to the interior of the body. An acrid and biting excretion exhales from persons of unhealthy humours, from those who eat harmful food, and from those whose digestion is bad; above all, if in addition to harmful food they drink marshy, muddy, filthy, swampy, or stagnant water, or water in any way tainted and putrid. It is the same with those who work too hard, who are sleepless or anxious, or are always taking acrid drugs. By harmful foods I mean those naturally such, as onions, garlic, nasturtiums, leeks, kale, basil and nettles; all those we call wild, such as our charlock, and also those which though naturally good, yet through some corruption sometimes acquire a harmfulness equal to or even greater than that of the others; for example, wheat and barley and all the other bread stuffs, which, either through length of time are reduced to a state of rottenness, or are tainted with mould through improper storage, or in their first growth are damaged by blight. Even to-day many persons when compelled by famine to eat such foods either die of putrid and pestilent fevers, or fall a prey to scabby and leprous-like eruptions. When, therefore, the body is infected with such humours but no obstruction exists

in any of the viscera, and the animal is freely ventilated and cooled throughout all the skin, it remains healthy it is true, but its health is transient and precarious.

When, however, either (a) the outer end is obstructed or (b) the internal passages are blocked, then in the first case follows the class of fevers we are now describing, and in the second that which we shall describe shortly.

The reason then that some dyspeptics are feverish and others not, is in no way surprising. Persons who are naturally of unhealthy humours and with difficulty ventilated, those who have worked hard at the wrong time, and those who have bathed recklessly are ready fuel for fever. To those of healthy humours and easy ventilation, to those who keep quiet and warm the parts about the belly and liver fever is an impossibility. In their case all the corrupt matter remains where it is about the belly and liver, and in time it is gradually concocted and becomes harmless. So, too, with those who after over-exertion stand in the summer sun, or take a hot bath of fresh water: the corrupt food is everywhere assimilated into the habit of the body. It is the same with those in whom the corrupt food has proceeded downwards: fever does not ensue except from some other cause, as for example, exhaustion from frequent going to stool, or inflammation in the parts about the belly.

In the case of blockage of the internal passages, however, and of damming up of the humours (for the discussion of this I postponed) animals suffer from the fever that arises from putrescence. For all those things most readily grow putrid which are hot and moist, and crowded in a hot site, without ventilation and cooling. So it is no wonder that fevers follow on plethora, for in such states the obstruction is great and the transpiration of the whole body becomes difficult.

So, too, with the other form of congestion, that in respect of the faculties, the humours speedily come to putrescence, being no longer kept in order and profitably concocted owing to the failing strength of the faculty that works upon them. Hence the more viscid and thick the juices of foods the more productive are they of disease, for the more liable is the humour derived from them to become obstructed and dammed up.

But then on the other hand, are not the rarefying and acrid foods causes of disease? For it is obvious that those who indulge immoderately in this opposite kind of diet are equally subject to fevers, since we have already stated that the juice of all such foods was unhealthy. The fact is that as far as unhealthiness of the humours is concerned these acrid foods are the causes of fever; when it is a question of putrescence it is the viscid and thick substances that are at fault, and it is on the score of putrescence that the parts beginning to be inflamed light up fevers. For the affluent humour, whenever it is naturally hot, being dammed up in the parts grows putrid through lack of proper ventilation.

Hence, when the flux is purely bilious an erysipelatous heat occupies the part: when it is sanguineous an inflammatory heat. When the flux is a mixture of the two an inflammatory erysipelas or an erysipelatous inflammation sets in; taking its noun from the predominant humour and its adjective from the other.

In all these instances fever is lighted up by way of conjunction; for the contiguous part steadily grows hot contactalous with the heated part, until the condition has reached the heart. For even in the case of carbuncles it is the contiguous part which grows hot, for these originate from blood which is thoroughly hot, but somewhat atrabilious owing to complete combustion.

Constitutions of excessive heat in the atmosphere that surrounds us, such as occur most commonly about the rising of the dog star, heat the heart itself directly through inhalation; and being poured out around the body from without, they make it hot in its entirety: above all the airways (arteriae), sucking in as they do some of the very essence of the surrounding atmosphere, so that the heart is perforce reduced to their common condition, and becoming itself immoderately hot is bound first and foremost to acquire the feverish state and to transmit it to the entire body. In pestilential constitutions inhalation is principally responsible. It is true that fever sometimes arises owing to the existence in the body of humours favourably disposed to putrescence whenever the animal embraces some slight opportunity offered by the atmosphere for the commencement of fever, but

as a rule it originates from the inspiration of the surrounding air after that has been infected by a putrid exhalation. The origin of the putrescence is either a multitude of uncremated corpses, a common occurrence in wartime, or exhalation from swamps and marshes in the summer season. Sometimes an immoderate heat in the atmosphere leads the way (as in the case of the plague that attacked the Athenians, according to the account of Thucydides:- "but when the folk were living in stifling huts in the height of summer the corruption fastened upon their bodies"), but it is from the favourable disposition of the body humours to corruption, the result of an unhealthy mode of life, that the pestilential fever has its true origin.

Perhaps, too, there was an afflux from Ethiopia by continuity through the air of certain corrupt infections upon those whose bodies were ripe for damage through their agency; the predestined causes of fever.

It is proper throughout all this work to bear in mind this - that there is no cause which is effective without a predisposition on the part of the patient. Otherwise all who are occupied in the summer sun would be feverish, so, too, would all those who over-exert themselves, or drink to excess, or indulge in passion or sorrow; and similarly, I imagine, all would be ill at the rising of the dog-star, and in times of pestilence all would perish. But, as we have said, the greatest part in the origin of disease is due to the predisposition of the potential patient. Let us assume then by way of illustration that certain seeds of pestilence are wafted through the surrounding air, and that of the bodies brought into contact with it, some are reeking with all sorts of excrementitious matters already in themselves predisposed to putrescence while others are free of these and untainted. Let us further assume in the first class a universal obstruction of the passages - the condition called plethora - an idle life spent in gluttony, drunkenness, and the immoderate use of venery, and in the concoctions that inevitably attend all the above. To all the other bodies - those that are untainted and free from excretions - let us ascribe in addition to their existing advantages free ventilation through all their passages, unobstructed transpiration, unimpaired as they are, moderate exercise and a temperate

mode of life. Then following on these assumptions consider how each class of bodies is likely to be affected by the putrid airs exhaled against them. Is it not reasonable that the first class at the very first inspiration should at once acquire the beginnings of putrescence and go to the very limit of distress; while the second, free of excretion and untainted, should suffer little or not at all, since to them the return to the state of health is quite easy? Similarly when the temperature of the air is violently diverted from its healthy state to moisture and heat, pestilential diseases inevitably occur, and in these the chief sufferers must be those who are already loaded with excess of moisture, while those who work in reason and lead an orderly life remain entirely unscathed in all such conditions. This argument is stated with reference to one example only, but it holds good nevertheless in every class of cause. Any one who elects to be perfectly versed in it may read my book on "Immediate Causes".

In the present work to avoid being tedious I will comprise all in one summary and be done. In each class of cause it is necessary to consider the faculty in virtue of which it most readily causes disease; secondly to consider those bodily states which favour or antagonize it, recognizing clearly that where the conditions are favourable damage is assured; where they are antagonistic and opposed they will remain invincible in proportion to the strength and size of their antagonism. When a constitution has come into being such as Hippocrates says arose at Cranon, I have myself seen carbuncles occurring as a widespread epidemic, corresponding exactly in their mode of origin and in all other points to his description. Nay more, all the points he details in the third book of his Epidemic Diseases in reference to the pestilential constitution have been duplicated in another constitution corresponding to the one he described.

The sum and substance of it, as Hippocrates himself made evident, was putrescence; so we, being forewarned of this at the very first establishment of the constitution, promptly endeavoured in every way to dry those bodies which we observed to be moist; those which inclined to dryness we maintained in their existing nature in this respect; those which abounded

in excrementitious matter we freely treated with purgatives; obstructions of the passages we cleared and freed. But this perhaps pertains more to the science of treatment, and assuredly in that work it will be fully discussed. At the moment I have touched on it merely in the course of my explanation of how in the presence of one predominant cause certain persons are attacked by fevers, while others remain unscathed. The bodily states being unequal and diverse some are easily overcome and are very predisposed to disease through the agency of the active cause; others are invincible and entirely immune, or with difficulty become diseased. To demonstrate this we have been forced to speak of treatment, like Hippocrates when he wrote somewhere that well-worn saw "The proof of this is in the cure". In fact what is called prophylaxis is in some such fashion a cure. Certainly the names are often confused among physicians; for as we have shown in another work the whole task of the physician is to correct the errors of the body. However, for the present purpose there is no need of such hair-splitting; for whether you divide the whole process into two words - cure and prophylaxis, or whether you combine the two in one and call both cure, that state of the body which prevents certain persons from falling victims to epidemic and pestilential diseases is a convincing proof that all are not similarly affected by this type of cause.

Our first and principal object is common to all cases - that the body should be as free of excrementitious matter as possible and well ventilated; the second follows on this - that it should be in the best possible condition to antagonize the predominant cause. All those in whom the contrary holds good fall ill first and suffer worst. Now since I have spoken of all pestilential fevers as having their origin in putrefaction, it is worth while to interrupt the argument here to consider the old axiom which alleges that every fever is caused by putrefaction of the humours. Even the school of Athenaens seems to entertain this opinion, men of eminence in their profession generally, and above all in their knowledge of fevers. Herein I, too, for the most part, agree with them. One condition, however, I except - the fevers called ephemeral. These to my mind do not follow on putrefactions of the humours; for when anyone is fevered through burning heat it is through the heat of the

efficient cause that he becomes deranged. When one is feverish through passion certain it is that there has been a boiling of the blood throughout the heart, but it has by no means gone the length of putrefaction. So, too, after exercise there is excess of unnatural heat, but without putrefaction of the humours.

Similarly, if a patient's skin is contracted when he is voiding excretions of somewhat acrid nature through it; with the accumulation of these he becomes feverish indeed, but without putrefaction of the humours. Furthermore, Hippocrates, I fancy, states that all fevers arising from buboes are violent excepting the ephemeral, and yet the bubo is of the class of inflammatory swellings and to this extent I agree with the putrefaction theory, for putrefaction is the cause of feverishness in inflammatory swellings and it is not as Erasistratus supposes. Nevertheless there are certain fevers consequent upon buboes which belong to the class of ephemeral fevers, as certain other authorities report, diseases which are difficult to handle, and spring from an inflammatory swelling, ulcer, abscess, or some other similar condition in a viscus. But the ephemeral fevers consequent upon buboes differ from those arising from putrefactions in some viscus or in the cavities and greater hollow vessels in that as the former steadily heat the contiguous part the heat indeed spreads to the heart, but the reek of putrefaction does not reach there but remains circumscribed where it is at the site of the bubo, and it is only by the modification of contiguous parts that the heat reaches the heart. Precisely in this way too in the case of those exposed to heat or fatigue does extension occur from the parts first heated to the vital principal. On the other hand in the case of putrefaction in the viscera and the great vessels a sort of vapour passes from the putrid humours to the cavities of the heart. So it comes about that the humours in the bubo all become putrid in the course of one or two consecutive days, in as much as they are in contact with one another, and penned up in one spot. Humours in the viscera, on the other hand, and in the great vessels are slower to kindle corrupt heat in as much as they are continually spreading abroad and reducing all they lay hold on to a common putrefaction. To put it briefly, just as in the case of allexternal objects everything which from any cause whatsoever becomes unnaturally hot (provided the heated thing is not putrid) remains hot like a stone or a log or whatever it may be up to the point at which

it insensibly becomes cold; on the other hand whatever is capable of putrefaction retains its heat and this spreads without respite in continuity. Even so I have observed in the country the dung of cattle and doves in some part so violently heated by the sun as to emit an abundant exhalation which rises up like smoke, and if one approaches it is extremely biting and annoying so that it irritates the eyes and nostrils; and if one ventures to touch it the dung is so hot that it burns those who touch or tread on it for too long. Yet this phenomenon does not persist for all time, for on the succeeding day all the dung that was at boiling point the day before will have cooled down while that contiguous to it which hitherto had been smouldering when the portion first to boil had reached its zenith, this, as the first declines, itself in turn grows hot, boils up, and a little later reaches its zenith, the first having now grown cool. Then the second portion in its turn declines, and the part next to it begins to smoulder. Then in a little while that too kindles, and reaches its zenith, and the other cools down. The period is roughly of a day and a night, so that the process is a most appropriate illustration of a quotidian fever. If the above cycle is completed in two days and nights it is similarly an illustration of a tertian; if in three of a quartan, and if in four of a quintan, supposing, that is, there is such a thing as a quintan fever: for my own part I have so far no satisfactory evidence for such a period, nor for any more extended than the quartan. But those fevers whose exacerbations occur periodically we shall discuss later.

The putrefaction of the humours which occurs in the vessels closely resembles that in the case of boils, abscesses and the other inflammatory swellings. It falls into two classes, and from a combination of the two classes a third species arises, which is complex owing to the difficulty of estimating the degree of excess or deficiency of one or other of the two classes in the combination. So far as concerns the two main classes the one comes into being when nature gets the upper hand there is in the case of boils and all inflammatory swellings, pus; in the humours of the arteries and veins we have corresponding to pus, the urinary sediment. Putrefaction such as this is not putrefaction pure and simple. There is present a certain element of coction. As long as the coctive faculty of the

of the vessels is maintained the humour which is meanwhile in process of putrefaction undergoes a coctive modification.

There is a second form of putrefaction when the coctive faculty is so impaired that it can effect no salutary modification of the putrefying excretion. This occurs sometimes when the coctive faculty is weakened to the last degree, even though the putrefying matter is only moderately malignant, and sometimes when the faculty has not reached utter impairment, but the moist matter is completely malignant.

The putrefaction of such an excretion as this has no constant consistency, colour nor smell: the putrefying matter constantly changes and varies according to its essential nature. The other putrefaction, that in which we said there was an element of coction, always changes to a form of pus constant in colour, consistency and smell.

When nature absolutely gets the upper hand we have the best form of pus; on inspection white, thick, and homogeneous throughout; smooth to the touch and not at all offensive. If it is as it were semi-putrid the third class in this series is constituted, the one we spoke of a little above. This class we described as the most diverse in its manifestations, for owing to the varying degree in which it has undergone coction its varieties are infinite. Often though it has reached the stage of whiteness it is either offensive or is thin in consistency. Sometimes its appearance is not white but livid and in all these points there are a thousand differences of degree. As numerous as the varieties of putrefaction in the case of abscesses are the species of the substances present in the urine in the case of fevers lighted up by putrefaction. The most favourable form - that which is reached when the putrefying humour undergoes complete coction by the containing viscus - has a sediment which is white, smooth, even, and not at all offensive. The least favourable is that which diverges most from this in all points. That which is intermediate is favourable or unfavourable in proportion as it approaches more closely either extreme. But the differentiation of urines I have discussed in my observations on "Judgments" (diagnostics).

The fevers that are lighted up from a putrefaction of the humours must be considered to differ from the ephemeral. Of these the diagnosis is not difficult even though to some it seems hopeless. This we have over and over again demonstrated in actual practice, when on the cessation of the initial exacerbation we have told the patient to wash, eat in moderation, and follow his usual routine, assuring him that he would have no more fever. And so it has turned out. The sole and certain indication of an ephemeral fever is that it arises from a recent and obvious antecedent cause - what all the younger school of physicians now customarily term an immediate cause. This, however, though inseparable from such fever is not peculiar to them; for certain other fevers begin from some obvious antecedent cause. What is inseparable from and peculiar to them is the prompt coction of the urine on the third day, combined with a notable increase in the amplitude and quickness of the pulse, so that its frequency is out of all proportion to the well being of the surface. A still more peculiar and inseparable quality is a total lack of increase in the quickness of the pulse, or if it does increase, its very trivial and inappreciable amount, differing very little from that of health.

Furthermore the mildness of the heat in this class of fevers is both peculiar to and inseparable from them. A point inseparable too is the evenness and easy advance both in the heat and in the pulse rate. This, however, is not peculiar to them. It is present in certain of the other fevers, as too is the moderate level of the fastigium; for not even is this peculiar to ephemeral fevers even though it is here most common.

Indeed these common properties in regard to the advance and fastigium, in so far as they are chiefly characteristic of ephemeral fevers, it would be better to describe as peculiar to them. By so doing, even though it were not an exact image of the truth still we should have in its fullest and most pathognomonic form an indication of this class of fevers which would be at once peculiar to them and inseparable from them. In the same class would stand the decline occurring with sweating or dampness or at all events with some amount of healthful vapour, followed by complete cessation of feverishness.

This, then, is the general method of diagnosing ephemeral fevers. I shall discuss each one individually according to its variety in what follows.

The other class of fevers which is in the opposite category to the ephemeral, has no name common to all its members, but its primary divisions are two; differentiated by well marked indications. The first are lighted up by putrefaction of the humours. The others attack the actual solid portions of the organism. These we call hectic fevers, either because they are stubborn, and difficult to resolve, like the habits of the body, or because it is the actual habit of the body that they attack. For this is the usual term for the solid parts in contradistinction to the moist

The diagnostic points in cases of fevers originating in putrefaction of the humours are the following: The first, not inseparable from but peculiar to them is that no immediate cause ushers in this class of fever. In neither of the other kinds does this hold good; for every ephemeral fever arises from immediate causes, while the hectic fevers, whenever they have come into being in the absence of immediate causes, are never the original form of attack; so that whenever it befalls any patient to be feverish without an immediate cause one may be assured that the cause of the disease lies in the humours. True it is that sometimes an obvious immediate cause does its part in bringing about an ephemeral fever and that a fever born of putrescence of the humours follows on whenever the unhealthy organism is so predisposed - i.e. when it is uncleansed and abounding in excrementitious matter. For these being well heated in the course of the ephemeral fevers and thence secondarily acquiring the beginnings of putrefaction, light up the second form of fever on the cessation of the first. There is one point at once peculiar and inseparable for the diagnosis of this sequela in all cases: the failure of the ephemeral fever to end in complete apyrexia. Sometimes indeed it happens that even at the fastigium of ephemeral fevers some evidence of the complication appears, and much more often during their decline; whenever what we stated a little above about their quite favourable subsidence fails to occur. These then are the evidences of a complication. An initial rigor without preliminary exposure to heat or to violent cold (such as most commonly occurs to those travelling in the snow or in other ways

long exposed to violent chill) is in itself a point peculiar to fevers which are lighted up from putrescence of the humours, yet not inseparable from them. Rigors do not occur in all of them, anymore than shiverings. In fact the latter are not merely not inseparable from this class of fevers, but at the inception are not even a peculiarity. The unevenness of the pulse and temperature whether at the onset or in the advance is a peculiarity of this class of fevers; but even this is not an inseparable feature for many of them come on and advance to the fastigium without perceptible unevenness. Still less is the development of numerous attacks as it were by the exacerbations; a feature that we call additional exacerbation. Similarly even the depression of the pulse - the term applied to the pulse when it is very small and uneven at the commencement of the exacerbation - is not an inseparable property of this class of fevers. Still it is not common to any other class of fevers; and it is a remarkable peculiarity of these, as likewise is the unevenness: whenever, that is, it is not the result of some special symptom. For often when any noxious humour gathers at the very mouth of the stomach, and irritates or chills it the pulse becomes both small and uneven. Smallness is the more usual feature in the case of chilling humours; unevenness in the case of irritating; but if there is vomiting both these features immediately subside but when the stomach is unaffected the pulse in the class of fevers mentioned is as described.

But the greatest indications of fevers arising from putrescence of the humours lies in the quality of the heat. There is nothing healthful nor moderate about it; nothing resembling in any way that of the ephemeral fevers; but just as the best of our predessors described it it is somehow biting to a degree, so as to be irritating and mordant to the touch as smoke to the eyes and nostrils. Now in the onset of the exacerbations while the heat is still smothered and the excrementitious matters still smouldering within it is not immediately recognised at the first laying on of the hand: but if you take your time the above type of heat rises up from the deeper parts. I am convinced that it was from his observation of this that Themison supposed it to be a peculiar and inseparable feature in all fever cases. This point, however, we investigate later in a place devoted to that argument. The kind of heat I speak of, that which is pungent, as one may call it, or mordant to the hand laid upon it, like some blistering application, is the product of putrefaction of the humours; clearly manifest in the advance and

at the fastigium: not clear nor immediately apparent at the onset. A peculiar and inseparable feature of the class of fevers lighted up from the humours is the quickness of the pulse beat, which is more plainly manifested in the increases, but not dubious even at the onset and fastigium. The commencement of these fevers is accompanied by a small fast pulse: the fastigium by an ample fast pulse. So, too, a frequency of the pulse that does not tally with the mildness of the skin temperature is a conspicuous feature of these fevers, and this is absent in ephemeral and hectic fevers. Peculiar above all to such fevers is the crudity of the urine, and this imperfect coction is a peculiar indication of fevers originating from the humours: for in the ephemeral fevers it is obvious that coction is neither absent altogether nor imperfect; neither undigested nor imperfectly digested. Either of these points taken separately is an indication peculiar to fevers arising from humours; taken together by way of a disjunctive proposition they are points completely inseparable from them. For in this class of fevers the first emissions of urine lack coction completely or partially. Any definite or notable indication of coction in the first urinations never appears in these fevers, excepting in that transition from ephemeral fevers which we have mentioned above.

In addition to these indications of the fevers under consideration there remains the point that at the height of the exacerbation they manifest some symptom of an ardent fever.

Similarly, if there appeared those symptoms of shivering fevers or malignant intermittent fevers, or of semi-tertian or typhoid, or any other similar fever, which are peculiar to the class of fevers lighted up from putrefying humours, even though they are not inseparable from them (and consequently when they are not present the diagnosis must be made from other considerations) - still if they did appear they would be demonstrative not merely of the class of fever but also of the particular variety.

Furthermore, the failure of the decline to end in complete apyrexia, whether that be with sweating or otherwise, means one of two things - either it is significant of a complication if all the prior indications pointed to an ephemeral fever, or if not,

it proves that from the very commencement the attack was due to a putrid fever.

Whenever the pulse feels hard on the first day of the disease we must consider whether there is any coagulation due to cold, or any dryness or spastic tension in the body of the patient, or any inflammatory swelling or induration; being well aware that it is in these conditions alone that the pulse becomes hard. As for Archigenes' errors with regard to the conception and diagnosis of the hard pulse I have proved them to the hilt in my tractate on "The Pulse"; with which anyone who intends to use the present work must certainly be familiar and particularly with the diagnostic portion. For in one tractate which I have entitled the "Differentiae of the Pulses" I have discussed their terminology and signification, and in another four volumes entitled "The Diagnosis of the Pulses" I have discussed the methods of diagnosing each. Similarly I have written a continuation of that in four volumes on the "Causation of the Pulses", and in addition to the above a fourth on "The Pulses in Prognosis" in which I demonstrate not merely in theory but in actual practice the value of this method of investigation. Anyone who acted as my clinical assistant when I was demonstrating in practice the theory of my books was in the first place above all convinced of this - that a hard pulse is neither a peculiar nor an inseparable quality of these fevers. But for the present this may wait, for in the above works and in yet another in eight volumes, in which we review Archigenes' book on the "Pulses" we have abundantly demonstrated this class of symptom. For the moment I merely mention what is serviceable to the present purpose. The hard pulse is not peculiar to nor inseparable from any kind of fever, ephemeral, putrid, or hectic. It is however for the most part present in hectic fevers and sometimes in the other two kinds on account of some chance symptoms - in the ephemeral fevers whenever the patient's fever is the result of violent chilling, or if there is any coexisting nervous tension, and sometimes it occurs on account of excessive exposure to heat, or exhaustion combined, or lack of food or extreme loss of sleep, or purging, whenever these accompany a defective diet. In the putrid fevers the pulse is hard whenever any viscus is inflamed or indurated. It will also become hard from the association of some symptom whether it be some nervous tension or dryness and also in those who drink cold water at an unsuitable time or take a cold bath or indulge greedily in certain fruits. But as far as fever, qua fever is concerned the pulse never becomes hard

either in ephemeral or putrid fevers. Even when patients are feverish from an inflammatory swelling, hardness of the pulse is not due to the same cause as the feverishness. The fever results from putrescence of the humours; the hardness from tension consequent upon the congestion of the vessels. To put it briefly, hardness originates in the coats of the arteries through coagulation, tension or dryness. Coagulation is brought about by violent chillings: tension by inflammations and indurations, and by a condition of the nerves corresponding to an inflammation: dryness by long continued evacuations (whether by a flux of the belly, lienteric or dysenteric diarrhoea, or prolonged vomiting or other such cause), by long continued hunger, by prolonged burning fevers, and in a word by all the conditions that powerfully desiccate the solid parts of the organism; as for example hectic fevers, with which it is now time to deal.

Let us begin with their mode of origin. The fevers called hectic arise in two ways. For the most part they follow on ardent fevers, either after these have been so far prolonged as in time to exhaust the moisture of the heart substance, or while that remains still abundant. The first are not merely hectic, but have become in addition wasting fevers. Those which originate while there is still moisture remaining fasten upon the substance of the heart itself and thence blaze up fiercely, just like the light of a lamp when it is burning wick. One of their modes of origin I have already mentioned. The other consists in a primary invasion of a hectic fever, taking its origin like an ephemeral fever from grief, passion and excessive exhaustion combined with exposure to heat. Such fevers readily admit cure. Those of them, however, which through the ignorance of the physician in attendance have gone the length of wasting are not merely difficult but impossible to cure: once, that is, the condition is established and has ceased to be incipient. Their nature is dry and hot, the heart being in much the same case as a lamp wick when it is almost consumed. For when it is burnt thus it grows dim and flickers and loses its steadiness owing to the dryness; so that even if you pour in oil without stint, it is impossible to kindle an ample flame. So the small, feeble flame is dispersed in the lamp, grows steadily smaller and smaller, until it goes out. Such is the typical wasting fever, a different ailment from the wasting disease which occurs in the aged without fever, owing to the extinction of the native heat. This is the most painless form of death and comes about

naturally from desiccation as also does that form of it occurring in persons wasting unnaturally which Philippus terms pathological old age: a condition in which I have often seen not the old merely but even youths involved.

The wasting fever, however, is not merely a dry but also a hot infirmity, and in it the animal heat is extinguished much more quickly and the whole body withers like a tree that has been dried to tinder whether by length of time, nearness to a flame, or excessive and immoderate drought. But I have written separately on the nature of the whole wasting state.

Since there are, as we have just defined, two species of hectic fever let us proceed to their diagnostic points. The hectic fever that complicates a case of wasting is the easiest and promptest of recognition. Before ever you set finger to the pulse or temperature you will see the eyes, from total loss of their watery substance, unnaturally hollowed, just as if they were sunk in pits, so that the bones to which the eyelids are attached jut out. Furthermore, the secretions of the eyes appear crusted and a certain parched condition is manifest, closely resembling that of those who have marched all day under a hot sun through thick dust. The very bloom of life has perished from the complexion, and this throughout the whole face. An intense parching is apparent in all the skin of the face, and above all in the forehead, so that it is hard and tense owing to the dryness. They are not even able to open their eyes wide but remain in a condition just like that of those who drowse: nay, they usually drop their eyelids like people in a doze, yet the condition is not one of sleep but an inability to keep awake. The flesh about the temples is wasted so that the parts seem collapsed and sunken. In a word they are nothing but skin and bone, so that if you strip them and inspect the abdomen you would fancy that there were no intestines nor viscera left and that the hypochondrium had been forcibly retracted into the chest. If you choose to touch them the skin is parched to the last degree and if you take it between finger and thumb and lift it, it stands up like so much leather. The pulse is thin, hard, faint, and frequent. The heat when first you put hand to it is doubtful, but in a little its acrid and mordant character is manifest, and the more so the longer you maintain your touch. There is no further need to enumerate the remaining indications

in so clear a case. Better to turn our attention to the initial stage of wasting, by which I mean that in which the moisture native to each organ and dispersed through the interstices of the homogeneous tissue, whereby the parts are primarily nourished, is in danger of becoming exhausted throughout the heart tissue. As long as any of this moisture remains the fever is hectic merely, but so far in no way a wasting fever. But whenever the possibility arises of this moisture failing altogether then the typical wasting occurs.

In all hectic fevers the condition is a serious one whenever, that is, they pass the limit of the first stage, which I define as in other diseases not by a calculation of days and hours but by the nature of the condition. For when the heart substance first diverges from its natural healthy temperament its native moisture is not immediately lost, nor its faculty impaired. At first there is a boiling up, as it were, of its moisture, and at this stage it is a most simple matter to cure such a fever, in as much as the heart faculty is so far unaffected. But there follows on the boiling a consumption of the moisture, and when this has gone a certain length the homogeneous tissues themselves, which are as it were the component parts of the heart, become drier and worse nourished, and the cardiac faculty becomes impaired in proportion as dryness and heat gain ground therein, and it only needs the victory of one or other of these to reduce the cardiac faculty to impotence.

A fever such as this hangs in the balance. It is midway between the dreadful and utterly hopeless wasting fever, and the easily handled fever of the first stage mentioned above. The ground it covers is wide, for its condition varies much in severity. A fever which is equidistant from the two extremes - i.e. from the completely typical wasting fever and from the fever that so far has no such taint - holds, I presume, an intermediate position, and as regards cure the balance has an equal chance of inclining in either direction. The fever which approximates to the wasting type is already in the danger zone. Similarly that which is closer to the first offers a reasonable expectation of deliverance.

We must now discuss in order the diagnostic features of each, and first those of the fever which easily admits of resolution, unless it meets with ill luck in the shape of one of the general ruck of physicians. When uncomplicated it is easy of recognition. When it

involves with itself one of the putrid fevers it becomes difficult to detect owing to the admixture. Let us take first the uncomplicated type originating from one of the causes already given, and let us assume that on the first day all the indications in the case point to a fever of the ephemeral class. With these the variety of the immediate cause will also be immediately manifest, and will be indicated in the course of my remarks. Even by interrogating the patient it will be possible to discover whether his general condition was irreproachable, and whether it was merely from excess of passion or grief, and from no other cause that his fever began. If this appears to be the case and yet the fever extends into the second day and fails to end in apyrexia and if without becoming more violent it appears more parching, then such a fever will be under suspicion of proving hectic. If moreover on the third day the patient in the absence of food shows a disposition to pass safely over the suspected hours of the third day exacerbation; if there is no considerable increase or diminution of the disease, but the small residue of the initial fever is prolonged and still present, and the body is parched; and if when you first apply your hand the heat appears moderate, but after longer application strikes on it as acrid, mordant, and parching, then such a fever must be regarded as hectic.

But the greatest and most irrefutable indication of its nature is this. When the patient seems to be quite safely past the suspected hours give him a meal. Within an hour or two after the meal it will at once be apparent to all who touch the patient that the fever has acquired a secondary increase. If we give food some may blame us for feeding at an improper season, alleging that we have above all given it in the very season of the exacerbation, that we should have held our hand a while longer, and that the accession was delayed. But it is not so. All the hectic fevers have this peculiar and inseparable feature:- if food is given the temperature rises and the pulse increases in amplitude and quickness so that a non-pathological accession seems to have occurred - by which term I mean one in which there is no shivering, no chilling of the extremities, no lethargy, no marked torpor, nor anything abnormal generally either in the temperature or pulse; in particular no smallness, weakness or other such symptom; merely the immediate increase in the size and quickness of the pulse natural to anyone after eating.

It is true that a physiological advance sometimes

occurs in certain other fevers, and to this extent it may be regarded as not being a peculiar and inseparable symptom of hectic fevers, but the distinction is a valuable one if you regard the sum total of the above named indications. In all the other fevers such physiological invasions occur in the absence of food. With hectic fevers it is quite the reverse, and at no time is there any accession, for it is all one continuous fever, like that which is distinctively termed the continued fever. The feature of that type, however, is the perfect blaze of heat that meets the touch of the hand: to say nothing of the extreme speed, frequency and amplitude of the pulse. In the hectic fevers no considerable heat meets us, while the smallness, infrequency, and slowness of the pulse, as compared with those of the continued fevers, is in proportion to the lower level of the temperature.

A common feature then of all hectic fevers is that they are low and even throughout their course, from the very beginning to the very end. Dryness is a peculiarity of those hectic fevers which are akin to wastings, for if they are not complicated by wasting hectic fevers often occur without dryness. Such fevers attacked very many in the recent great famine. Hectic fevers then differ, as we have said, from continued fevers. From the other fevers which show physiological accessions they differ chiefly in this - that whereas the former develop a pathological element when the patient eats just before the onset of the exacerbation in the hectic fevers the accession which comes about after food is practically physiological, and in fact is no accession at all, as I stated a little ago, though it deludes the inexperienced physician both by the height of the temperature and the size and quickness of the pulse. Such a fever will be more clearly recognised on the succeeding day if we continue to keep a very careful eye on the length of the time that the alterations in the pulse and temperature remain after the patient has taken food. It will be found that all these signs remain recognizably modified so long as the digestion and assimilation due to the food continue to refresh the dryness of the heart; but that then they return again to the condition in which they were at first, before the patient took nourishment. Hence, if you feed the patient at a different hour on the next day, and again at a different hour on the day following, you will find what I say taking place - the rise of temperature after the meal and the modifications in the pulse as described. Apparently they behave in the same way as quicklime and heated stones. If you pour

the coldest of water on these they appear much hotter: their parching heat being apparently nourished by the wet substance. Why this happens is a problem in physics, but that it does happen anyone may discover who likes to try. If you take a lump of quicklime in your hand its heat is trivial and is not perceived, but if you put it down on the ground and pour water on it you will see it at once growing quite hot and boiling like caldrons when they are exposed to a hot flame. You will see, too, a cloud of steam rising up from it, and if at this point you have the hardihood to touch it you will promptly get burnt.

So, odd though it seems, the power of moist heat is, if we can trust our senses, far more manifest than that of dry. That it is a case of dry heat in the hectic fevers which end in wasting you may learn from the following considerations. No one in the first stage of his illness falls a victim to this class of fever if he is of a moist habit of body; whereas all those who are naturally somewhat dry and above all if they are in addition of hot temperament, and have adopted a life of toil, wakefulness, anxiety and spare diet, are usually from the very first attacked by a hectic fever after passion or grief; still more if there is a concurrence of a summer season, a hot and dry constitution and a locality to correspond. What defines the first stage is that at the time when ephemeral fevers are passing by a mild declension to apyrexia, not merely is this feature altogether absent, but there is a manifest increase in the dryness. At this point the fever first emerges from the ephemeral class and begins to be hectic. What defines its growth, as it were, and full development is the exacerbation on the third day. If at this stage as we said a little ago, no second exacerbation makes its onslaught and yet the patient fails to lose his fever, and his dryness reaches a higher pitch then this is assuredly one of the hectic fevers; and in course of time it will speedily become a wasting fever, with feeble and hard pulse. Thereafter it is bound to become small and frequent. It is, however, not these symptoms that make it a wasting fever, but the feebleness and hardness.

Feebleness is caused by powerful cardiac distemperature, hardness by desiccations; and if these conditions attack the heart the animal body thereupon inevitably suffers from a wasting fever. Persons suffering from acute and burning fevers fall for the most part

into the same condition if they have been incorrectly treated: those particularly who when they needed cold water to drink received neither a drink nor any other medicament to cool their chest and hypochondria. If in addition to receiving none of these they are vigorously treated with the honey poultices which are the fashion of the moment they are still more predisposed to wasting, whether it is fever simply from which they are suffering or an inflammation of the liver or belly; for it is principally these inflammations which when incorrectly treated end in wastings; so much so that some consider that such a condition can arise in no other way, not knowing that neither liver nor belly, nor any other viscus or part can cause wasting or any hectic fever whatsoever, until as I have stated, there is trouble in the heart. In the heart the disease is sometimes autogenous, as in violent and prolonged passion or grief; sometimes it arises from ardent fevers, and sometimes from affections of the lungs and chest - particularly in pulmonary abscesses and phthisis - and as with these so with the belly and liver and in a word with all chronic inflammations in the principal parts of the body when conjoined with dryness of the whole organism, and above all of the heart. I at any rate have seen even a chronic inflammation of the colon passing on to wasting, and so, too, of the stomach, bladder, and kidneys. Quite commonly certain dysentery patients suffer from this class of fever; obviously in consequence of an inflammation of the bowels. Lienteric and prolonged diarrhoea whenever attended either from the very commencement or in the course of time by a low fever end in wastings; and, to be brief, all cases in which the substance of the heart after complete desiccation takes on a feverish heat in a form difficult of resolution.

Hence it is that a very important indication of hectic fevers is that the arteries are manifestly hotter than the surrounding tissues, a condition that does not occur in other fevers. The symptom becomes still more obvious if we foment or in any other way rarefy the patient, so that a sort of moisture is poured forth and the heat evaporates. After such evaporation the heat in all other parts strikes one as moderate, but in the arteries it is as great as before. This can be recognised most accurately during the diastole of the pulse, which for its part does not alter as a result of these evaporations but remains the same in all respects. The hectic fever, then, when uncomplicated

is a clear case, whether it be hectic pure and simple or whether it be wasting as well. When it is combined with fever of another type its recognition becomes more difficult. Take for example one which recently attacked a certain female patient. It had definite exacerbations which occurred not merely by day, but in the night as well. Now all the physicians in attendance missed the wasting fever. They considered that hectic fevers had no business with a perceptible first stage, advance, or fastigium; just as though it was impossible for a hectic fever to be complicated with a putrid. But we, even in this woman's case, recognized the condition at the very commencement, for each accession, whether occurring by day or by night, displayed a shortness of duration in the stages of the exacerbation; and often had a remission with some dampness or transpiration of vapour so definite that the body appeared to the touch of healthy temperature. But the arterial signs I have just described persisted throughout. They failed to cool down with the other tissues, or to remit the speed and frequency of their motion. Here I must repeat what I have said a score of times before in other places. It does not do to regard merely the cycles and proportions of the exacerbations. It is much more important to consider the individual aspect of the fever, and from that to recognize fevers themselves in the same way as we recognize men from their individual appearance. By this method we have often recognized the variety of the fever on the first day, without waiting for its tertian, quartan, or quotidian alternation. This point, however, is more fully discussed in the second volume of my "Judgments". I state, too, in the same work that it is essential to recognize the varieties of ephemeral fevers, and I promised, I am aware, to discuss them here, but when I recall how little short my observations there are of a full statement of the whole case I consider it a waste of time to transfer them here en masse, and shall merely add what was there inadequately defined.

In patients then whose fever results from exposure to heat the deviation of the skin towards heat and dryness is more marked than that of the pulse to feverishness. Consequently they are less thirsty than those in whom the heat is general. When you first put your hand on them the heat seems maximal - the converse of those whose illness results from obstructions, in whom the heat is ingravescent. In fever from exposure to heat the head principally seems to burn, and the

patients derive more pleasure and profit from cold affusions. Their eyes are hotter and redder, and are dry except in the cases where there is coryza and catarrh. For in some cases of heat fever these conditions are present also, and then the head is not merely hot but congested with blood, so that the veins of the eyes, temples, forehead and entire face are excessively distended. This vigorous congestion is a valuable point in distinguishing these cases from those whose fever is due to chilling of the humours, for in the latter class also all patients who have received any damage to their heads are easily liable to coryza and catarrh, and in them the fever is merely a symptom of the head condition. But as a rule the fever is more severe when the exposure to cold or heat has affected the body as a whole.

The skin is not so hot in cases of exposure to cold, the body is of bigger bulk; and there is no such dryness about the face as there is in cases of heat fever without congestion of the head. These patients as a general rule all suffer from congestion of the head except where the body is perfectly pure and void of excretions. In their case only can the head remain uncongested after beginning to grow warm. All the same sometimes even apart from congestion an abundant heat may envelop the whole head after exposure to heat. The condition, then, in this case, differs most obviously from that in the case of exposure to cold. The condition which is accompanied by congestion is, however, hard to differentiate in so far as it may excite catarrh and coryza, themselves accompaniments of fevers caused by cold. But as we have pointed out the dryness and excessive heat of the skin and all the other features I have just mentioned are peculiar to heat fevers. These features I shall discuss further in my observations on the method of treatment, together with all the other differentiae of ephemeral fevers. Their diagnostic points I have already given in the second volume of the "Judgments" and, therefore, do not need to detail now. We shall conclude the present work at this point. In the succeeding volume we shall speak of all the differentiae of the fevers which are lighted up from the humours.

VOL. II.

It remains to detail the differentiae of fevers lighted up from the humours, first stating in this regard that the theory held by some that an increase and predominance of the bilious humour called by some pale bile, by others yellow, is an insufficient explanation of their origin. On such an hypothesis all persons suffering from jaundice would be in a very high state of fever, for in their case an abundance of this humour floods the whole body, yet they have no fever; except from some other concurrent cause; as to which I shall have something to say shortly. And it would be absurd to suppose that in the quartan and true quotidian fevers there is such a collection of bile as occurs in the tertian and ardent fevers. For contrary to what occurs in these, in quotidian and quartan fevers there are no bilious vomitings and no appearance of bile in the sweat, urine, or stools, to say nothing of any hint of it in any of the previous or attendant symptoms. Tertian fevers, it is true, as a rule occur in bodies that are somewhat bilious by nature, in persons in the prime of life, - the age which is beyond all others bilious - and principally in the season of summer, a time in which the bilious humour is predominant. They are common, too, in districts where the climate is hot and dry, in an atmosphere of a similar constitution and where the life is spent not mainly in sloth and ease, but in toil, anxiety, wakefulness, exposure to the sun and with a diet that is spare, and dry and heating to boot. Even the immoderate exhibition of heating and desiccating drugs is inducive of tertian fevers. Quotidian fevers on the other hand are a complete contrast. They occur in natures which tend to the phlegmatic humour; their prevalent season is the winter, their atmospheric constitutions are dampness and cold; they affect mainly the old and young; affect localities that are damp and cold, and lives of combined indolence and plethora, particularly when the subjects bathe after food, and above all when their actual food tends to the phlegmatic in type. But these patients show no bilious vomiting and there is no bile in the stools or sweat, as in the tertian fevers. Tertian fevers have their natural origin in a putrescence of the yellow bile, while the quotidian follow on phlegmatic humours, just as the quartan on the atrabilious. Hence bodies of more atrabilious nature, ages past the prime, the season of autumn, and corresponding to the above, everything dry and cold in composition in the food, drink, and whole

mode of life are productive of quartan fevers. For this reason there is even a difference in the initial rigor. In the tertian it gives the impression of an effective cause which is pricking and wounding: in the quartan of one that is chilling. But we have fully discussed the types of rigor in the "Causes of Symptoms" where in differentiating kindred fevers, I show how intermittent fevers - for so I term those which attain a perceptible apyrexia - arise from the movement and progress to every quarter of the body of the humour which produces the fever, while continuous fevers are developed when it is pent up and enclosed in the veins. The diagnosis of these conditions is given in the second volume of "Judgments".

The varieties of intermittent fevers are three in all: the quotidian, the tertian and the quartan. The quotidian arises from putrescence of phlegm; of the two forms of bile putrescence of the yellow bile causes tertian, of the black the quartan fever. Of the continuous fevers two forms arise from the yellow bile: the first comprises those called the continued fevers, whose whole course is one exacerbation from start to finish: the other those which though a species bear the generic title of continuous fever, and whose course is one of numerous cycles composed of the usual stages.

The varieties of the continued fevers are three in all. Some of them from beginning to end maintain an even level; some gradually increase, and the third kind gradually diminish. Certain authors call the first uniform or maximal, the second advancing or increscent, and the third decrescent. The continuous fevers fall into two principal varieties - those which are exacerbated on the third day only, and those which produce an intermediate exacerbation as well; and for these there is no distinct individual term. Those, however, which are exacerbated every third day I personally call tritaeophyes, but I have no objection to anyone calling them anything else he likes so long as his terminology corresponds to the difference in the facts. For of the continuous fevers which are exacerbated every third day those which terminate in apyrexia are one thing, and those which have a feverish decline are another, and over and above this those which have an intermediate exacerbation are different again. None of these do I call semitertian, but I do not gainsay those who wish to call them so, if in so doing they will be good enough to take care not to pass over any type of fever, but to name

name them all in order as I am now attempting to do in this work. For some of the continuous fevers which show an intermediate exacerbation progress after the fashion of a quotidian fever, with their two exacerbations closely resembling each other. In others the two are dissimilar, the third closely corresponding with the first and the fourth with the second. Their course is that of a double tertian. These are mainly of biliary origin. Those, however, with a similar exacerbation each day arise rather from phlegmatic humour. There is a third kind of continuous fever, of rare occurrence. Here the exacerbation progresses after the fashion of the quartan cycle, and does not terminate in apyrexia; and just as the tertian is sometimes double so this is not only double but actually triple.

However these involvements of fever are more more appropriate to my study of "Types". The sum total then of all the varieties of simple fevers that are kindled from the humours is as stated here. But from combinations of these certain others arise with which I shall deal next. First, however, I will add what remains to be said about the simple fevers, inasmuch as every fever which is typically simple possesses one single form which is as it were a criterion of those which we are now to describe. Whichever of them degenerates from this in any respect to that extent deviates from the class of simple fevers.

The fever generated by the passage of yellow bile through the sentient parts of the body is ushered in by a rigor and is of the ardent type. It terminates in the vomiting or evacuation of sweating of bile, or in a combination of two or all three of these. In this class of fever the maximum length of the exacerbation is twelve equinoctial hours; it is called the typical tertian; and it originates in a patient of bilious temperament, and when the season, atmospheric condition, and the manner of life are hot and dry. The other causes that contribute to its inception have all been mentioned a little above. The duration of the exacerbation is generally less than we have stated, and may vary considerably with the quantity and quality of the bile, the patient's resistance, or the diathesis existing in him at the moment. Excess of bile causes a longer exacerbation than deficiency of bile; thin bile a shorter attack than thick; and similarly a high resistance means a shorter attack, a low resistance a

longer, and for the bodily diathesis a rarefied condition involves a shorter and a dense condition a longer attack. During the intermittent stage of such a fever the pulse gives absolutely no indication of putrefaction of the humour during the day or night following the exacerbation, but when the fever begins to smoulder it becomes faintly recognizeable in the first hours of the next day, and more clearly still towards the end of the same day or night, and even more clearly on the day succeeding - the one in fact which precedes the day or night of the next exacerbation. On that day the indications from the pulse are quite clear; still more when the exacerbation actually begins, and more than ever when it is advancing to its height. At the height they are less definite than during the advance, and become again much fainter during the decline. If you are prepared to call this fever a true tertian you will be using a venerable term. If not, at any rate allow me so to term it for the sake of clearness in exposition.

The second type of true simple fever arises when putrescent phlegm is impelled by nature through sentient bodies. It sets in with a chilling of the extremities and with a shivering rather than a rigor. Its temperature is slow to rise and its advance to a height is prolonged because the humour of which it is composed is cold and damp in its temperament, and viscid in consistency. Hence it lights up with difficulty and is slow to permeate, and being everywhere held up at the natural channels it sometimes impairs and depresses the faculty and makes the pulse unequal, weak, and small, both in the invasion and in first stages of the advance. It is true that in the bilious fever, too, you may with the invasion of the exacerbations get all the pulse symptoms here described, but in that instance all of them speedily subside, including the inequality, which does not as a rule, accompany this class of fever at all. The heat, too, soon after the end of the rigor, blazes up brightly like a clear fire without a single wreath of smoke on it. But as for the phlegmatic humour, on the other hand, you may compare its heat to the smoky flame of green wood kindling. That is why its stools are scanty; the duration of the exacerbation is prolonged and the intermission, unlike that in the first, is incomplete, and always preserves some indication in the temperature and pulse of a corruption of the humour. And though in this fever, too, the indication of corruption is most pronounced during the invasions and accessions of the exacerbation, yet this, too, in its typical form, is

commonly regarded as having a complete intermission. Even I myself frequently so describe it whenever extreme precision is not required. It occurs where the corporeal nature, seasons, places and conditions, the habits, mode of life, and so on are phlegmatic.

It has a daily exacerbation, though this is less hot than the bilious tertian. But it is obvious that the latter (owing to its humour being readily inflammable, and to the ease with which all that portion of it which has boiled up with each exacerbation can on each occasion, thanks to its volatility, be entirely cleared away) goes on to a clearer apyrexia, and after the exacerbation leaves behind but a tiny spark of putrid heat. On the other hand the phlegmatic fever is not completely cleared away in the declension of the exacerbations, and leaves behind as it were no small smoulder. Hence the insignificance of its intermission, and the earlier onset of the next exacerbation.

The third class of intermittent fevers is the true quartan This, originating in a humour which is purely atrabilious, cold and dry in temperament, begins to smoulder little by little: just like a stone, shell, bone or any other such cold dry substance. But when a flame, as it were, has been kindled from it, it leaves behind after its exacerbation nothing smoky or half consumed, and so the evacuations are more abundant in this humour than in the phlegmatic. The intermission has the appearance of being complete because in this case the kindled portion of the atrabilious humour is completely voided and dispersed. For the same reason the rigor very closely resembles that of persons frozen to the bone in extreme cold; not like that which sometimes occurs in cases of heat exposure, exhaustion, or from the use of caustic and irritating applications to a sore. This type of fever is necessarily induced by everything in the habits, mode of life, atmospheric conditions, season, and locality that causes a collection of black bile, and the nature and age of the patient are atrabilious.

The exacerbation of this fever, too, closely resembles the tertian in duration. Sometimes it is longer, (though the fever still remains true to type), owing to the somewhat cold humour in which it consists. The cause responsible for the difference in length of the exacerbations is practically the same in this as in all other fevers, and lies, as we stated a little while ago in reference to true tertian fevers, in the quantity and quality of the humour;

the strength or weakness of the resistance, and, further, in the state of the sick person. In this as in all their other features they are comparable to the fevers of bilious origin. If the atrabilious humour does not putrefy, nor pass violently through sentient bodies it will not cause a true quartan cycle. Certainly chronic atrabilious indispositions of the spleen, and discolorations of the entire skin correspond to the jaundices; cancers and eating sores to the form of erysipelas that arises from yellow bile. But fever is no more a necessary concomitant of the atrabilious condition than of the bilious; except when there is a previous putrefaction of the atrabilious humour. Nature in fact, relying on her own faculties, is always endeavouring to assimilate to the parts requiring nourishment everything that admits of becoming healthful, and to void that which does not. If through density, excess, or viscidity of the excrementitious matter, or through any obstruction of the ways, or by her own weakness, she fails to expel all the noxious element, then this must if it lingers on throughout the animal body, inevitably become corrupt, for to remain in its original condition is an impossibility to any of the humours, much more to one which is so detrimental that nature cannot turn it to account. It must either undergo coction and be added and assimilated to the solid portions of the animal, or it must become corrupt and putrid. So with jaundice and atrabiliousness; when the bilious humours remain in excess over long in the body fevers supervene.

The state existing in the liver or spleen frequently ends in fever, if any inflammation or obstruction has brought about the aforesaid disabilities. For the same reason, when it is the phlegmatic humour that is in excess fever does not ensue unless it has first become putrid. Here we often observe what the ancients regarded as an impossibility - the occurrence of a rigor without fever. Sometimes this is an isolated phenomenon; sometimes it occurs at intervals for several days, or is continuous from start to finish, or is so extremely slight that when the patients are asleep it seems to be absent, and only to become perceptible when they move: or it may be of greater severity and trouble them even when they do not move. But as time goes on and this humour, too, becomes putrid they have not merely rigors but fever as well, and tedious and intractable indeed is the fever, quotidian in appearance, that supervenes from these causes.

The fever peculiarly termed "Shivering Fever" is of this class. In this the sufferers have fever and rigors simultaneously and they are sensible of both at the same time and in every part of the body. Archigenes, for his part, considers that the term "shivering fever" should never be applied to any other fever save this alone. On the other hand certain of the Attic School plainly so term the rigor that preceeds a fever. Praxagoras, I think, calls this humour the "hyaline" or glassy. The younger school, Philippus among them, calls it the "crude", without adding any noun to narrow the definition. It belongs, I take it, to the phlegmatic variety, being abundantly cold and viscid; for whatever humour is alike moist and cold falls under the denomination of phlegmatic if one is content to follow Hippocrates, and the practice not merely of the ancient physicians but the whole Greek world. Prodicus in his work on the "Nature of Man" is in error about this term, misled by an astounding piece of etymology. But it is inopportune to digress in this direction at the moment, for I have devoted a separate work to this subject. Let us return to our subject. Every corporeal humour which is moist and cold we call phlegm. You, if you will, may call it Thingamybob; so little concern have I with mere names. But this you must recognize. This humour embraces several varieties. One form is extremely cold, so that it causes very severe pain if it is obstructed in a hot place, and often you may see the agony of a colic, as it is termed, abating after a pungent enema has brought away ~~evacuated~~ humour of this character. In appearance it resembles molten glass. There is a second form of phlegm which is often expectorated after coughing. It is distinctly sweet and obviously this variety cannot be typically cold if we remember what we proved in our remarks on the Efficacy of Simple Remedies. There is, too, a third form of phlegm. This tastes acid when expectorated. It is not as cold as the hyaline, but colder than the sweet. Similarly there is another which is saltish; either through putrefaction or through admixture of a salt serous moisture. Patients with this form of feverishness do not have a rigor, but merely a shiver at the onset of the exacerbation. The acid and hyaline type, if they become active and pass through the sentient bodies cause rigors without fever. If a slight amount of putrescence is superadded they produce "shivering fever". If putrefaction proceeds further a rigor proceeds and fever follows:- the chilling yielding to the preponderance of the heat, to disappear entirely during

the advance and at the fastigium. It is possible that the quality of the hyaline and acid phlegm is identical, which would make the varieties of the phlegmatic humour three in all - the acid, the sweet and the salt.

The introduction of fever by a rigor is least common in putrescence of the sweet phlegm. It is open to anyone to assume that this class of fevers is not simple, nor of simple causation; supposing, that is, the moisty of phlegm which is putrescent lights up the fever, while the remainder, i.e. that which is not yet putrescent and in virtue of which the rigor comes, differs in quality from the putrescent portion; for if the rigor is due to the non-putrid and the fever to the putrid portion, the cause will always be two-fold. Here it is without doubt open to us to maintain that the fever is due to the one class of cause and the rigor to another and that rigor and fever are two distinct entities; still in tertian fevers at any rate yellow bile is the single cause of rigor and fever alike. But these points are more appropriate to a discussion in logic. It is time to return to our present subject.

When the putrescent phlegmatic humour from which we said the quotidian fever arises, is mixed with the bilious, which is responsible for the tertian, both the cause and the condition are composite and twofold. The first humour produces an exacerbation every day; the second every other day. Hence on one day there are two exacerbations, on the next one. This of course does not apply to those cases where the moment of the two exacerbations coincides closely in time. When they coincide there will be one combined exacerbation which does not preserve either the true tertian or the quotidian type.

Since there are two forms of each fever, there will be four combinations:- first a mixture of the tertian and quotidian; second, of the tertian and the continuous quotidian; third of the quotidian and the continuous tertian; and fourth, of the continuous quotidian with the continuous tertian.

Each of the above combinations has two varieties according as the two exacerbations come on jointly at the same hour, or begin at different times. The latter are easily diagnosed, except that the inexperienced often miss the intermittent element owing to the patient never becoming quite free of fever. But we must fix our attention on

the individual nature of the exacerbation, as we have described more fully in the second volume of "Judgments", and make our diagnosis from that rather than from a comparison of the cycles.

Suppose someone is attacked about the first hour of the day by an exacerbation. The rigor has the appearance of lacerating the very flesh of the patient and thereafter up to the fastigium all the other indications of a tertian fever are prominent. The decline occurs with vomiting of bile and healthy sweating and the time is now the ninth hour. Suppose, too, that from the whole progress of the exacerbation we judge that about the eleventh hour the patient will be free of fever;— in the state, that is to say, which we customarily term apyrexia in cyclical fevers. But while we are in this expectation suppose that the sweating is suddenly suppressed (either from a mere densification or an actual shivering of the skin) and that thereafter ensue all the symptoms both in onset, advance, and fastigium of the type of a continuous phlegmatic fever. In such a case we shall recognize that the cause and type of the fever is two-fold -- a combination of an intermittent with a continuous fever, even though there is no observable intermission.

On the second day we shall expect the onset of an exacerbation at the ninth hour and if our forecast is justified by the result we shall, of course, be quite equally confident that on the third day, while the patient is still in a state of fever there will be an invasion of a tertian exacerbation about the first hour. If, however, the exacerbation we expect at the ninth hour of the second day, or at the first hour of the third day anticipates or lags behind its time then on the ensuing days we shall no longer expect it at the ninth hour or at the first hour, but at one advanced or delayed in proportion to that deviation in either direction from the original time, which was apparent in the first cycle of the exacerbations.

Which of the two stops first must be judged from the type of the fever, from the duration and severity of the exacerbation, its nature and progress; secondly from the alternation of the cycles in the point of anticipation or retardation; and in addition from the obvious signs of coction or want of coction of the entire disease; and of these the most important will be those in the urine. All these points I have discussed at length in the "Judgments".

If it is not at the ninth hour, but at the fifth or sixth that the continuous phlegmatic fever follows upon the intermittent bilious fever which began at the first hour the diagnosis is still more difficult to the ordinary run of physicians. They have no interest in observing whether it is one form of fever that is in question or two, or the nature of either; and inasmuch as they are blind to all this, they are ignorant not merely of how to treat them - for they fail to diagnose them - but they do not even know whether they should on the second day suspect both the hours which ushered in the exacerbations on the first. I am positive that they often make a guess at the likelihood of an exacerbation coming on rather by a process of divination than by scientific prognosis.

In this very combination of a tertian and a quotidian fever that we are now handling I have sometimes seen a pure tertian exacerbation making its attack about the first hour, and about the sixth hour a "day by day" fever as the younger school of physicians peculiarly term it. It is their practice so to term a fever which exacerbates every day, and never terminates in apyrexia. Such a fever it is my own habit to describe as a continuous quotidian; for the word "day by day" is absolutely unknown to Greek literature, and every action which takes place on successive days is called "quotidian". But as Plato says, when the things we have to deal with are of such importance one may be indifferent to words. For the sake of clearness in exposition let us then call the fever which has an exacerbation every day and ends in apyrexia, quotidian pure and simple without further qualification; that which does not, continuous quotidian. If you prefer you may add to the first the epithet "intermittent". So with that which exacerbates on alternate days, the first variety is the tertian pure and simple or the intermittent tertian; and the second ~~and~~ the continuous tertian. It is permissible to call the continuous tertian third day fever simply without further addition, as in fact certain authors actually do. But we have no business to be prosing about terminology. Let us return to our subject.

The lad in whose case occurred the combination of tertian and continuous quotidian fever that I have mentioned, in the morning of the first day began with a rigor characteristic of tertian fever, and up till the

sixth hour showed all the features of a genuine tertian, including a sudden and profuse vomiting of bile, a free action of the bowels, and bilious at that, and a moderate sweat. At that point contraction set in and he shivered, and thereafter, a second accession occurring, the pulse became small and unequal. Afterwards, up till the ninth hour, kindling as yet little by little, he showed for the most part the characteristics of the accession, but to a slight extent of the advance. Thence forward till about the fourth hour of the night the increase was definite. After that it remained at the same level as far as one could observe, until the sixth hour of the night, when it clearly began to decline till the fourth hour of the second day.

At that point contraction had begun and signs of the accession appeared, his extremities growing colder and the pulse small. Until the evening he showed a gradual advance, without a shivering or other abnormality, and then again reached the height about the fourth hour of the night, and began sensibly to decline about the sixth.

It was clear that somewhere about the second hour on the third day one might expect him to have his quotidian accession. What was not clear was whether the tertian would or would not observe its original hour. Well, at the second hour an exacerbation set in with a shiver. This increased faster than the exacerbations of the continuous quotidian on the first and second days, up till the fifth hour. Then in the hour following it made a fresh start and showed symptoms in every respect resembling those that had occurred in the second hour. The patient then again showed an increase and more readily, until the eighth hour when he again shivered, and shortly afterwards the exacerbation speedily grew and advanced, coming to its maximum somewhere about the fourth hour of the night.

What could this have been but a true semitertian exacerbation - the two fevers invading simultaneously owing to the quotidian being two hours before and the tertian two hours behind its time? Hence to anyone capable of recognizing individual types of fever it was plainly evident that there was a mixture of the symptoms of tertian and continuous quotidian fever. For since tertian attacks with a rigor and quotidian without, the combination of the two suddenly caused a shiver. This is a smaller affair than a rigor but greater than a chill

and it exceeds the chill and falls short of the rigor by an equal amount. Hence a shiver being equidistant from either of the two extremes occupies between rigor and chill an intermediate position, as happens in a blending of extremes. It is not, therefore, unreasonable that the name given to this class of fever should be the semitertian; for being a blend of the continuous quotidian and the intermittent tertian each half of its whole make up is composed of one of these two fevers. The term semitertian is formed on the analogy of "hemionos" ("half donkey" or "mule") and "demigod". The mule though it is half horse and half donkey that contribute to its origin, is named half-donkey after only one of them. So "demigod" indicates that the half share is god but does not state that as to the other half it is man. So the semitertian is half tertian fever and half continuous quotidian. It has two modes of origin, either from the coincidence at one point of the two exacerbations, as we have just described, through one coming too soon and the other too late; or from the two being combined with each other in the very beginning. The one which occurs when both coincide at one point shows only one exacerbation of a semitertian nature: the other every one from the commencement of the disease to its termination; and hence is by all most legitimately called semitertian. On this point, however, I shall have more to say anon, thanks chiefly to the school of Agathinus and Archigenes.

The young man, then, assumed in our narrative on the third day experienced an exacerbation of this nature owing to the invasions of both fevers occurring simultaneously; the quotidian coming steadily two hours ahead of its time and the tertian steadily two hours behind. On the fourth day, therefore, the exacerbation attacked at sunrise and preserved the true form of a phlegmatic fever. According to the calculation the fifth exacerbation of that fever might be expected to begin possibly about the tenth hour of the night, since it always came two hours in advance, while the third exacerbation of the bilious fever was due to attack somewhere about the fourth hour of the fifth day; so that the interval between the beginning of the two fevers would be six hours. And so it proved. About the tenth hour of the fourth night an exacerbation came on of the phlegmatic type of fever and so progressed until the fourth hour of the day. Then the bilious fever linked itself on. There was a mild rigor; the subsequent appearance showed by the exacerbation was once more that of a mixed type of bilious and phlegmatic combined. On the succeeding night about the eighth hour a pure and simple phlegmatic

fever began and occupied all the succeeding or sixth day. This declined until midnight and then began again after the same fashion. It continued for the remaining half of the night and till midday on the seventh day. It was then, I fancy, on the point of declining when the tertian took up the running, coming on with a rigor in the true tertian fashion and giving all the other indications equally clearly in the same way. It caused vomiting of bile, a bilious evacuation, a healthy urine and a slight amount of moisture in the evening. This was a very clear indication to those who have learnt to diagnose the appearances of fevers that it was on the wane and passing the worst, and would stop perhaps after one more cycle, or at the most two. For the declension showed as a matter of fact a remarkable mildness, far beyond any of the preceding ones, until the fourth hour of the night. At that time the phlegmatic fever came on which had its exacerbation every day, though two hours before its time. It continued all night, and all the next day, and then began again at the second hour of the eighth night. All this night, too, it continued and declined on the following or ninth day. The tertian exacerbation was, I suppose, due to occur on that day about the eighth hour, since it came two hours after time, but on that occasion it came on about the ninth hour, showing in this point, too, its failing vigour. At sunset the phlegmatic fever attacking prematurely, as usual, linked itself on to it, and continued throughout that night and the following day. On the tenth day it came on again at the tenth hour, and again on the eleventh at the eighth hour, remaining purely phlegmatic throughout. Then about the first hour of the night an invasion of the tertian took place with a shiver four hours late. At the sixth hour of the night there was a bilious stool and a certain dampness throughout the body, and following on these the whole decline almost approached apyrexia. It was by this time plain that the tertian was quite done with and that the phlegmatic fever alone remained; and that it, too, was beginning somewhat to abate. Hence, on the twelfth day the exacerbation no longer came two hours early, as it had always done before, but came on at the seventh hour. On the thirteenth day it did not appear at the sixth hour but went beyond even this, coming on at the seventh hour with a notable mildness and decline. On the fourteenth day the decline was still more favourable; the exacerbation came on at the ninth hour and remarkable signs of coction were present in the urine; foreshadowing that resolution would take place at the next critical point.

With this we are not now concerned, except as by the way. What the case of the patient here described does prove abundantly is that heterogeneous fevers are often combined - bilious with phlegmatic, intermittent with continuous; and that they are missed by most physicians.

Having given a reasonable explanation of the case we will return to the point we deferred a little ago. In that combination of a tertian and a continuous quotidian which we call semitertian either the yellow bile is in excess, and therefore the symptoms of tertian are more pronounced; or the bile is less and the phlegmatic humour predominant; and therefore the lesions of the continuous quotidian are more assured; or neither humour has extra potency but each is present in equal strength, in which case we get the true semitertian fever. Its form corresponds to the description given by Hippocrates in the first book of his Epidemic Diseases: "Most of these had the following morbid conditions:- shivering fevers, continuous, acute, unintermitting throughout, though in type semitertian, with one day comparatively clear, but with an aggravated exacerbation on the next: and in their course increasing to an acuter form".

By "shivering" he does not mean simply fevers that come on with a shiver, for scores of fevers, of which I shall have to speak subsequently, do that; but all those where the greater part of the exacerbation is taken up by shiverings, at any rate on the second of the two days - that on which the tertian and continuous quotidian come on together. The other is of course occupied by the quotidian alone. Usually it is the first day that introduces the combined fever, and the second the continuous phlegmatic fever; still it sometimes happens that this makes its invasion on the first day, and the two together on the second.

When, therefore, the humours are of equal potency, the combined exacerbation corresponds to the description we have just given of the semitertian. When the tertian element is in the ascendant the fever shows more shivering and acquires in addition a certain quality of rigor during the accession. Such a fever promptly becomes hotter and more burning, rises more quickly to its height, and produces some bilious vomiting, evacuation or moisture. When the other or phlegmatic humour is in excess the prevailing symptoms are chilling of the

extremities, and the shiverings are unimportant; the depression of the pulse is more pronounced and persistent; the increase of the exacerbation is slow, and it is late in reaching its height; thirst and burning, do not occur in it, nor is there vomiting or evacuation of bile or dampness.

Archigenes himself has reached some dim conception of this combination of the two fevers, but in a confused and disjointed way, as we demonstrate in the seventh volume of our observations on his treatise "Concerning the Pulse". He holds that in semitertians sometimes the tertian fever prevails, and sometimes the quotidian; but as for the equipotent mixture of the two which alone constitutes the true semitertian, this he has neither dreamed of nor demonstrated, but has utterly passed it by.

Whenever the intermittent bilious and the continuous phlegmatic fevers are equal the exacerbation comes on with a shiver; for the shiver is intermediate between the rigor, which accompanies the tertian, and the chilling which accompanies the continuous phlegmatic fever. The increase after the invasion is, qua the tertian, quick to take the heat and prompt to reach its height; qua the phlegmatic, which does its best to make the advance slow, it is retarded and interrupted.

There is, as it were, a sort of clash of symptoms. Sometimes the patient grows hot as the heat of the tertian, working more powerfully, brings the humours to the surface; sometimes the progress of the tertian is restrained and dragged inwards by the phlegmatic humour, which is sluggish, hard to move, cold, and by nature slow to permeate. With the victory of the cold humour in this duel contractions and shiverings occur and chillings of the extremities and skin, so that another exacerbation appears to be imminent. If the hotter element prevails the patients grow hot all at once and seem to have got near the fastigium. In a little while when the phlegmatic humour has got the upper hand they become once again contracted and cold, and shiver. This continues till the fastigium, which itself is seen to occur earlier than in the phlegmatic and later than in the bilious; for the phlegmatic humour restrains the speed of the bilious, and the bilious spurs on the sloth and sluggishness of the phlegmatic. Such, then, is the typical semitertian which arises from an equipollent mixture of two fevers, as of two humours.

The atypical semitertian has an excessive share either of the bilious humour or of the phlegmatic.

There is a second combination and mixture of two fevers - that of the intermittent tertian and the intermittent quotidian. Its exacerbation is similar to that previously described, but differs in that this one goes on to complete defervescence and that on the second day the isolated quotidian comes on with a shiver or a rigor. This form of fever we cannot, however, call semitertian, if, that is, the semitertian is one of the continuous fevers. On the other hand if we reckon the semitertian among the other class of fevers, then certain others besides will have to be called semitertian fevers. As to this Agathinus appears to me to call all prolonged tertians semitertian. However, since these are questions more of names than facts I do not think it worthwhile to linger on them. We have written on medical nomenclature separately in another work, in which I have clearly shown and fully defined the difference between controversies about facts and controversies about names. Let us, therefore, return to facts - the fever called by Hippocrates a semitertian; which is accompanied by a shiver and is continuous: which is produced by the blending of a tertian with a continuous, not with an intermittent quotidian; for the reason that a fever made up of two intermittent fevers must itself be intermittent.

Neither again can two continuous bilious and phlegmatic fevers produce a semitertian. Such a combination cannot produce a fever of the shivering type, nor one which displays numerous repetitions. For since by its definition every true continuous fever is exempt from shiver or rigor a combination of the two will be equally exempt. It follows, therefore, that if the fever is to be at one and the same time shivering and continuous it must have its origin from two fevers, one intermittent the other continuous. Hence it is that a blending of the tertian with the continuous quotidian produces the semitertian, and that two intermittent fevers, or two continuous cannot generate a fever of this character.

There is, therefore, only one combination left able to generate a fever which is at once continuous and shivering - that of the intermittent quotidian with the continuous bilious fever. In contrast to the first this type will owe its continuous element to the bilious, and

its shiver to the phlegmatic fever, while its involvements will be due to their mutual antagonism - above all when the humours are equipollent. When one or other predominates the method of diagnosing from the symptoms has been illustrated in the case of the first combination.

The whole subject of the four combinations of bilious and phlegmatic fever, one might consider to be more appropriate to the tractate "On Types", but it is perforce dealt with here on account of the semitertian whose origin Archigenes for his part ascribes to a tertian and quotidian; not realising that he is creating an intermittent fever; while Agathinus states point blank that the semitertian is of the same class as the tertian, and differs from it merely in the gravity of the exacerbation. Now, if they had given an accurate description of all the differentiae of fevers, and had gone astray merely in their terminology there would be no cause of complaint. But since they have not given a full list of the differentiae either of the simple or the compound fevers, and have furthermore imported others that are superfluous, and valueless both for prognosis and treatment we have to the best of our ability tried to hammer out the whole type in its purity, devoting endless time, practice and theory to the elucidation of the differentiae useful to this end. The simple varieties are the subject of the present work, those formed from an overlapping of these belong to the book "On Types". The student who reads this one with attention will not be entirely uninstructed in the other; for from my remarks on the combinations of the phlegmatic and bilious fevers with each other he may be applying them to the atrabilious, form a judgment on the overlapping and blending of these with each other. By overlapping we denote the condition in which the invasions come at different times, by blending that in which the first stage of each is simultaneous. Thus anyone who bases himself on my book will without further aid be able to work out the overlappings and blendings of the three fevers. The head and front - the A.B.C. of the whole matter-is to distinguish accurately the individual appearance of each of the simple fevers. Their number is not appalling; just three in all; the bilious, the atrabilious, and the phlegmatic. Each of these has two varieties, the intermittent and the continuous, so the varieties of fevers kindled from putrescent humours are just six in number. If any other variety is added separately to these it will owe its origin to variations in the amount of the humour, the extent and nature of the putrescence, to the form of its motion and to the part in which putrescence takes place.

Take for example the intermittent fevers that exacerbate on alternate days. If they have a short exacerbation, an invasion accompanied by a rigor, and a resolution with sweating and bilious vomiting or bilious evacuations of the lower bowel, they are called typical tertians. When any of these symptoms is wanting they are termed not typical tertians but tertian simply. If the intermission is shorter and the exacerbation obviously longer, it is called the extended tertian; a form which may vary considerably one way or the other. It is, I suppose, possible to call a fever which shows twenty-four hours exacerbation and the rest non febrile the "prolonged fever" simply; another that maintains its feverishness for thirty hours, the "much prolonged fever"; a third which extends to thirty-six hours "the further prolonged fever"; and a fourth which extends to forty hours and more "the most prolonged fever". But to define each of the above within accurate limits is an impossibility owing to the fallacy of the sorites.

It is unnecessary, however, to aim at such terminological exactitude. With its help we can both give students an accurate demonstration in each case of disease, correct treatment, and a prognosis of the event. Suppose so-and-so is in a state of fever for fifteen hours and remains free of it for thirty-three; and suppose that this happens to him time after time at the calculated intervals. It is obvious that anyone will know when to give him food from the time of the exacerbation and intermission. Moreover, he will know quite well how far he can turn this to account in prognosis and treatment, without enquiring whether he ought to call such a fever a tertian simply or should elaborate the distinction by some other epithet. Surely anyone who is anxious to explain to a second person the nature of the patient's fever will do so more accurately by stating the length of the exacerbation and the intermission, than by seeking to express himself clearly and definitely by a label that comes to precisely the same thing. This then is the best method of statement and exposition.

Next best is that we mentioned a little ago, in which we call one a typical tertian, a second simply tertian, a third slightly prolonged, a fourth somewhat prolonged, a fifth further prolonged, a sixth most prolonged. Worst and most obscure of all is that first mentioned, over which the younger school of physicians are daily wrangling and squabbling, without having the

sense to see that it is all over a word. As for the rest of them one perhaps might be the less surprised, In the case of Agathinus, however, that emotion is justified, seeing that although he talks of extended quotidian and quartan fever he has not observed the corresponding practice in regard to the tertian; but calls it when its exacerbation is somewhat extended, a semitertian. But I have said quite enough by this time about nomenclature and have myself possibly wasted more time over the subject than it deserves. It is time, therefore, to return to the investigation of the remaining facts.

Herein no enquiry could be more unprofitable than whether certain forms of fever arise from a putrescence of the blood as they do from putrescence of the two biles and the phlegmatic humour. We said, you remember, that ephemeral fevers arose from a mere heating of the blood, not from its putrefaction. It is, however, where putrefaction is present (for the blood too must on occasion putrefy) that we must seek the individual form of the fevers. This we may expect to discover if we discover first how blood putrefies. Aristotle seems to have been correct when he said that putrescence is caused by foreign heat; meaning by foreign heat that which arises from without; not the heat innate in and proper to every separate entity. It is the function of the latter to digest: of the foreign to corrupt, i.e. to make putrid. Heat from without accrues to blood in heat exposure, pestilential constitutions, and, speaking broadly, in all fevers, whatever be the cause from which they come to birth. But when blood collects to excess in any part of the animal organism and overmatches the faculty of that part it grows corrupt; particularly when it is clogged in small vessels owing to its thickness, or is compressed owing to its amount, as happens in buboes, inflammatory swellings, and speaking broadly, in all inflammations. In such states there are two reasons for the corruption of the blood:- it is not ventilated and it passes out of the control of the natural processes. The tendency of substances to rot in the absence of ventilation may be observed in the case of all external things, for example fruit, seeds, and even fabrics.

What occurs in pleurisies is quite enough to convince us of the truth of this statement. In pleurisies some cough up a frothy matter, others a pale, and others again a red. This is the unretained part of the humour dominating the inflammation, which owing

to its thinness is exuded. Sometimes this matter is black in appearance; not immediately at the beginning, but in the course of time. It is usually preceeded by a yellow sputum, which is as pathognomonic of the predominance of the bilious humour as froth is of the phlegmatic or redness of blood. It is, therefore, likely that blood itself sometimes putrefies in the inflamed parts, and that the resulting fever though simpler than those originating from the other humours, should correspond most closely in its exacerbations to the tertian cycle. Such at least we observe is the case in those suffering from pleurisies when the sputum is red. If, however, it is exposed to too much heat it becomes modified in all ways; that moiety of it which is at once very thin and oily to pale bile; that which is thicker to black bile; as in the case of carbuncles, as they are called, for in their case the transformation is to the atrabilious humour owing to the violent boiling of the blood. When, however, I say that it becomes an atrabilious humour you must understand me to mean that it has not yet fully become black bile, but occupies a borderland position. So then the constitution of fevers varies according to the variety of the humour into which the blood is converted, and they differ merely in their virulence or non-virulence. Those caused by a conversion of the blood are simpler above all in the mildness of their heat; for even though it seems very great when you apply your hand still it is quite mild, like that of a hot bath. The amplitude of a feverish heat always depends on the amplitude of its emanation, but its noxiousness as judged by the external application of the hand depends on the acridity of the humour. Let this - I mean the quality of the heat - be your criterion of the humour responsible for the fever. Heat which is most vaporous and inoffensive is due to blood. If noxious, devouring and biting it arises from the biles. Lastly, whenever the heat at first touch seems rather vaporous and not acrid, but when after a little delay a biting element is superadded - very unequal, and giving the impression of percolating through a strainer or sieve - then you may be sure that such a fever comes from a putrefaction of the phlegmatic humour.

As I was turning this over and asking myself why fevers caused by the phlegmatic humour should show the inequality described while those caused by the other humours showed an even output of heat it appeared that the likeliest cause lay in the viscosity, thickness, and

insolubility of the humour. It is, I suppose, true that transpiration proceeds in this as in all the other humours in proportion to the amount of it which moment by moment becomes volatilised, but it becomes volatile with difficulty inasmuch as it is exceedingly thick; and if it is by nature cold, with still more difficulty. Consequently it is only at the point where the putrefaction is in strength, not as a whole nor with evenness, that it becomes volatile, is exhaled and brought to the surface. The process is like what happens when viscid, thick humours in external objects are on the boil. Bubbles form on these which burst, and a cloud of steam rises, carrying up with it volatised moisture. When thin humours are on the boil there are no bubbles and the steam which rises from them is at all points homogeneous and continuous.

Having given a reasonable explanation of the above let us consider the causation of what are called "continued fevers". It seems to me remarkable that in their case one single exacerbation should be maintained from beginning to end lasting often four or five and sometimes even seven days. And yet if one looks into it closely it is still more remarkable that the exacerbation of certain fevers should be periodic. The illustration we gave previously of the dung-heap which putrefied piecemeal cannot apply exactly to the animal body wherein there is a free commingling of the putrescent with the non putrid humours owing to the intimate passage of the airy and humid elements to and from all quarters of the body It is therefore impossible for putrefaction to occur first in one part and then in another except when an inflammation pins down the humour that is beginning to putrefy, and localises it. Since, then, the argument has chopped round and it is more difficult to detect the cause of the fevers which have a periodic exacerbation than of the continued let us endeavour to discuss both without longwindedness or controversy over false theories; detailing, as in all our previous writing, the truth and the truth alone: a base from which one may track out the errors of others.

Let us start from those conditions in which observation is easiest, e.g. certain inflammations of the eye, some of which have a daily exacerbation and others one on alternate days. Diseases of the ear and of the head, too, are capable of observation, whether of the whole or of half the head - the so-called migraine. In

certain cases, too, gout and rheumatism have a periodic exacerbation which may be observed. Now, just as in all these diseases one may see the veins swelling in the exacerbated parts, the inflammation increasing and the pain growing more acute and a discharge which is, I suppose, excretory, poured forth, so one must conceive that in the case of internal diseases, everything preserves the same analogy even though it is not apparent to the eye. Thus in pleurisy and pneumonia the inflammation will rise to a height at the commencement of the exacerbation and will be diffused and abate in the decline. How this takes place we shall promptly discover if we recall the demonstration of the origin of inflammation and of what we called the flux conditions which I have given elsewhere in my book on "The Unequal Distemperature" This, with the addition of what is apt to the present argument, will suffice for the investigation now before us.

All agree that the flux carried to the eyes flows from the head, but why the flow frequently takes place in a definite cycle they are unable to explain. They have not scientifically investigated the natural faculties; a subject on which I have written three volumes. There I have shown that these are four in number, and that by their agency the vegetable and animal kingdoms are regulated. The first is that which attracts to itself the appropriate nutriment; the second retains it; the third modifies it; and the fourth excretes what is incapable of modification. This material may be incapable of modification in two ways: either by its quality or by its amount. Now this collects owing to the strength or weakness of the faculties in the parts concerned.

If the faculties are adequate and the passages that pass off the excess are in a state of health then the parts remain sound. If more nutriment is brought to the part than can undergo modification all the excess must of necessity be excreted, being thrust out by the excreting faculty. If, however, that is impaired it will remain in situ, its mere bulk overloading and distending the part and, if acrid, devouring and biting it; and similarly if hot inflaming it, and if cold chilling it. This plainly appears in affections of the belly. When people happen to overeat themselves, they are sometimes nauseated and compelled to vomit; and sometimes they are seized with diarrhoea. Now that which is in these cases excreted through very wide channels which regurgitate the superfluity to the exterior, in other

parts of the organism passes by flux through fine apertures not to the exterior but from one part to another; the stronger thrusting it forth and the weaker receiving it. From these it is thrust out again to others and from them it flows down to others until it descends to those parts that are weakest of all. It is unable to double back again thence to other stronger parts, and consequently in conditions of plethora and unhealthy humour it is the weakest parts that are attacked by inflammation, by erysipelas, herpes, or other diseases, or fall into the conditions called flux. This I have described separately.

It is not then astonishing that the brain, or on occasion the whole head, should after accumulating some excrementitious matter, thrust it away to one of the weaker parts - the ear, eyes, temple, lip, the teeth, jaw, palate, gums, uvula, the tonsillar region and the glands situate there; and when there is no weakness in any of these it is not remarkable that it should transmit its flux to the chest, lung, pharynx, stomach or belly. And just as disease of any of the above organs often originates in the head so in inflammation of the liver or spleen it is one or more of the contiguous parts or even parts quite remote that generate the lesion, transmit flux thither and cause a periodic exacerbation therein.

It is not surprising then that what happens in these conditions should in a way resemble the process of evacuation of excrement by the belly. If you merely looked at the amount of the daily excretion, without comprehending the reason of the process you would be astonished at the sequence. Similarly, if you do not know how excrementitious matters originate in the head and are excreted from it, and fail to comprehend why they sometimes pass by flux to the exterior and are sometimes transferred by flux to some other part you are baffled and puzzled to account for the afflux. So, too, if you neither know what organs transmit excrementitious matter to the liver nor the reason of its transmission you are puzzled to account for hepatic fevers. On the other hand if you realise that it is the flux descending upon the viscus which is the starting point of the inflammation and that it is the affected part itself which is responsible for the ensuing exacerbation there is an end of your perplexity.

The occasion for such an afflux is two-fold: firstly, as I have just described, when one part transmits

EX BIBL. UNIV. EDINBURGI

excrementitious matter to a weaker part; secondly, when the weaker part attracts it. The latter we must now discuss, taking here, too, as the starting point of our argument phenomena that may be observed by anybody.

Suppose you smear someone with thapsus. In a little while you will see that the subject's part is hotter and is swelling greatly. So, too, if you heat the part at the fire, or rub it vigorously, or if after anointing it with resin or fairly hot pitch you then a little while afterwards tear this all off, or if you paint any part with a vesicant. In all these instances you will see the part swelling, since the nature of the heat is to attract to itself or to receive fluxes. Between these two functions it is not at the moment necessary to differentiate further, seeing that we already have all we need for our purpose without any such hair-splitting. Flux seems to determine towards whatever parts grow excessively warm. In bodies which are plethoric and rich in excrementitious matters the flux is quite abundant; it is scanty in those who have no excess. Flux occurs, too, and vigorously, in cases of pain. Thus it often happens that when a patient pricks the tip of his finger with the tiniest needle there is a momentary pain, then a little while afterwards there is inflammation and great swelling in all the surrounding parts. In some patients inflammatory swellings develop in the arm-pits - the loose and spongy structures in that region which we call glands getting some of the benefit of the flux. In others the same thing can be seen happening in the mid-arm, too, if a gland of any size is located there. What I am describing you will see most plainly of all in those cases where there is a tiny little uninflamed and painless sore near the nail. If this is neglected and does not heal and scar over, then, owing to the pressure of the nail on the granulation tissue, there is first of all pain, and next the whole digit and sometimes even the wrist or foot swells up and becomes extremely inflamed.

It follows then that pain, too, induces flux in parts affected with pain. The reason for this, however, we need not go into here. That has been done more appropriately in another place, and it is unnecessary for our present purpose. What is now clear is that the causes of fluxes starting in the parts which are themselves exposed to flux are two-fold:- they may arise firstly from the heat kindled in the parts, and secondly from the ensuing pain. The reason why the afflux is more or less in amount or in virulence depends not merely on the actual

tissues exposed to flux, but as far as the degree of virulence is concerned the cause lies in the parts that send the flux, and for the difference in amount, in both factors combined. Violent heats and violent pains attract more powerfully, the weaker ones less. So, too, bodies that are void of excrementitious matter send a scanty supply to the attracting parts, whereas the plethoric and those which abound in excrementitious matter send a supply which is in proportion to their deviation from the state of natural health.

The above distinctions in fluxes occur irrespective of weakness in the parts subject to flux. Others arise out of the weakness of these and the strength of those parts which transmit the excrementitious matters, for setting aside trauma all the inflammations that assail the parts come into being from the descent of certain excrementitious matters from stronger to weaker parts; and these inflammations promptly light up true fever whenever the heat arising from them owing to its magnitude or its propinquity attains the heart.

For the reasons already given the descending streams of excrementitious matter in every form of inflammation putrefy. But all do not putrefy alike, since some are phlegmatic, others atrabilious, and others bilious. As they putrefy an unnatural heat is kindled in the inflamed part. This heat first warms up as much of the inflamed parts as it touches, and then the parts continuous with these; and by these others again are heated by propinquity, and again by these others, and so sometimes conduct the heat as far as the heart. The state of the parts beginning to be inflamed has been described in my book on "Irregular Distemperature" and in the one on "Pathological Swellings". We shall, however, state here why in many cases it is unavoidable for the blood in the inflamed areas to putrefy along with the afflux.

Excrementitious matter that has descended from one part to another is sometimes so plenteous and virulent as to damage the faculty of the part exposed to the flux. Sometimes it is so mild and scanty that it does no injury to the tissue that receives it. If the damage is so severe that the faculty is impaired and no longer exercises its previous control then it is inevitable that the blood too should putrefy, and this for two reasons: first because if the humour is no longer controlled by the native heat the single transition left it is to putrefaction, and secondly because putrefaction of the blood keeps pace with the putrefaction of the excrementitious matter.

If the damage is not so severe as to impair the faculty and stop its activities entirely, in this case the blood becomes as it were semivirulent and semiputrid, putrefying in so far as it is associated with the putrefaction of the excrementitious matter, but remaining in its natural health to an extent proportioned to that of the faculty that regulates it. However, that may be the heat kindled with the onset of putrescence is altogether more acrid and mordant than natural heat, and it continues to increase as long as the excrementitious substance is forthcoming. In a way these bear a similar relation to the heat they kindle, that as wood does to fire. Fire is generated from the modification of wood, yet the wood does not suffice for that process indefinitely. There is a limit to its transformation - the consumption of its inherent moisture. As long as any of the innate juice remains so long can combustion proceed; but when it has been used up combustion is at an end and we have the residue called ash. Just so in putrescence of the humours the heat remains until they are completely burnt up, and it is common sense that the earthy residue of humours should be small, not as in case of wood abundant, seeing that in the substance of humours the predominant element is moisture, not dryness. So, too, if you propose to boil some external humour, wine or oil for example, the ash you leave will be negligible; all the rest will be volatilised into steam and air and vanish. And thus when humours have boiled up in cases of putrescence and have been volatilised by the heat, their substance disperses entirely into the atmosphere throughout the height and decline of fevers till there remains an exceedingly small residue or none at all - small when the humours are more viscid: none when they are more serous. Should no weakness arise in the faculty of the inflamed part, nor reinforcements of excrementitious matters arrive, then the disease is at an end, and the patient would not have a second attack of fever on the following day, nor on the third, nor the fourth. Should the same cause, however, which led to the first attack launch a second contingent of excrementitious matters against the part, or if, failing this, there were a persistent impairment of the faculty, then the patient would inevitably have a second attack.

For let us assume in the first place that while the faculty of the part remains active there is in the interval an accumulation of excrementitious matters throughout the original transmitting parts, equal in quality and amount to that first transmitted. Such a condition arises whenever the state of the transmitting

parts and the quantity and quality of the nutriment attracted to the parts remain constant; for when something equal and similar undergoes modification by the same faculty it follows, I presume, that the excrementitious matters it forms are equal and similar. Furthermore, the time taken for the accumulation of this excrementitious matter will of necessity be equal, for the parts in process of nourishment, nourished as they are by the same nutriment will, so long as they maintain their original constitution, accumulate excrementitious matters which are equal in amount and similar in quality, and for the same fixed time limit. Furthermore, they will show the same periodicity in setting themselves to thrust out these excrementitious matters, and to transmit them to weaker parts, if, that is, the excretory faculty first sets itself to its proper function at the very moment when it is overloaded by the amount of the excrementitious matters, or injured by their virulence. All this, however, is demonstrated in my notes on the "Natural Faculties", and he who means to comprehend by demonstration the present argument must be well grounded in them. It is an investigation that offers him a valuable reward in the way of scientific treatment. Passing over all else that I shall describe in that treatise I shall mention one point only; a very obvious one and common in my experience - the periodic exacerbation of an ophthalmia: a point that will, I fancy, be a great encouragement to the student to master the argument we are here bringing to a close. In such conditions our treatment is always other than that of the self-styled ophthalmic surgeons. They are always meddling with the eye itself; we, on the other hand, employ sometimes purgation, sometimes baths, sometimes, as Hippocrates directs, draughts of unmixed wine, or venesection, or both, or an enema combined with venesection. When these measures have been taken we then sometimes hold our hand at once; sometimes after taking precautions with regard to the head over and above. All patients treated on these lines have either no further exacerbation at all, or one more only, and that far milder than the first. However, this is not the place to discuss therapeutic distinctions and indications. What the present work is concerned to demonstrate is that either the head as a whole, though itself free from disease, may sometimes, through being supplied by blood which is deleterious and excrementitious, accumulate excrementitious matters in greater amount and of greater deleteriousness than before, so that the natural drainage and ventilation no longer suffice for them and nature is compelled to thrust

away the redundancy to one of the weaker parts; or that while the humours remain in a state of health excrementitious matters may accumulate and launch themselves upon some part from some disease of the head, or from a combination of both causes. So long as the influent humour is similar and the state of the head is constant, so long will the accumulation of excrementitious matters be similar and equal and at equal intervals, and so long will the ocular exacerbation be similar.

In the same way suppose it be not the head as a whole, but some part of it, the meninges or brain, that is so conditioned that from a given nutriment it accumulates excrement of a given bulk and quality in a given time, and that next it begins to thrust forth this excrement at the precise moment when it has received from it appreciable damage. The result will be that at the same moment there will be a periodic exacerbation in the eye or ear or whatever the weaker part may be to which the redundant material was expelled. Just as then in the case of eyes, ears, feet, and many other such parts we plainly observe the exacerbation occurring as we have shown in cycles, is it not natural that in pleurisy, pneumonia, inflammation of the brain and all those other conditions where the inflammatory processes are incapable of observation there should be a similar influx of redundant matter, and a similar kindling of the fever thereby, even though the part in process of inflammation is itself under no special or peculiar disability causative of the above condition, other than that at the moment in question it is weaker than the parts transmitting the excrementitious matters? Neither again is it surprising that all varieties of excrementitious matter do not accumulate according to one fixed time table; for seeing that neither the blood supply nor the state of the parts supplied remain constant throughout, there will be variations in the time required for the accumulation of excrementitious matter to an extent that will first injure the natural health of the part and then force it to drive away the injurious material as foreign to itself.

Nor again should we be surprised that the length of the exacerbations themselves varies; for if the excrementitious matters differ in class, species and amount, then it is appropriate that their mode of kindling and dispersal should not be identical. Excrementitious matters which are more abundant, colder, viscid and thick cause a more prolonged exacerbation; those which are scantier,

warmer and more volatile a less prolonged; and in this respect a great part is played by the constitution of the body as a whole, and the vigour of the faculty at the particular time. A body which is more rarefied shortens as much as may be the attacks; a body which is denser lengthens them. When the faculty is potent it abbreviates them; when it is weak it greatly prolongs them; for when the faculty is strong it more readily rejects from itself that which is foreign, and when the body is rarefied it does not retain the afflux. Hence, other things being equal, patients of this constitution are bound to be quickly rid of their excess; while for the same reason, in those where the body is of the opposite constitution evacuation of their excrementitious matters is bound to be a lengthier process, the faculty being feeble to thrust them off and the constriction of the outlets retaining the afflux. When all the factors coincide then we get the extreme of length or brevity in the attack; of length when the excrementitious matter is thick and abundant, the faculty weak and the outlets contracted; of brevity when the excrementitious matter is volatile and scanty, the faculty vigorous, and the passages patent.

For the same reason there is no difficulty in understanding why some exacerbations come down to normal and others do not. Whenever the duration of the first exacerbation is so short that it has already resolved before the second begins, then the entire interval between the end of the first and the beginning of the second is afebrile. When, however, the onset of the second anticipates the full resolution of the first, then there is no interval left between the two. I am here assuming that, as I have stated, the faculty of the part receiving the excrementitious matters remains unaffected, i.e. still exercises its original control over the blood contained within its jurisdiction. But should it ever be weakened, and this weakness make the faculty responsible for the corruption and putrefaction not merely of the excrementitious matters but of the blood also, and for the kindling of fever, then at that point cyclical exacerbations will begin again. If the heat in question is still retained twofold varieties of fever will occur interlocked which each other. If, however, the heat abates, but the state of the part receiving the flux is constant, as we predicated above of the part transmitting the flux, then mark this: The receiving part also will, like the transmitting part, form in itself excrementitious matters, for two reasons, first because the blood contained

in it is deleterious, second because its faculty is impaired. Similarly, if for any cause whatsoever the faculty of a part is at any time so impaired that the blood present in the part becomes more nuisance than nutriment it will become corrupt, and, if it is hot, will readily putrefy; if it is chilly and phlegmatic it will in time attain the same state, though not immediately. Furthermore, whenever any part whatsoever is incapable of concocting the excrementitious matters originating in itself, or of thrusting them away to another part it will create fever in its native self precisely as a transmitting part creates it in a foreign part.

Incapability of transmitting excrementitious matters to a foreign part depends firstly on the respective faculties of the transmitting and receiving parts; secondly on obstruction of the passages - as commonly occurs with viscid, thick and abundant humours. Hence we need not be surprised that setting aside the transmission of excrementitious matter from one part to another, e.g. as from the head to the eyes - parts can from retention of their own excrementitious matters be reduced to the same condition as the part that receives excrementitious matters from a foreign source. For everything that obstructs the natural outlets must itself in time putrefy and become responsible for a congestion of excrementitious matters in the part through preventing its natural drainage and transpiration. Subsequent accumulations putrefy in the same way as the first, and the combination of all together promptly kindles the heat of fever in the part. It has been already shown that where any heat is kindled or increases there is an afflux of blood thither from the other parts. It follows that during the continuance of this afflux these other parts must grow cold through deprivation of blood, and the part affected be overloaded and distended, while the affluent blood must undergo modification; and for two reasons:- first because it is mingled with excrementitious matters that are already in course of putrescence and secondly because owing to the obstruction it remains unventilated. It smoulders, therefore, like damp wood thrown pell mell on a small fire. All this period is termed the beginning of the exacerbation. Then when the heat has got the mastery of the wood the corresponding stage is called the increase and advance, and in this the heat grows so much in volume that it not only burns the place that is, as it were, the focus of putrescence, but begins to spread in continuity to the whole body. When the heated humours have reached boiling point that part of the exacerbation is called the

fastigium, and at that point the patient's whole body seems to be ablaze, the heat being augmented equally throughout the entire organism. Next, if it happens that the humours are volatile, the faculty vigorous, and the body rarefied, the bulk of the boiling humours is voided and poured forth as sweat. If the humours are thick, the excretory faculty feeble and the passages constricted, visible efflux there is none; merely something so volatilised that it has been transformed to the nature of thin vapour. This stage is called the decline. It is a sort of transpiration of the boiling humours. If the state of the part remains the same a second accumulation of excrementitious matter is bound to be generated therein, the nutriment once more attracted to the part being not all duly disposed of. This excrementitious matter, as we have said above, by reason of the putrid excreta left behind in the part and its own inherent noxiousness once more acquires the beginning of putrescence and after it has grown hot enough, there is, just as we have described above, a second afflux of blood to it from all the other parts of the organism, and once more there is an exacerbation with a beginning, an advance, a height and a decline. And this cycle does not cease as long as the disposition in the part that first begets the excrementitious matters is maintained.

Such a disposition may arise in two ways, either from a certain weakness of the part in virtue of which excrementitious matters are generated, or from the cumulative effect of their successive generations. For do not suppose that while the domestic vessels in which food is boiled and turned into steam and savour become imbued with a certain disposition, none remains in the parts in which humours undergo putrefaction. It is still more impossible for the disposition to be abolished if the whole body is full of unhealthy humours or plethoric, and much more if, over and above this, there is the further handicap of a constriction of all the passages that drain excreta from the part. Similarly healing would result if the passages were purged so as to make the part permeable; if the faculty were strengthened, the disposition corrected, and the whole body were neither plethoric nor full of unhealthy humours. But so long as these causes continue so long must there be a continuance of the cycle of exacerbations. Such at any rate is the case with women. With them as long as the causes of their menstruation remain equal and similar so long is the regularity of the menstrual cycle maintained. All these points are fully discussed in my work

on "The Dispositions Leading to Flux", and there is no merit now in wasting time over proving what has been demonstrated already, or in going beyond the minimum of our immediate requirements. These are to recognize in the first place that certain parts transmit flux to other parts, e.g. the head to the eyes; that certain others acquire the beginning of feverishness from the excrementitious matters generated in themselves; next that all such instances have one feature in common - the putrefaction of the excrementitious matters - and that what is peculiar to each is, in one case, the obstruction and damming up of the vessels through the viscidity, thickness or abundance of the humours; in a second the stoppage of the passages, whether visible or invisible; in another the congestion of the cavities throughout the whole of the patient's body; and in addition the relation of the congestion to the activity of the faculty - as I have described in my book on "Congestion".

The aetiology of fevers with a cyclical exacerbation is, I think, now complete. The irregular types attain their particular constitution sometimes through modification of the humour, sometimes owing to a faulty mode of life. Modification is most common in putrefaction of the blood; for as we have said already, one moiety of the blood becomes yellow bile, the other black bile. Again, the cycles of the exacerbations vary in degree with the alteration of the humours in the system of the sick person, so it is not surprising that with the alteration of the humours there is a variation in the due sequence of the attack. Important variations occur also from a difference in constitution between the nidus of putrefaction in any part and the flux transmitted to it from other parts; whether it is of that constitution in those parts alone, or prevalent throughout the entire organism. Similarly all the errors of which a patient is guilty in his mode of life equally upset the sequence of the cycles; for as a deleterious mode of life is an established cause of disease even in the healthy, even more readily, I imagine, as a result of their indiscretions do exacerbations befall the sick; and it is not merely while they are still ailing but also at the stage of convalescence that patients are easily injured by any error. Hence, with each appreciable injury they either make the cycles anticipate their time by a good deal or they create for themselves other cycles different in kind from the former ones, as the result of which the sequence of the exacerbations is destroyed. Often (through failure to diagnose the interlocking of cycles)

patients are thought by their physicians to be suffering from exacerbations of irregular type. Such cases, however, merely have the appearance of irregular fever: they are not so in reality. Those that are really of this type are the result either of the alteration in the humours that cause the fevers or of a faulty mode of life. The remaining class, the continued fevers, whose whole course is one single exacerbation which is either of equal severity throughout, or of steady declension or of steady ingravescence till the crisis - this class customarily originates from the cause that Praxagoras predicated of all fevers - a putrefaction of the humours in the venacava. A fuller and truer account would be as follows: All diseases whose exacerbations come in cycles arise from the dispositions of the parts that transmit, receive, generate or attract excrementitious matters in the way we have just described. In all non-cyclical diseases no special spot is the site of disease, but the humours in all the arteries and veins, and principally those in the largest and hottest boil up through some extraneous cause - as in the case of ephemeral fevers - or through putrefaction, and kindle one continued fever. This has no remission from start to finish. It persists and burns the patient up until the humours that generate it are consumed, or concocted, or undergo a mixture of both processes.

TEMPERAMENTS.

I.

That animal bodies are a blend or "temperament", in varying proportions, of hot and cold and moist and dry, has been amply proved by the best philosophers and physicians of antiquity. We have, ourselves, given a suitable account of their work in a previous volume--our inquiry into the Hippocratic elements. In this, its continuation, I proceed to establish all the varieties of the temperaments, their numbers and kinds when we classify them into their species and genera. And, first, to define our terms. Whenever people say that corporeal substances are a blend or "temperament" of hot and cold and dry and moist, they mean us to understand by these terms those things which are so absolutely: i.e. the elements, air, fire, water and earth themselves. On the other hand, whenever they say that an animal or vegetable is hot or cold or dry or moist, the case is altered. No animal can be absolutely hot like fire; nor absolutely moist like water; nor, similarly, can it be utterly cold or dry. It takes its title from the element that predominates in the "temperament"; and so we term "moist" that in which moisture has the greater share; and dry that in which dryness. So, too, we call "hot" that in which hot exceeds cold, and "cold" that in which cold exceeds hot. This, then, is the sense in which we use the terms.

And here it would be seasonable to say a word about the temperaments themselves. The opinion commonest among the most distinguished physicians and philosophers is that there is a moist and hot temperament; a second that is moist and cold; a third again dry and cold; and a fourth dry and hot. Some, however, maintain that while there exist a moist and cold, and a hot and dry temperament, there is by no manner of means a hot and moist, nor a cold and dry. It would be impossible for moisture to coexist with an excess of heat, or dryness with an excess of cold. The moisture will be used up by the predominating heat, and so the body would become hot and dry. Those bodies, again, in which there was a failure of heat, would remain incapable of concoction and digestion. Hence, where heat prevailed, dryness would be bound to follow; and where coldness was in excess, moisture must ensue. These authorities are therefore satisfied for the reasons given that there are no more than two varieties of temperament.

Against them those who hold that there are four have two lines of argument. Some flatly refuse to concede their first assumption that moisture must inevitably dry up in the presence of predominating heat. Others, while granting this, differ on other grounds. The first school maintains that it is the function of hot to heat, and of cold to cool; and again of dry to dry and of moist to moisten. Hence, all bodies that are naturally both hot and dry, like fire, qua their heat heat, and qua their dryness dry. Again, all that are moist and hot, like hot water, moisten and heat; herein, too, exercising one function in virtue of either faculty and inseparable from it. They do not, therefore, admit that whatever is hot must straightway desiccate. On the contrary, if there is an element of moisture in the heat, it must heat and moisten simultaneously, like a warm bath. Whatever is hot and dry like fire will not merely heat but also from the first desiccate, but this is not in virtue of its heat, but owing to the associated dryness. On this point they quote the case of those who have been overlong exposed to the sun in summer and who, naturally, have become dried up, with their whole body dry and parched, and an unbearable thirst. For such persons, say they, cure would be prompt and simple if they not merely drank but took a warm bath; seeing that moisture, whether combined with coldness or with heat, can always perform its own function, which is to moisten that with which it comes in contact. By the same argument they maintain that dryness always dries. Boreas, for example, which is a dry cold wind, dries everything. Hence the Homeric line

"As when autumnal Boreas dries up
Swiftly the newly watered threshing floor"

In the same way they point out that opium and a score of other drugs both dry and cool. Hence it does not follow that because a thing is cold it must immediately be moist as well; nor because it is hot that it must immediately be dry. Hence the hot temperament is not bound to be dry, too, and it is possible that sometimes there may be an excess of hot over cold and of moist over dry in the animal's temperament. Furthermore, all beginning, modification and change are from opposites to opposites. Would it not be ludicrous for a man to say that white had been modified and changed into warm? The reasoning is not concerned with the contrast of temperature, but of colour. White changes to black and black to white; hot changes to cold and cold to hot; and similarly moist

to dry and dry to moist. If anyone said that a body hitherto moist had been changed to white or that one previously dry now appeared black he would be held insane. If, however, he said that what had hitherto been moist had now become dry, or what had previously been black was now white or that something had become cold instead of hot or hot instead of cold, then he would be thought to be in possession of his faculties and to be talking sense. That which is in process of change must transpose itself in respect of the quality in which it changes. For example we say that so-and-so has become or is becoming musical: obviously from having been non-musical before; or that he has become a critic or an orator when previously he was neither. But it would be an abuse of language to say that he is becoming a critic instead of a musician, or a musician instead of a critic, or what you will instead of some other non-comparable profession. True, that a man formerly a critic may afterwards become a musician, but it is by adding musicianship to his criticism, not by discarding his criticism. Surely if he acquires an additional accomplishment and still retains his previous one it is obvious that he has not changed in respect of the one retained. Hence, he has not ceased to be a critic in becoming a musician; for he is a critic still; but in becoming a musician he has ceased to be unmusical; for it is impossible for him still to remain unmusical when he has already become musical. Since, then, all changes take place by means of opposites, from opposites, to opposites, it is plain that if what is moist should change in respect of its moistness it will itself become dry and that which dries it will itself be termed dry.

Hence, they say, let no one maintain that it is impossible for a temperament to be at once hot and moist. That the same temperament should be both hot and cold or moist and dry is an impossibility, for opposite qualities cannot coexist in one and the same body; but it is possible for a thing to be both moist and hot or cold and dry, as our argument and the examples adduced above have proved.

This, then, is the argument of the first school. That of the second runs like this: Granting heat to be the most active of the four elements, so that it can act not merely upon the cold but also on the moist, there is nothing unnatural in the existence of a moist and hot temperament whenever there is an assemblage to the same part of a supply of moisture and heat at the first beginning of the animal. Their

argument goes to show not that it is impossible for the moist in excess of the dry and the hot in excess of the cold to exist in one and the same body; but that such a condition cannot endure, for the continued desiccation of the moist by the hot in time makes the body dry, and so it ceases to be hot and moist and becomes hot and dry, and again, this condition of hot and dry will itself become in course of time cold and dry. For they hold that at the point where the hot has consumed all the body's sap, the hot itself begins to decline, since it is no longer supplied with the nutriment wherewith it is kindled.

Hence they consider it is by no means extraordinary that to begin with when the animal first comes into existence the moist element should collect together in excess of the dry or the hot in excess of the cold, but that in course of time it is likely that the temperament which was previously moist and hot should in turn become dry and hot, and similarly, too, that as the heat died down the dry and hot temperature should end in being cold and dry.

These, then, are the arguments by which they demonstrate that there is a hot and moist temperament and in addition to this one that is cold and dry. That it is impossible for more than the four varieties of temperaments to exist they seek to explain as follows: Granting, they say, that there are four qualities with the power of acting and reacting on each other, i.e. heat, cold, dryness and moistness; then two sets of contradictories arise, one of hot to cold, the other of dry to moist, and hence the combinations are four in all. It is true that six conjunctions of the four with each other are possible, but of these two must be ruled out, for a body cannot be at once moist and dry or hot and cold. It follows, then, that there are four combinations of temperaments, two of moist and two of dry, differentiated by heat and cold.

This, then, is the account given by our most illustrious predecessors in medicine and science. I must now point out what I consider them to have omitted: and this first and foremost, that they have forgotten the perfect temperament just as though it did not outdo in value and importance all those described; and have neglected it as completely as if it did not exist. And yet they cannot even discuss the others apart from this. Why, it is impossible to conceive of heat as being

predominant in the hot temperament or of cold in the cold, without first postulating the perfect temperament. From no other standpoint can they devise a healthful mode of life save from that of the perfectly blended nature, and ordain the cooling of the body which is too hot for health, the warming of that which is too cool, and similarly the drying of that which is too moist, and the moistening of that which is too dry; always, of course, moving up reinforcements of that which is deficient against that which is in excess, so as to bring about a perfectly blended and balanced constitution. That which is their constant aim, that which is the mark whereby they correct faults of temperament, I, for one, think that they should have specified first of all. But they, so far from making mention of it first, omit it altogether. "Oh no!" say some of them, "it is not omitted. It is implied in the hot and moist temperament". Then why do you not say that there are five temperaments instead of four, if you are including the most important? It is one thing or the other: You must have omitted either one of the imperfect temperaments or the perfect. For my own part I am quite clear that it is the perfect that they have left out of their calculations; for where they talk of a hot and dry, a cold and moist, or any other temperament we must understand these terms not in the sense of the absolute "qualities" but of that quality which in each instance predominates.

If they do not admit that they have omitted the perfect temperament they must be convicted of having omitted one of the others. For granting that the perfect temperament is the moist and hot, as they themselves make out, then they have omitted the temperament which is the antithesis of the imperfect temperament of cold and dry - that in which moist and hot are present in excess. "No, no" say they, "This <u>is</u> that temperament". Then how is it possible for the hot to be in excess and not in excess, or the cold to be deficient and not deficient simultaneously? If the temperament is a perfect one no one quality holds unequal sway over any other: if imperfect, then one of the opposed qualities must be in excess. "Ah no", they say, "This and nothing else is the characteristic of the perfect temperament - the predominance in it of heat over cold, and of moist over dry. When the predominance of cold is slight, the temperament is faulty; when it goes further we have the beginning of disease, similarly when to an extreme degree there follows death. So, too, in the case of dryness we have in the first stage an imperfect temperament; when it prevails still further we have disease; and when to an extreme degree death" - just

as if this did not happen in the case of moist and dry! Who would deny that when hot happens to be slightly in excess of cold or moist of dry that an imperfect blend originates in consequence, and when the excess is greater we have disease, and when very great death? The argument is the same in both instances. Otherwise let us cease to incriminate those "constitutions" that are immoderately moist and hot; and all those "hot" illnesses which come into being along with immoderate moisture let us refuse to acknowledge as illnesses at all.

In opposition to this argument some of the school of Athenaeus ~~the sect~~ of Attalia, coming to grips, deny that a moist and hot constitution is ever at fault, and allege that no moist and hot illness occurs. Illnesses, say they, are most decidedly hot and dry, like fever; or cold and moist, like dropsy; or cold and dry, like melancholy. And here they instance the seasons of the year, alleging that winter is moist and cold, summer dry and hot, autumn cold and dry, and spring, say they, is at once a perfectly blended season and hot and moist. Similarly with the ages of man they say that childhood is at once perfectly blended and hot and moist. The perfection they consider to be demonstrated because the activities of the body are then in the prime of their vigour. Furthermore, death, they say, reduces animal bodies to dryness and chilling. Corpses, for example, are called "alibantes" or "waterless" since they no longer possess any "libas", water, or moisture. They have been at once devaporised owing to loss of their heat, and solidified by chilling. Now, if death, they say, has these qualities, it follows that life, being death's antithesis, must be hot and moist. Moreover, if life is something hot and moist it surely follows that the temperament which is most similar to it is the best; and if this is so, it is of course obvious that this is the perfect temperament, so that a nature which is moist and hot means a nature which is of perfect temperament, and perfect temperament is simply a predominance of moisture and heat.

This, then, is the argument of the school of Athenaeus. They would make out, too, that the philosopher Aristotle, Theophrastus, his successor, and the Stoics hold the same opinion; thus dazzling us by the array of their authorities. For my own part I may, if need be, have a word to say later about Aristotle's views on the hot and moist temperament. To me they

seem to misinterpret him. At the present point I will endeavour first of all to make plain to these advocates wherein they delude themselves and then summarily to clear up the whole argument. In holding that the spring is hot and moist and at the same well-blended they are manifestly deluded. Spring is neither as moist as the winter nor as hot as the summer, so that it has neither quality to excess. But each of those terms denoted excess and in their own very arguments was indicative thereof. They have made two errors; first, by their determination to find at all costs a season of the year corresponding to the fourth combination of the temperaments, and next by assuming that spring is hotter than winter and moister than summer. Now there is no need to assume a season of the year corresponding to the fourth combination of the temperaments if, as a matter of fact, it does not exist; and to compare it with the contrasted seasons will as easily prove it dry and cold as moist and hot. If hot and moist are terms indicating excess then their statement is incorrect, for the spring is proportionable in all things. If again, spring is moist and hot because it is moister than summer, and hotter than winter then we may equally consider it to be cold and dry, because it is colder than summer and drier than winter. How arbitrary it is to take one of the two contradictories from the winter and one from the summer! In either instance that which differentiates the two needs to be compared not partially but completely; and if this were done I claim that we shall get a different result; for spring will be hot and dry if compared with winter, and cold and moist if compared with summer. When the comparisons are made as a whole in neither will the spring be moist and hot. And if it is allowable for our friends to take half of each comparison and prove that spring is hot and moist, we, I imagine, may lay hold of the other half and prove it dry and cold: dry, that is, as compared with the winter, and cold as compared with the summer. And so in this way spring will be everything - moist and dry and cold and hot!

Still not even our friends will assert that it is possible for all four qualities to predominate in one and the same thing. The right way is to compare spring neither with summer nor with winter, but to examine it in relation to itself. We do not say the winter is moist and cold because it is moister and colder than the other seasons. It is so on other grounds and it is said to be moist and cold because, considered by itself, its moisture exceeds its dryness and its cold its heat. Similarly summer is said to be hot and dry because in itself its moisture falls

short of its dryness and its cold of its heat. In fact the right way is to test each of the seasons by its own nature instead of comparing it with some other season, and then to label it hot or cold or dry or moist. And if you investigate on these lines it will be obvious to you that spring is a precise mean of every extreme; for in spring there is no excess of cold over hot as there is in winter; nor deficiency as in summer. Similarly dryness and moistness have roughly an equal share in it and there is no predominance of dry as in summer, nor of moist as in winter; hence the saying of Hipprocrates is a true one: "Spring is most healthful and least deadly".

Again, autumn is less warm than summer and less cold than winter, and so here again the season is neither frankly hot nor frankly cold, for it is both, and neither completely. It has, too, an additional disadvantage, which Hippocrates indicated in the "Aphorisms" when he said "Whenever you get alternations of heat and cold in the course of the same day then be on the look out for autumnal diseases". What makes autumn so very unhealthy is just this unevenness of temperament. Hence it is incorrect to call it cold and dry; for it is not cold, as winter is, if you consider it per se, though it is colder than summer if you compare it with that. Nor is it by any manner of means evenly well tempered like the spring. In this respect it differs most widely from that season since it does not exhibit a sustained level of perfect temperament and regularity, seeing that it is much hotter in the afternoon than in the morning and evening. Again, it is not an exact mean between moistness and dryness, for it inclines to the dry side. In this feature, too, it falls short of summer, though not so much as it does in respect of heat. It is, therefore, obvious that we cannot, as our opponents maintain, term autumn absolutely cold and dry. In the fullest sense it is neither. Dryness has a larger share in it than moisture, and so far we might in this respect justifiably call it dry; but if we differentiate it in terms of heat and cold then it is an irregular mixture of the two.

Hence, if they must at all costs parcel out the four combinations of the temperaments among the four seasons they must understand that they are wrong not merely in ascribing moistness and heat of temperament to the spring but also coldness and dryness to the autumn.

Moreover, granting that the autumn were dry and cold, it would not necessarily follow that the spring should be moist and hot. For if the combinations of disproportioned temperaments were four in all, it does not follow that all four should be assigned to the four seasons. On the contrary, if there is any providence in the universe and all things are ordained for the best it would be more reasonable that the bulk of the seasons should be well tempered and one, at most, ill. Our friends, however, would fain prove the opposite - that none of the seasons is well tempered, but that at one time cold is bound to predominate in them, at another, heat; at one time, it may be, dryness, and at another moistness. For my own part I am so far from making out that spring is hot and moist, or from admitting that whatever is well tempered is hot and moist that I maintain the very reverse: that the worst "constitution" of temperament in the atmosphere that surrounds us is the hot and moist, one which you will never find among the seasons at all, though it does sometimes occur in morbid and pestilential "constitutions" as Hipprocrates instances when he says "In the summer heats there was furious rain throughout". Now the peculiarity of a moist and hot constitution is continued rain in summer heats. If there had been heat alone as in an ordinary summer, or if the rain had occurred in a cold season as happens in winter, then such a constitution could not have been hot and moist. You may ask was that season a salubrious one in which, as he says, there was in the summer heats furious rain throughout? Or the contrary. He narrates that carbuncles broke out in it: obviously from the putrefaction of the waste materials of the body and the immoderate generation therefrom of hot and moist discharges. You will realise this from the passage in question if I quote it entire. It is as follows: "Carbuncles in Cranon in summer. In the summer heats there was furious rain throughout. They increased with the South wind, and discharges originated under the skin. Being pent up they became inflamed, and caused irritation. Then inflammatory pustules broke out, and seemed to burn beneath the skin".

In this case the evil was less since there had been a derangement in one season only. If there had been an alteration in two or three or if the whole year had been moist and hot inevitably a very great pestilence must have arisen - such a one as he describes in the third book of the "Epidemics". I will quote first what he says about the disorder of the seasons,

and then his remarks on the mortality that followed. Throughout I would have you give your undivided attention and see first of all which sort of an affair a hot and moist temperament really is, in nothing resembling a well-blended season like spring; and next how in its course everything is bound to putrefy. Hippocrates, then, begins his description in these words: "The year was damp, showery, with continued calm". He then adds to this the details of the entire "constitution", saying that in the course of a hot and damp constitution there was much rain, and then again he ends by summing up the whole account with the words - "The whole year being damp, moist and mild" - such and such happened. To quote it in full would be tedious here, but anyone who pleases can take the third book of the "Epidemics" and read the details, all of which are summed up in the one conclusion of a very great putrefaction - one to which Hippocrates often refers under that very term, as for example when he says: "The ensuing flux was not like pus, but a corruption of a different sort, a flux abundant and diverse", or again, "and in the genitals there were carbuncles such as come in summer, and other appearances which are termed putrefaction"; and when he says that as the result of this putrefaction many patients had sloughing of the whole of the upper arm and forearm, and in many the thigh or the parts about the knee and the whole foot were stripped bare. Furthermore, there was extensive necrosis of muscle, bone and tendon. In a word none of the conditions which he described can be adequately explained except as the result of putrefaction. Nothing can putrefy through the agency of dry nor of cold, as you may learn if you consider the meats and all the other things that we preserve, and which are kept in good condition either by salt, brine or vinegar, or by some other desiccating medium. You may see, too, that when the north wind, which is naturally dry and cold, prevails everything remains unputrefied for a very long time, whereas they readily putrefy in southerly constitutions; for this wind is moist and hot.

Hence we give a flat denial to those who conceive the spring to be moist and hot. That is not its nature, nor if it were so would it be healthy. Our opponents not only say that this is its nature, but that it is for that reason healthy. In both statements they are wrong as far as we can discern by our senses or

investigate by argument. Using our senses we can plainly see that spring is exactly well tempered: using argument we can prove that it is healthy precisely for the reason that no one of the four qualities is present to excess. If there were a great excess of hot over cold, or of moist over dry, spring would be fertile in putrefactions and of all seasons the most unhealthy. It is the equal blending of the four that is responsible alike for its perfect temperament and for its healthiness. What, then, has possessed some physicians and scientists to make out that the spring is moist and hot? Obviously from their desire to parcel out the four combinations of the temperaments among the four seasons of the year; which in turn has come about from their omission of the principal temperament of all, the perfect. So, too, they differentiate regimens and drugs and everything on earth according to these four combinations.

Hence we see how dangerous in treatment are physical speculations that diverge from truth. It is preferable either not to engage in such studies at all and to rest everything on experiment, or to have an initial training in the study of logic. To neglect experiment and to attempt the study of physics before a fitting practice in the reasoning which is our approach to physics is bound to send them straying after fallacies such as these. It compels them to argue on the appearances like blockheads, and to drag in Aristotle to support them though they misinterpret his teachings.

What is called hot and cold and dry and moist Aristotle understood in many senses. Our friends take it not as having many senses, but one single sense on all occasions. Again, Aristotle explained that there was a difference between being hot with native, innate heat and being hot with acquired, foreign heat. This, too, they misunderstand. Furthermore, Aristotle and Theophrastus, too, have accurately described the points we have to consider before assuming any nature to be well or ill tempered. This also they do not realize; and whenever they hear them (Aristotle and Theophrastus) say that the animal is moist and hot or that the temperament of a child is moist and hot they do not understand the sense in which this is said, and stupidly transfer the remark to the seasons of the year - just as though the moisture and heat of the native human temperament and the moisture and heat of the surrounding atmosphere were one and the same thing instead of vastly different. For a moist and hot temperament is not the same in an animal as in the atmosphere, nor are the words used in

the same sense.

I will now explain the cause of all this error and will show clearly to all who will give me their attention that trivial slips by students of the rudiments of logic are responsible for the gravest blunders. It is probable that everything done amiss both in the arts as a whole and in the transactions of life is the result of fallacious arguments. For example those now in question proceed from misinterpreting terms, instead of considering that "hot" is used in two senses - in the first as heat unblended, unmixed and simple; in the second as the predominating moiety in a compound of opposites. They forget, too, that often when we compare one temperament with another we put the hot and the hotter on a par. For example, it is thus that animals are said by the ancients to be hot and moist; not absolutely and in virtue of their own temperaments, but as compared with vegetables and the dead. For living animals are moister and hotter than the dead, or than vegetables. Furthermore, if you compare animals themselves with one another by species then the dog is drier and the man moister. If, however, you compare the dog with the ant or the bee then you will see that these are drier, and the dog moister. Hence, the same animal is dry as compared with man and moist as compared with the bee. Similarly, it is hot as compared with the man and cold as compared with the lion. Nor is it strange that things which have been referred to different standards should admit of opposing classifications. There is nothing odd in the same body being called both hot and cold, unless it has been referred to the same standard. There is nothing odd in the same man being simultaneously on the right hand and on the left, provided that this is not in relation to the same person. If he is on the right as regards this one and on the left as regards the other, then it is not odd. Hence in this fashion a dog is at once moist and dry and cold and hot; but not in relation to the same thing. Compared with man he is dry; compared with an ant moist: compared with man hot; and compared with a lion cold. Furthermore, he is hot qua living creature, since whatever is dead is not hot, but he may not be hot compared with some individual dog. In all this we are speaking comparatively and in relation to other things. It is different when we speak qua animal generically, and different again qua the species of animal. Compared with an ant and a bee the dog is moist; qua animals generically he is dry: as regards the species "dog"

this one is dry, that moist, and another, qua dog, well-tempered.

We have spoken at length about all this usage of the terms in the second volume of "The Diagnosis of Pulses", but it seems necessary to give a summary of the matter at this point, too, as much as will serve the present purpose. That which is dry absolutely without reference to any other thing, occurs in the elements fire and earth alone; the moist in water and air. And in the same way one must conceive of hot and cold. None of the other corporeal substances is exactly hot or cold save the elements alone. Take whatever else you please and it is a blend of the elements, and thence each of the other substances is not called hot or cold absolutely, in virtue of being unmixed and pure, but it is called hot or cold in the second sense of the term as being made up of more heat and less cold or of more cold and less heat. "Hot" and "cold" and "dry" and"moist" are used in these two senses: in the one when we speak absolutely of what is unmixed and pure, in the other when we speak of that which is a mixture of opposites, but which bears the name of the moiety which predominates. In this sense, therefore, blood, phlegm and fat, wine, oil, honey and all the like are each called moist. Bones, cartilage, nails, hoofs, horns and hair, stones, timber, sand, earthenware have a smaller share of moist and a larger of dry, and hence again all such substances are termed dry. Qua animals an ant is dry and a worm moist, and again in the class of worms one may be drier and another more moist, either absolutely qua worm or by comparison with some other worm.

But when we say that a worm is moist, a man hot, or a dog cold, is not the whole argument bound to fall into confusion unless we understand and conceive of this in an accurate way? And the accurate way is that described in my second volume on the "Diagnosis of Pulses" - to call everything in its class or species not hot nor cold merely nor dry nor moist but also great and small and fast and slow and so on, then and then only when it varies from the standard and mean. For example, an animal is called hot when in its temperament it exceeds the animal mean, or a horse hot when it exceeds the mean of the horse. The means in each genus and species are the standards, for they are equidistant from the extremes in that genus and species. "Animal" is the genus; "horse" and "ox" and "dog" the

species. Furthermore, in the whole genus of animals the blend is man. This will be proved later. The mean of the human species is what is called the well-nourished man: he whom we cannot call fat or thin or hot or cold or denote by any other adjective indicative of disproportion. Whosoever varies from this man is assuredly either too hot or too cold or too dry or too moist. Such a one is so called sometimes absolutely, sometimes not absolutely; absolutely, if he is called hot or cold or dry or moist without being the object of specific comparison to the standard man, and in another way not absolutely if he is compared with the standard and mean of the whole species. Thus a dog is called a dry animal absolutely, as is obvious to anyone, if he is not compared, for example, with an ant; but in another way not absolutely, if he is compared with the standard and mean in temperament of all animals, whatever that be.

Hence it is now clear that we call everything hot or cold or dry or moist either by comparison with some one thing and relative to that thing, or by comparison with the mean of the species or genus to which the thing so called belongs - "species" being represented by horse, ox, or dog, plane-tree, cypress, or fig, and "genus" by animal or plant.

In addition to these the words had still a third meaning when attached to those things which bore them in their absolute sense - those things which we stated have unmingled and complete qualities and are called elements: and furthermore we sometimes call the qualities themselves by the same name as the corresponding substances. But this we shall discuss later. For the present, since the corresponding substances are spoken of in three different ways it behoves us to consider in each instance how one uses the term; whether as denoting something absolute and unmixed; whether by reference to the standard of its genus or species; or whether to some chance thing. For example when some one says a bone is dry or cold, calling it thus quite absolutely without adding a "lion's" or a "dog's" or a "man's" bone, it is plain that after reviewing the whole nature of created things, he conceives of a certain mean, and declares that in reference to this the bone is dry. If again he says that a lion's bone is dry it is obvious that the reference is to the mean of animals' bones. And here again one must hold that as all animals vary in the dryness of their bones, bone of a mean dryness occurs in some one class of animals, e.g., if you will, in man - and

that it is in reference to this that other bones are called dry or not dry. Furthermore, amongst men themselves one will be said to have dry bone, another moist bone, after reference to the human mean.

Throughout the argument we must always understand - even though we may omit to state it - that in all things the mean of the extremes is the standard and the proper temperament for the particular class or species. Furthermore, this being so, whenever someone says that this temperament is moist or hot we have to enquire in what sense he makes the statement. Is it specially relative to some one individual - a comparison, e.g. of Theophrastus with Plato - or is the reference to some class or species?

For the third meaning of each of these terms - implying something absolute and unmixed - is inadmissable for blended things and applies to those primary things alone which we call elements. Hence although the corresponding bodies have three significations two alone do we employ for our treatise on temperaments - the one where the reference is to one individual thing; the other where it is to the generic norm.

Since classes and individuals, too, are many, the same body may be hot, cold, dry and moist in many ways. Now, whenever the comparison is to some one chance thing, it is quite clear that contradictory statements may mean the same thing, e.g. Dion may be drier than Theon and Memnon and moister than Ariston and Glaucon. It is when the comparison is with the norm of the genus or species that the tyro is likely to get confused and muddled; for the same man can be at once moist and hot, and dry and cold: dry and cold as compared with the normal man and moist and hot as compared with some other animal, or a plant or other substance whatsoever; with an animal, for example, if compared, say, with a bee or an ant; with a plant, if compared with an olive or fig tree or with a laurel; with some other substance other than an animal or plant, if compared with a stone, iron or bronze.

In these examples when the comparison is with a man it is a comparison with something of the same genus, as ~~and~~ it is when the comparison is with any sort of plant. For granted that this class is more primitive than the animal, just as stone, iron and bronze, examples of the

primitive classes, are more primitive than the plant, still, for the sake of brevity of exposition, let us call all this sort of comparison comparison with something of the same class. In doing so, however, let us make just one qualification: namely, that whenever any substance is said absolutely to be of correct temperament and some other substance is said to be drier, hotter, colder or moister than this, we thereby denote as correctly tempered that substance in which the opposites are present in exactly equal proportions, while any substance which falls shorter of this and shows excess in any respect we dub by the name of the moiety in which it exceeds. On the other hand, whenever we call any plant or animal well-tempered, we do not when so speaking make an absolute calculation of the opposites, but are laying our account with the plant's or animal's nature, and term, say, a fig-tree well-tempered when it is all that the nature of a fig should be; and again we term a dog, pig, horse, or man well-tempered when each of these is in fullest possession of its own appropriate nature. This point, the fullest possession of its own appropriate nature, is determined by its functioning; for we say that any plant or animal is at its best when it functions most successfully. It is the merit of a fig-tree to bear the best and biggest crop of figs; and of a vine similarly to produce the most abundant and beautiful clusters; of a horse to run fastest, and of a dog to be superlatively courageous for hunting and on guard, and most good-tempered to those of the household.

All these, therefore, (I mean animals and plants) we shall speak of as having a perfect and mean temperament in their class not in the absolute sense of having an exact equality in their opposite components, but because they possess the due proportion that their faculty requires. Similarly, we say that justice is done when it determines not by weight and measure, but rightfully and according to desert the thing that is equal. So equality of temperament in all animals and plants of correct temperament means one depending not on an equal bulk of the blended elements, but on that which befits the nature of the animal or plant. Now it is befitting that sometimes the moist should exceed the dry, and the cold the hot; for it is incorrect that the temperament of man, lion, tree and dog should be the same. If one asks what is the temperament of a man, horse, or dog or any other sort of thing, no unqualified answer can be given; for no one can avoid error if he makes answer in one

sense to things that are spoken of and interpreted in many. The alternatives are either to go into all the distinctive meanings or to ascertain that in which the question is asked, and speak to that alone. If he ascertains that the question of temperament relates to the animal creation, then he must hold in view that which is in temperament the mean of all animals, and so make answer. If, again, the question is put absolutely, and with regard to nature as a whole, then in this case he must compare the opposing moieties of the thing's components one with another and assess them; no longer referring the thing's temperament to its functionings but to the proportions of its elements. If again the question refers specifically to some one thing, then he must refer to that one thing alone. And again, if we are asked what is the temperament of some one individual, of Dio, say, or of such-and-such a dog, no unqualified answer can be given. To do so gives our pettifoggers no small opportunity for sharp practice. If you say that Dio is of a dry, hot temperament, it is as simple as can be for him either to bring forward some man or other who is hotter and drier in temperament than Dio and prove that, as compared with this man, Dio is moist and cold; or by adducing some plant or animal - a lion, say, or a dog - to demonstrate that Dio is also moister and colder than these.

Hence, it behoves anyone who does not intend either to deceive himself or to be deluded by someone else, before passing on to the other substances to begin with those that are termed hot, cold, dry and moist in the absolute sense, and as regards them definitely to lay it down that not even they, though they seem most obviously to be spoken of in the absolute sense, can avoid the reference to the standard of their class. For just as we say that a dog is the mean in temperament of all dogs when he is equidistant from the extremes, so shall we say that a substance is mean in temperament when it is equidistant from the extremes, i.e. from the primary elements of all things. A substance will obviously be equidistant from the extremes when these have all been blended in equal proportions. Hence any which exceeds or falls short of this one we shall term a hot substance or a cold, or a dry, or a moist, both by reference to the mean substance and also by an assessment of its opposing elements. Furthermore, by the latter procedure we shall speak of it as being hot, cold, dry or moist in the absolute sense; but when we refer it to the mean temperament then we are not speaking absolutely, but say that it is what it is in virtue of reference to

the standard of its class. Now here the class is that of substance, for under substance all things are comprised, however general their class, both things animate and inanimate; and substance is a class that embraces a man, dog, plane and fig tree, bronze, iron and all else whatsoever. It is subdivided into many other classes; in animals the classes of birds and fishes; in plants those of trees and flowers; in birds those of the eagle and the crow; in fishes those of bass and hake. Similarly, in trees we have the class of the olive and of the fig tree, and in flowers the class of the pimpernel and the class of the peony. These are terminal classes, and hence they are also called species, as also are crow, hake, fig-tree and pimpernel. And so with man, ox and dog. If we proceed from above downwards these are terminal classes, and hence they are also called species: if upwards from the individual substances they are primary. In another work we have shown how reasonable it was for the ancients to term all these things that are intermediate between individuals and the primary classes both species and classes.

Now that we have defined our terminology and have clearly proved that it is incorrect to maintain that any corporeal substance is hot, cold, dry or moist in the absolute sense, we have next to enquire into the mean of recognizing them. But even here we must first define the terms that are bound to crop up in the argument that follows, and to explain a matter that has practically been demonstrated already, but which may not have been clearly apprehended by all readers of this treatise. We will first discuss our terms and then proceed to the matter in hand.

We have shown above that the terms hot, cold, dry and moist as applied to corporeal substances have more than one meaning among the Greeks, but we have not yet stated, and it is now time to do so, that they sometimes apply these terms to the qualities inherent in the corporeal substances apart from the substances that have acquired those qualities. So, just as in the phrase "White is the colour opposite to black", we apply the term "white" to the colour and to the corporeal substance that has acquired it when we say that "the swan's body is white", similarly we apply the word "hot" both to the quality (just as if we were using the term "heat"), and also to the corporeal substance that has acquired the heat. For we must hold that the quality exists and has an individuality of its own apart from

the corporeal substance that has acquired it. Heat, then, is a quality and it is also called hot; and so with whiteness and white; but the hot corporeal substance bears the name of "hot" and nothing else, and so with the white; but the mere corporeal substance is never termed heat or whiteness. In the same fashion both the corporeal substance and the quality are called cold and dry and moist, but the corporeal substance is by no means called coldness or dryness or moistness like the inherent qualities.

This being so it is well that there should be no trickery whenever anyone in discussion uses the terms "heat" and "coldness". These terms denote qualities only. If, however, he says "hot" or "cold", since these names apply both to the quality and to the corporeal substance that has acquired the quality, it is very easy for anyone who wishes to be unfair to take the term in the sense not denoted by the speaker, and so to trick him. Something of the sort are those guilty of who dispute the aphorism of Hippocrates which says "Growing things have in the highest degree the innate hot". For since they do not understand Hippocrates to speak of "the hot" which is innate in the animal in the sense of a corporeal substance, and do not seek to discover what this is, but take it merely in the sense of the quality that we call heat they dispute his diction on these lines. And it is obvious that the definition of ambiguous terms, however minor a matter it may be, is of considerable importance when it comes to a practical application.

But since this point, too, has now been clearly defined let us once more proceed to what still lies before us. Since there does exist a certain unblended and unmixed quality both of heat and cold and dryness and moisture, it is obvious that all corporeal substances that have acquired these qualities are perfectly and exactly hot, cold, dry and moist. Now observe that these are the elements of all things that wax and wane, whereas all other corporeal substances, both those of animals and of plants, and of all inanimate things such as bronze, iron, stone and timber lie intermediate between these primary substances. None of them is completely hot or completely cold or completely dry or completely moist, but is either an exact mean between the opposites so that it is no wise more hot than cold or more dry than moist, or it has approximated to one or other of the extremes, so as to

be more hot than cold or more dry than moist. Now if it be an exact mean in respect of each of the two contradictories so as to be in no way more hot than cold or more dry than moist this will be called absolutely well-tempered. But if one of the two opposites predominates either in respect of one of the two sets of contradictories or of both, it will be no longer well-tempered. If it is more hot than cold it will be called after that which is in excess. Similarly if it is more cold it will be termed cold; and so with dry and moist. And if one of the extremes predominates in each of the two sets of contradictories then the corporeal substance will be called hot and moist, or hot and dry, or cold and dry, or cold and moist.

Now these four faulty temperaments, as we have said above, are recognized by most physicians and scientists; but the other four, the half way stages of these, they unaccountably omit, together with the most important of all, that which is perfect. The possibility of the temperament, even when the hot is in excess, being neutral in respect of the two contradictories moist and dry, I judge to be quite obvious from what has been already said. Even if we had said nothing it would be very easy to infer it once it was granted that there is a moist and hot temperament and another which is dry and hot. For if the hot temperament is not absolutely bound to be dry as well, but can be moist too, it is obvious that it can also be equidistant from either; for the temperament that is intermediate lies closer to the dry temperament than does the moist.

In the same fashion there is a second or cold temperament wherein the cold element is more potent; nevertheless this is not bound to be either moist or dry. It is possible for it to be intermediate, for here too you will apply the same argument, so that if the cold temperament is not necessarily moist, but may possibly be dry, it is obvious that it is also possible for there to be an intermediate temperament, for this lies closer to the moist temperament than does the dry. Since then we have shown that in respect of the one set of contradictories we have these two faulty temperaments, the purely hot, and the purely cold, in the same way there will be two more in respect of the other set, the purely moist and the purely dry - the hot and the cold being on a parity one with another. For here again we shall affirm that if it is not

inevitable - assuming that there is a dry temperament - for this to be automatically hot also, but that it is feasible for it to be cold as well, then it will not be impossible for a temperament to be neither cold nor hot, but well-tempered in this respect, and dry in respect of the other pair of contradictories; and similarly that the moist temperament need not be either hot or cold, but may conceivably lie intermediate between the two as far as these contradictories are concerned.

If, then, neither the temperament that is faulty in respect of hot and cold is necessarily followed by that which results from the other opposition of contradictories, nor the latter by the former it may happen that the nature which is well-tempered as far as heat and cold are concerned can be either dry or moist, and that in turn the nature which is well-tempered in the latter respect may be either hot or cold. Hence we have these four faulty blends over and above those which earlier physicians and scientists have bequeathed to us, and they lie intermediate between the well-blended states and those which are ill-blended in respect of both sets of contradictories. For the state which is perfectly well-tempered shows an excess in neither category, while the badly tempered state which is diametrically opposed to this is faulty in respect of both. Intermediate between these is that which is well-tempered as regards the one and badly tempered as regards the other; and this, being half well and half badly tempered may be fittingly called intermediate between the absolutely well-tempered and the absolutely badly tempered. And if this be true, as it is, we may now confidently affirm that there are in all nine varieties of temperament: one well-tempered and eight badly tempered; of which four are simple, the moist, the dry, the cold, and the hot temperaments; and four others compound, the moist and hot, the dry and hot, the cold and moist, and the cold and dry.

In each of the temperaments described the question of degree is very important, both as regards what are termed temperaments generally; nature as a whole; and finally each separate class. If anyone means to be an expert in temperaments he must begin his study with those natures which are in each class the well-tempered mean. By a comparison of the others with these he will easily discover the redundant or deficient element in each. First, then, let us speak of those that are called absolutely well or badly

tempered, and which we said we would investigate throughout all created things, and not only in animals and plants. And here, too, we must so far define our terms as to state that a hot temperament is actually one thing and potentially another, and that we call all those things potentially so and so which though they are not yet what they are called, still easily become so because they possess a natural aptitude for so becoming. First then let us discuss those things that are actually hot, cold, dry and moist; beginning with nature as a whole and then proceeding to plants and animals; for thus our purpose will be fully wrought out.

Since, then, in every class and particularly in nature as a whole the mean is formed by the commingling of the extremes, it is from these that we must form our conception and criterion of the mean. So far as conception is concerned the matter is easy. Starting from what is the hottest of all the things appreciable to our senses, e.g. fire or water at boiling point, and coming down the scale to what is coldest of all the things of which we have knowledge, e.g. ice or snow, we conceive of a certain intermediate point and note this accurately as the mean. In this way we shall arrive at a conception of the standard -- that which is equidistant from either extreme. Indeed we can even construct such a standard by mixing an equal bulk of ice and boiling water, for the blend of the two will be equidistant from either of the extremes, that which is blazing hot, and that which is perishing with cold; and so by touching that which has been so blended it will not be difficult for us to arrive at the mean of all the material that lies between the contradictories of hot and cold, to fix it in our minds, and so to assess all the rest as though we were measuring it by rule. Furthermore, if one were to wet dust or ash or something else that was perfectly dry with an equal bulk of water he would make a substance that would be the mean of the contradictories of dry and moist. Here again it would be no difficult task for him to distinguish such a substance by sight and feel, commit it to memory, and use it as a measure and criterion for the recognition of deficiency or excess in substances that were moist or dry. It must, of course, be granted that the corporeal substance assessed is of standard warmth, for if it be raised to the extreme of heat or cold, mean though it is of moist and dry, it will on occasion present a deceptive appearance and seem to be sometimes moister

and sometimes drier than the standard. If it is made unduly hot it will, by melting and liquefying, present the appearance of being too moist: if it is improperly chilled it stiffens, coagulates, becomes firm and appears solid to the touch, and hence presents a false appearance of dryness. If, on the other hand, it lies intermediate between heat and chilling as exactly as it has an equal share of moist and dry, then such a substance will seem to the touch neither hard nor soft.

Now to make a complete blend of these - I mean hot and cold and dry and moist - is beyond human skill. If you make earth into a paste with water, it is indeed to all appearances mixed, and in this sense blended throughout; yet such a mixture is but a juxtaposition of particles, not a complete blending or temperament. To blend the two completely is a task for God and nature, and still more so if hot and cold are to be completely blended together. Nevertheless, to effect a juxtaposition such that each of the simple substances ceases to be recognizable is a task not reserved for nature and the almighty; but is also possible to mortal man. It is in no way difficult to make mud from such a mixture, a mean between moist and dry; and so, too, with hot and cold, and to all appearances such a substance is not only well blended in temperature but is also intermediate between hardness and softness.

Such a substance is the human skin, which is an exact mean of all the extremes of hot, cold, hard and soft; and above all the skin of the hand. For the hand was devised to be a measure of all sensible things, a tactile instrument peculiarly wrought by nature for the most intelligent of living creatures. Hence, it had to be equidistant from all the extremes of hot, cold, dry and moist. Furthermore, it has come into existence not from a mere mixture of these in equal proportions, but from a perfect tempering; a thing which no man could effect, but which is the work of nature. Hence all those parts that are harder than the skin, e.g. bones, cartilage, horns, hair, nails, ligaments, hooves and cocks' spurs have an excess of the dry: those which are softer, e.g. blood, phlegm, soft and hard fat, the brain and spinal cord, have an excess of the moist over the dry. Furthermore, in man the driest part of all is as much harder than the skin as the moistest is softer. It is apparent, I think, that the argument at this stage approaches a most fertile field, and shows (a) that man is not merely the most perfectly tempered of animals, but of

all corporeal substances as well, and (b) that the palmar surface of the hand has with exactitude avoided all the inequalities of his other members.

Interrupting our argument again at this point, let us enquire who is the most correctly tempered man of all; who it is whom we are to set in the mean position of all nature, and, still more important, of men and of all other living things, as a sort of rule and index, that by comparing them with him we are to label them hot, cold, dry or moist. To ascertain him many indications must coincide. Such a one must plainly be in the mean position when we test him against the whole range of nature, and still more when he is tested against men and living creatures. The indications that are common throughout the range of nature have been described already. Those that concern the species of living creatures are determined by the perfection of the function that is distinctive of each species. Man is distinguished by wisdom; a dog by gentleness and courage; a lion by courage only; and a sheep similarly by gentleness. Furthermore, the necessity that the functions of the body should be related to the disposition of the soul has been proved by Aristotle in his books "On the parts of Animals" and equally by myself on the same subject. This, then is the mode of investigation.

To train oneself to recognize unhesitatingly the mean in each class of animal and universally is beyond the ordinary man, and needs one of extreme industry who has learned to detect the mean by long experience and a large acquaintance with all the individual instances. This, at any rate, is the way in which modellers, painters, sculptors and statue makers paint or fashion their masterpieces in each sort - whether it be a man of perfect symmetry or a horse, a bull or a lion; the mean in that class is their aim. There is a certain celebrated statue of Polyclitus called "The Rule", which gets its name from the perfection of the mutual symmetry of all its parts. Yet the Rule of which we are now in quest has a wider application than his; for our well-made man does not merely stand in the central position between moisture and dryness, but is also blessed with a perfection of make up, which is perhaps due to the right blending of the four elements, or which possibly has a different and more divine origin from on high. That such a one should be rightly blended in every way is inevitable; for the due proportion of the well-made man is the

product of right blending. It follows that the functions of such a body are in a condition of perfection and that it has a due share of hardness and softness, and of heat and cold. And all these merits hold good of the skin: particularly the skin of the inner aspect of the hand; provided, that is, that there is no callosity present such as occurs in oarsmen and navvies. The hands subserve a double purpose: touch and grasping; and soft hands are more suitable for delicacy of touch and hard ones for strength of grip.

Furthermore, the skin, which is not only the mean of all the human parts but of the entire range of material whereof all the corporeal substances capable of origin and decay are composed, is not callosed skin, hard and stonelike, but that which is in its natural state where, as we said, the touch was most delicate. Its intermediate position among all the parts of the body in respect of hardness and softness is plain enough: that it is also intermediate in respect of heat and cold you may best learn from its composition. It is as it were a sort of vascular sinew precisely intermediate between sinew and muscle, as though it had originated from a blending of the two. Now a sinew is quite bloodless and cold: muscle is very vascular and hot; and the skin, lying between the two, is neither quite bloodless like sinew nor is it very vascular like muscle. If, then, you apply the skin as a measure and standard, as it were, for all the parts of the animal body and test and compare the others with it you will find among them the eight different sorts of imperfect blendings. Indeed, I will run through them all individually in order.

Phlegm is moistest and coldest: blood is hottest but not as moist as phlegm. Hair is coldest and driest. Bone is not as cold and dry as hair, and cartilage is not as dry as bone. Next after cartilage come ligaments; then tendons; then membranes and arteries and veins, i.e. the solid framework of the vessels; and then all the hard nerves. The soft nerves resemble the nature of the skin as far as their intermediate position in respect of moisture and dryness is concerned. In respect of the other set of contradictories the soft nerve is not the mean between hot and cold and lacks heat in proportion as it lacks blood. In the same way all the other tissues we have enumerated above are colder than skin in proportion to their inferior vascularity. The very coats of the most vascular

vessels - I mean the arteries and veins - are naturally bloodless and cold, but through contact with the blood they grow warm and attain a mean condition of temperature. The blood itself, too, derives its heat from the heart, for that organ is naturally the most vascular and the hottest of all the parts of the animal body; and next to it the liver. But while the heart falls but little short of the skin in hardness the liver falls far short. Everything that is softer than the skin is to the same degree moister. Furthermore, muscle is moister than skin, but is also hotter. The spinal cord is moister but also colder; the brain is moister than the cord, and the soft fat than the brain, and its coagulation is due to its contact with the membranes, for it has the appearance of thick oil, and hence it coagulates when associated with cold and non-vascular parts. Soft fat cannot coagulate in the liver nor in the arteries, veins or heart, nor indeed in any other part that is quite hot. Just as it coagulates in a cold part so it melts like all other coagulated substances when it grows warmer. The brain, however, even when warmed, does not melt; which proves that it is not as moist as soft fat. Lung tissue is not as moist as soft fat, for it also does not melt when warmed. The tissue of the spleen and kidneys is still less moist than soft fat. Yet all of them are moister than the skin. I shall go into the proof of this in the book that follows this, and in the two succeeding commentaries I shall add all that is lacking to a full exposition of the temperaments.

II

In the preceding work we laid it down that the terms "moist", "dry", "cold", and "hot" substances had more than one meaning. We proved also that there are nine varieties of temperament: one duly proportioned and tempered, and the rest all faultily; four of them being simple, with one quality - heat, cold, dryness, or moisture - predominating in each, and four others in which one power in each opposition of contradictories was in excess. These oppositions are two in number: one in respect of hot and cold, the other of dry and moist.

Next we passed to their diagnostic features and considered how it is that the well-tempered nature exceeds them all in worth, power and order of intelligence. And since we find that "well-tempered" means one thing when used of the nature of things as a whole, and another when used of each class of thing, we deemed it necessary first to consider that which was being assessed generally in respect of nature as a whole. Here the measure and method of determination was the equality of the component elements, in virtue of which was formed as an exact mean between all the extremes is termed well-tempered and duly proportioned. The rest, those things that are well-tempered as regards their respective classes, are determined by the appropriate functioning and usance of their bodies. Hence it is possible for an animal or vegetable body to be at once a mean of all its congeners, i.e. well-tempered and duly proportioned in that class, and ill-blended when compared with another class of plants, animals or inanimate things. Thus the body of a living creature is moister and hotter when compared with that of a corpse. For example, a living lion is hotter and moister than the same lion or another lion when dead. Hence the ancients said that a living thing was moist andhot, not in the sense that it had any absolute excess of moisture or heat - for on that argument you will find that very many living things, such as mosquitos, gnats, flies, bees, and ants are dry and cold - but by comparison with the dead. Thus a live bee is moister and hotter than a dead bee, and an ant than an ant, yet when compared with a man, a horse, an ox and the other red-blooded animals, all such creatures are cold and dry in temperament. Furthermore, if you examine them in regard to nature as a whole not even so do they evade

being dry and cold; for just as everything in each class that diverges from the mean bears the name of its predominant quality, so in regard to nature as a whole everything that exceeds the mean is no longer called well-tempered but either hot or cold or dry or moist.

We have shown above that the temperament of man is not merely more perfect than that of animals and plants, but of all things. Since he is made up of many diverse parts it is reasonable that that which is the mean of all these in temperament should be itself in the absolute sense well-tempered; for that part which is the mean of the animal which is the mean in temperament is in the absolute sense the most excellently tempered of all things. This in man we showed to be what is called the skin; and particularly the skin on the palmar surface of the hand, provided that it has remained in the state in which nature fashioned it. Furthermore, we showed above that it is not every man's skin which is an absolute mean of the range of nature, but only his whose temperament is best. There is great variation between man and man and that man's temperament is best whose body is obviously an absolute mean between the extremes of leanness and fatness, softness and hardness, and lastly of heat and cold. By touching the human body you can in each individual discover whether the heat is healthy and vaporous, or fiery and acrid, or whether, both of these being absent, there is a sort of overmastering chilliness. "Overmastering chilliness" you must understand as relative to an animal body and moreover, one that is red-blooded and moist. Such then physically is the man of perfect temperament. Morally, too, he will be an exact mean between hardihood and cowardice, procrastination and haste, pity and spitefulness. Such a one will be cheerful, affectionate, humane and intelligent.

These characteristics, then, will first and best reveal the man of perfect temperament. Other important indications will necessarily follow and accrue to these. He eats and drinks in moderation, the coction of his food is excellent not merely in the stomach but in the veins and throughout all the habit of his body, and, to sum it up, all his physical and moral functions as they are called are irreproachable. His senses and the mobility of his limbs are perfect. His complexion is good, his breathing always easy, he is neither somnolent nor sleepless; neither bald nor

shaggy, neither dark nor fair. As a boy his hair is flaxen rather than dark and as a man the converse.

Since we have mentioned the variation that occurs in respect of the stages of his growth, it would be as well here to say a word about these. It is true that it had been my purpose first to go into the causes of each of the diagnostic features here enumerated, but since the consideration of the stages of growth is more urgent at the moment and gives us an easier passage to the investigation of these causes we will approach this first.

Let us observe the animal just in process of being fashioned in the pregnant uterus, and realize that it is superlatively moist and hot. It consists originally of blood and semen, things that are moist and hot. As these grow steadily more and more dry membranes are first fashioned, coats, viscera, and vessels; and lastly, as the material coagulates, bone, cartilage and nails are formed. Before the subject matter can stretch or coagulate none of the above can come into existence. Coats, membranes, arteries, veins and nerves are formed through its stretching: bone, cartilage, nails, hoofs and spurs through its coagulation. When these parts have thus been perfected in utero the young one is then born, but is still extremely moist, like sea-moss, not merely in its vessels, viscera and muscles, but in its very bones - parts which in the grown man are driest of all. Yet even these and all their limbs likewise babies' nurses mould like wax, so great is the moistness throughout a baby's whole body. Moreover, if you wish to eat or dissect a young slaughtered animal you will find the flesh pulpy and flaccid, and the entire bony system like newly coagulated cheese, so that the carcases of new born animals are unpleasant to eat owing to their excessive moisture. This applies most of all to pigs and sheep because they are most moist; goats, being drier, are better and more palatable eating. With old beasts, in contrast to the new born, all the bones and ligaments are quite dry, lacking moisture and juiciness; their flesh is sinewy and tough, and their arteries, veins and nerves are like leather, unpalatable and juiceless. As for the animals that are intermediate between these and those newly come to birth, those that are some way advanced in age fall short of the extreme of dryness in proportion to their distance from old age, while those that are younger and not yet

fully grown diverge from the moisture of the embryo to an extent proportioned to their advance in years. The prime of every animal's life lies intermediate between the extremes: it has not attained the limit of dryness like old age, nor does it consist in moisture and abundant wateriness like the stage of infancy.

How then is it that certain distinguished physicians make out that old age is moist? Can it be that they have been led astray by the abundance of its excrementitious matters? Old men's eyes water, their noses drivel, an abundance of saliva gathers in their mouths; moreover they hawk and spit up phlegm, showing, I suppose, that the lung is full of that humour. The stomach is full of phlegm, and each joint charged with mucus. But all this is no argument against old men's bodies being dry. You will find that the nerves, arteries, veins, the membranes, and the coats of all the organs, though much drier than in earlier life, are coated inside and out either with a sort of phlegmatic humour or a mucous moisture; but so far are all such indications from proving that old age is moist that in my opinion they are evidence of its dryness. The reason why each part becomes drier is that owing to the decrease of heat it is now no longer nourished as before. There is an abundant overflow of moist excrementitious matters to the surface, but the deeper parts of each body are dry, so that they can neither draw into themselves their nutriment nor derive due benefit therefrom. Old age, then, is moist not in its own native parts, but in its excreta; and dry not in its excreta but in its own native parts; and so in one way it is moist, and in another dry. But we are not dealing now with excreta but with those native parts whose physiological activities constitute life. The old man is therefore dry in those parts in which the boy was moist, i.e. in the solid parts of the body themselves, the bones, ligaments, membranes, arteries, veins, nerves, coats and muscles; and Aristotle has aptly compared old age to a plant that is withering; for plants while they are young are soft and moist, but as they grow old tend to get manifestly drier, and at last become completely dried up and so perish.

It is obvious from the above that of the stages of life old age is the driest. That it is also the coldest is even plainer: so much so that of this there has been no question. If you touch old men they are evidently cold; they easily become chilled, cyanosed and livid; they are easily attacked by cold disorders such

as apoplexies, paralyses, comas, tremors, convulsions, running at the nose and hoarseness. Practically all their blood goes and hence the redness of the complexion goes too. Moreover in the old coction, digestion, blood formation, assimilation and nutrition, appetite, movement and sensation are all impaired and in poor condition. In fact what is old age but the pathway to the grave? So that if death is the quenching of the innate heat, old age is, as it were, its waning.

As for childhood and the prime of life, however, doctors differ; nor is it easy to adjudicate the quarrel. There are plausible arguments both on the side of those who maintain that boys are hotter than grown men, and of those who say conversely that grown men are hotter than boys. Assuming that blood is the hottest of all the humours normally present in the body and assuming that the embryo is at first practically pure blood, and afterwards, as the parts are in process of development, some become bone, some artery, some vein or what not, yet all of them red and with the fullest share of the purest and hottest blood, the first school concludes that the embryo is hottest of all. And if this be so they hold that the boy, as being closer to the embryo, is hotter than the grown man. On the other hand, assuming that the grown man, too, is rich in blood and even richer than the boy (hence his frequent haemorrhages) and moreover assuming that yellow bile, which is a humour far hotter than blood, is most abundant in the grown man the second school maintains that the grown man is hotter than the boy.

Arguing again from their functional activities the first say that heat is powerful in children because they are growing, and their appetite and digestion are out of all proportion to their size. The others hold that their growth depends more on their moisture than on the intensity of their heat, whereas their coctive powers so far from exceeding fall far short of those of grown men. Children, they say, are prone to vomiting of unconcocted food, and to pass loose, crude, unchymified stools. And, granting that their appetite is excessive, this, they say, is no proof of the intensity of their heat. In the first place it is not through excess of heat that animals acquire appetite, but quite the reverse: it is through the cooling of the appetitive parts; and secondly, since their food goes not merely for sustenance but for growth as well, they require an ampler diet. In respect of all their other functions,

however, children quite clearly fall short of grown men. They can neither walk nor run nor use their hands nor in a word discharge any of the active functions as ably as a man, while in men perception and intelligence have attained their maximum. In a word the child is an imperfect, the man a perfected being; in the perfected they say it is reasonable that the most active and sovereign elements should predominate. Furthermore, you may observe that children sleep most and grown men least; and yet, say they, not even a lunatic denies that sleep comes about through the hot element being somehow overcome and weighed down by an excess of moisture; as one may see in those who have had too much to drink or been too long in a bath. For the same reason opium, mandragora, wild lettuce and the like are hypnotic because they tend to be moist and cold.

Such then are the arguments on each side with regard to the temperament of the ages in question. To go into them all is, I think, superfluous, since the character of their attempted proofs is quite obvious from what we have already said. The deductions on both sides are loose and practically a petitio principii, and they argue as though their hearers are already informed of the process of growth, coction and nutrition. In the same way they expatiate on perception, intelligence, active and physical functions, and prattle of the origin of sleep and the composition of foods; none of which things is to be absolutely and easily apprehended, for all require prolonged investigation, and possibly cannot be understood at all unless one has first learned to recognize the moist and dry and cold and hot temperaments.

If one were to demand of them proof of any of the statements they take for granted they would certainly feel the need of that discussion of the temperaments that now confronts us. It is, in fact, by arguing in a circle that they establish their proofs; for in all their talk about the bodily functions, their researches into the virtue of foods and drugs, and their inquiries into sleep and so on - they take for granted all that we are now investigating, and on the other hand that with which we are now concerned they prove by taking these other questions as already determined. Such methods of proof I cannot commend: in fact, to be candid, I do not regard them as proofs at all - a point I have illustrated at greater length elsewhere - and I affirm that in every work of instruction it is better to define the order of one's conceptions.

So if the starting point of any treatise on the temperaments is the enquiry whether the elements are constant and completely unchangeable, or are capable of modification and change, and if, when that has been established, next comes the discussion with which we are now concerned, they have no right to assume the proofs of these matters from what has not yet been apprehended; but, as is right and proper, the assumption which is to prove their case should be either something self-evident or something that has been proved already. Let them not, therefore, talk about the origin of sleep or coction or growth or anything of that sort; but let their enquiry proceed simply and solely from the essence of the subject in question.

This is what we did in the preceding book. We laid it down that "actually" is one thing and "potentially" another, and said that we had first to discuss what was actually hot, cold, dry and moist, and so arrive at what was so potentially. The determination of what is actually hot, cold, dry and moist is easy and familiar to all; for to distinguish them we have the sense of touch, which informs us that fire is hot, and ice cold. If our friends have any other method whereby they can conceive of and determine hot and cold let them tell us. It is a desperate philosophy they profess - or it would be truer to say, a frenzy - if they have any more reputable index of objects of sensation than the senses. Indeed if there is no other possible index of things actually hot let them touch a string of men, old men, lads, children and infants; for thus they will discover how they vary in heat. If they demand a logical proof for objects of sensation it is more than time for them to inquire whether snow is to be considered white: as all men see it: or whether it is not white; as Anaxagoras maintains. Furthermore, they must look closely into pitch, crows, and all other black objects, for it is unfair that the eyes should be disbelieved when they see white and believed without proof when it is a question of black. Let them, therefore, assert here and now that all sensory impressions are fallacious, and uphold that without logical proof a swan is not white, nor lime, nor daylight, nor the sun itself. Similarly for sounds let them disbelieve their ears; for smells their noses; and for all tangible objects their sense of touch. Is not this an impasse worthy of Pyrrho himself - an abysmal absurdity? It is assuredly improper that those who have accepted that most valuable of all philosophic principles which assumes hot and cold and dry and moist

as first principles and elements should deviate so far from the authors of that hypothesis as not to recognize that the first principles of all proof lie in what is self-evident to the senses and the intelligence; and if anyone boggles at this it is labour in vain to push his enquiry further, seeing that he has not left himself even a starting point.

Why they have gone so far astray and have sought to recognize by logic things that are objects of sensation for my own part I cannot even conceive. It is by touch that I distinguish what is actually hot. What is not yet hot, but has an aptitude for becoming so, i.e. what is called potentially hot - this I try to investigate by logic. But our friends have somehow put the cart before the horse and to support their theories given us long and laboured prize essays. Well, we may dismiss them, merely reminding ourselves that the main source of faulty doctrine is to frame your proof without first investigating your facts, and while you are still collecting your facts to attempt a demonstration, for whatever it may be worth, as though you knew the facts already. Let us get back to our subject and decide the question of heat in the various ages of man first and foremost by touch. This will be best practised on the person of one single infant. We shall be able to remember what his heat was formerly at the age of two, and what it is now after an interval, say, of two or three years. If there seems to have been a general change in the infant in the direction of heat or cold there will be no difficulty in calculating what the increment will be till he is fully grown. If you purpose comparing several children with several grown men then compare thin with thin, those in good condition with those in good condition, and fat with fat, and similarly as far as you can those of like complexion and so on. For if you are trying to arrive at the differentia in the various ages you will be on surer ground if you investigate natures that are similar in each individual point as much as may be. To review those that are dissimilar involves a good deal of fallacy: the differentiae of the bodies under examination depending sometimes not on the age but on the natural temperament. Similarly, it is well to select bodies that approximate to each other in their whole regimen and in the seasons in which they are under examination; and not compare the athlete with the untrained; the man who has bathed with him who has not, the fasting with the full; nor the thirsty

with the drunk; nor him who is warmed with the sun with him who is perished with cold; nor the wakeful with the sleeping, nor in a word those who are in anyway whatsoever of opposite nature, mode of life, or environment.

Let all the other factors be as far as possible the same with the exception of the age alone. Hence even when comparing the individual child with himself you will naturally take care that his circumstances are strictly the same to prevent any thermal difference in these being ascribed to the alteration in his age. It perhaps seems a tedious investigation that I propose to you; but it is preeminently the right one, and depends on the essential nature of the matter under enquiry, as described in my remarks on "Proof". You may possibly prefer the short cut without caring whether it leads you astray. If so, be sure you will take not merely the wrong road but the long road; not in three or four years will you attain your quest, but throughout your whole life you will continue in your ignorance; for as for these gentlemen's disputations there is nothing in them capable of convincing proof, since it is quite unreasonable that the proof of the premises should depend on the conclusion.

Let our senses therefore decide what body is hot or cold - I mean a body which is so in fact and not merely potentially - and for the moment let us dismiss all the other methods of diagnosis. If you mean to decide for yourself I leave you to make the attempt: how I myself decide I will explain. After carefully feeling a number of bodies, not merely children's or infants', but lads' and grown men's, I used to find that neither those who said that the grown man was absolutely hotter than the child nor those who said he was colder were right. If you exclude all other external variations and consider the differences that arise from the age alone, neither the one nor the other will seem to you absolutely hotter. It is in their quality, due to a difference in their evaporation, that the heats of the two differ; and it is owing to this that certain authorities, deluding either their readers or themselves, hold that the heat of the child is stronger, and others that of the young man. It is a fact that the heat of children is more vaporous, more ample and agreeable to the touch. That of grown men has acquired something acrid and disagreeable. Hence this difference in the way the heat impinges on one induces the majority to maintain that the body of the grown man

is hotter. But this is not so. If one has trained his sense of touch in different materials to distinguish a greater or less or equal strength of heat I am sure that to him the heat of children is clearly equal in respect of strength to that of grown men or even greater.

The method of training is this. One must start from the most obvious examples. The air of baths is sometimes so hot that it seems as if nobody could bear it without being scalded: sometimes so cold that it is impossible to sweat. And, of course, I need not say that besides these there is a third very desirable "constitution" - that which is well-tempered. The same three constitutions appear in the bath water. You often find it hot enough to scald you, or so cold that you are not even warmed, or well-tempered so that you are warmed befittingly. Now, if I were to ask you which is the hotter, the well-tempered water or the well-tempered air, you could not say one or the other; for since both are equally agreeable and befitting to the body I consider it foolish to say that the one is hotter and the other colder. Again, if you take the water in the cistern that has reached its maximum heat so that it boils, or air that is a perfect blaze, it is obvious that you will be scalded equally by both. And if you take again water so cold that it is almost freezing, or air completely chilled, as occurs in snow storms, it is plain that you will be equally chilled and perished by each of them. Hence you will note that there is an extreme of heat and cold in air and water alike, and equally a mid-point between either pair of extremes in both. It follows then that both in water and in air the space between the mid-point and both extremes will be of the same extent and interval, and you will say that the one is hotter than the mean by the same amount as the other. Similarly, you will say that the water is colder than the mean by the same amount as the air; even though the distinctive way in which the two elements impinge upon one was not the same; for well-tempered water and well-tempered air do not impinge upon one in the same way. But why adduce unequals such as these? Even when the air itself maintains an equal heat it impinges upon one with an impression that varies with its being sometimes, as it were, misty and vaporous, sometimes murky and smoky, and sometimes absolutely pure. In many different substances there is an equality of heat that deceives the inexpert with a seeming inequality because it does not appear similar in all respects. It needs a man expert in the calculations I have described and with his senses

trained by long familiarity with every detail to detect the equality of heat in boys and adults and not to be deceived because the heat of the one occurs in a moist essence and of the other in a dry. Stone and water may acquire an equal heat and it makes no difference that the stone is dry and the water moist.

Hence, though I have times without number examined a host of boys, youths and lads, and the same boy both as an infant and a lad, it was never apparent to me that a grown man was hotter than a boy or a boy than a grown man. Only, as I have said, in boys the heat struck me as being more vaporous, ample and agreeable. The boy's essence, being moist, disperses freely to the exterior; grown men's being dry, scantily. Hence neither of the two appears hotter absolutely: the boy seems hotter through the abundance of his transpiration, the man through its acridity. Innate heat in the boy is greater if we grant that he is the product of blood and semen, and it is more agreeable.

So touch is the sole test of a hot or cold body; but of a moist or dry body touch combined with calculation. If a body is dry, certainly it is hard as well. And this may be ascertained by touch. But if a body is hard it does not follow that it is also dry. Hardness is an inseparable but not a peculiar characteristic of a dry body. Thus what has been coagulated by cold - e.g. ice - is hard. Hence one must not attempt all at once to differentiate moist and dry without first investigating how things stand with regard to cold and heat. If something is hard when combined with extreme cold it does not follow that it is dry also; nor if something is soft when combined with excessive heat is it necessarily moist. You must consider whether it is soft or dry when it is merely moderately hot. Then if it is soft it is moist, and if hard, dry. If this be so, none of the moist parts of the human body can be hard, for it is impossible for such cold to exist in the body as to freeze anything into hardness. It is true that what was once fluid - soft fat, for example - may attain a certain consistency, for the oily and greasy part of the blood, though it is fluid, coagulates when in a cold part; but even so it does not become hard.

Hence it was aptly said by the ancients that soft fat was moistest; and, after fat, flesh as a class. Of this there are several species; first that which is legitimately termed flesh and which you will find nowhere

in the body as a separate tissue, but which is a constant component of muscle; and next the individual substance of each of the viscera. This the school of Erasistratus call "parenchyma" and conceive of as something trivial and unimportant, not knowing that it is on this that the function of every viscus depends. But we cannot enter into this now.

The distinctive substance of the brain itself and of the lung comes next in moistness to the soft fat, as we may infer from their softness; for they are not coagulated by what is cold any more than they are melted by what is hot. Close to these in kind comes marrow, yet bone marrow is not of the same class as the brain and cord. Brain and cord are of the same class, but all other marrow is of a different kind. The brain is moister and hotter than the cord, and hence is also softer. Indeed even in the brain itself the frontal portion is moister in proportion to its greater softness. All these tissues are not merely moister than skin, but colder too; and generally everything non-vascular is colder than what is vascular. Very close to skin comes the nature of the soft nerves. That of the hard nerves is just like the skin itself - in point of moisture and dryness that is; for in heat it falls as short of it as one would expect an entirely non-vascular substance to fall short of one that is vascular.

The flesh of the spleen, kidneys and liver is moister than the skin in proportion to its greater softness, and hotter in proportion to its greater vascularity. Furthermore the flesh of the heart is drier than all these in proportion to its greater hardness, and in heat exceeds not only these but all the parts of the body without exception. You can ascertain this clearly by your senses during dissections of an animal's thorax. If you dip your fingers down towards the left ventricle of the heart you will find that this part is a good deal hotter than all others. Now, the flesh of the liver, spleen, kidneys and lung is simple in its nature, having been formed around the arteries, veins and nerves of each viscus. In the heart, however, its kind of flesh is not simple, but just as in muscle there are fibres round which the flesh has become compacted, so are there also in the heart. Albeit the fibres are not all of the same class. Those in muscle are parts of sinews and ligaments. In the heart they are of a special class, as also are those of the arterial and venous coats, of the intestines, stomach, uterus and the two bladders. For undoubtedly in all these organs also

one is able to observe that the characteristic flesh has become compacted around the organs' distinctive fibres.

These kinds of flesh are hotter than the skin: the fibres are either to a varying amount slightly colder and drier than skin or resemble the nature of skin in all points. All membranes are drier than skin, and so, too, the meninges of the brain and cord, for they also are membranes. Furthermore all ligaments insofar as they are harder than skin are in the same degree drier. Even tendons, though softer than ligaments, are at any rate demonstrably harder than skin. After ligaments come cartilages and a sort of intermediate tissue, that some anatomists call fibrocartilage. This is a hard cartilaginous ligament. Bone is the hardest of all tissues invested by the skin. Of those that project from it the driest is hair, next horn,and then nails, hoofs, spurs, beaks and all similar structures in the irrational creation.

As for the humours, that which is most wholesome and native is the blood. From this as a sort of dregs or sediment we have black bile, which is colder and thicker than blood. Yellow bile is far hotter, and the coldest and moistest of all animal humours is phlegm. To determine this here, too, the test is touch, as Hippocrates has assumed in his "Nature of Man". That it is cold touch alone decides; that it is moist as well, touch, sight and reasoning - touch and sight because to each of these senses it clearly is so, and reasoning because that assures us that it is not through an abundance of heat but through its innate moisture that it became what it is. These, then, are the facts with regard to the parts and humours of the body.

We must now go into what results from the temperaments. Resulting from, or rather completely inseparable from them we have, as we have said above, not only hardness from the dry temperament and softness from the moist (that is when the heat is moderate) but also grossness and fineness of the body states; and this not merely in those which are congenital but also in those which may be acquired by prolonged habit. Often we see persons naturally fine made gross, and the gross refined: the first through indolence and luxury passing in their whole temperament insensibly into a moister condition, and the others, owing to

continued hardships, anxieties and spareness of diet, becoming dried. Here also we shall describe the diagnostic points; for it is better that we ourselves starting from certain indications and without waiting for others to tell us, should be able to recognize whether it is by nature that the patient is what he is or whether he became so by habit. For these signs, as for all else, our teacher is the admirable Hippocrates.

All those whose vessels are dilated are naturally hotter: those whose vessels are contracted are colder; for it is the function of the hot element to dilate and breathe through the vessels. Hence it is natural that contraction of the vessels should as a rule accompany a fatty and somewhat gross state of body, and a fine state of body accompany dilated vessels. If a person were at once fat and gross and also had dilated vessels then he became so through habit, and was not fat by nature. Similarly if a man were to have contracted vessels and yet were thin it would not follow that he again was so by nature. Again, in the starving, says Hippocrates, one must judge of their normal condition from these points (i.e. the dilatation and contraction of their vessels) and not from the state of the body as a whole. Those whose vessels are contracted are anaemic and do not tolerate prolonged fasting; but those who have dilated vessels and abundance of blood may be starved without injury. The reasons for this are obvious enough without my stating them, if, that is, you bring your intelligence to bear; but since this is beyond the power of some I must for their sakes here state that all the fatty, light, and refined parts of the blood becomes, as it were, a sort of fuel for the heat in those bodies that are of hotter nature, but in those that are colder it is unconsumed; and, oozing out from the vessels when it becomes involved in cold parts like the membranes, it coagulates there; but in those that are naturally hotter - I mean of course the fleshy parts - it is used up by the heat and evaporates, except where a lazy mode of life combines with a somewhat cold temperament to promote a growth of fat even in the fleshy parts themselves. Thus we often find that hibernating animals tend to fat, and women are fatter than men. This is because the female is colder in temperament than the male and is usually a stay-at-home.

Where the bodily states are naturally well-tempered and moderate exercise is taken, we are bound to have persons in good condition: that is, duly proportioned in all respects. Where there is sufficiency

of moisture and the heat does not fall far short of perfect proportion the persons are over fleshy, as also are those who, though naturally well-tempered, live a lazy and indolent life. It is an excellent saying of our fathers that habit is second nature; and perhaps if I say this now, once and for all, it will not be necessary henceforward to lay down under each head whether so and so is colder by nature or by habit. This I may leave to my readers and in the interests of brevity proceed myself to the bodily states appropriate to each of the temperaments. Now, there are some who though thin yet have small vessels; yet if you lance one of them fat protrudes; obviously because it has formed beneath the skin along the subjacent fascia. This is rare in men, but in women you will find it quite often. It is an indication of a colder nature and a more indolent life; for fat is always formed through a chilling of the bodily state. Excess of flesh, on the other hand, is the product of abundance of blood; while good condition is an indication of a well-tempered nature. Now the over fleshy, without question, have more fat too than those in good condition yet the increase in fat is not always in proportion to their fleshiness. You may see some gross persons with an excess of flesh: others with an excess of fat; and others with an equal increase of both. In those with an equal increase of both the moist and cold elements exceed those of the well-tempered nature by equal amounts. In those in whom fat predominates the excess of the cold is greater than that of the moist; and, similarly, in those in whom flesh predominates moisture, but not coldness, is in excess. Whenever the hot element keeps within its due bounds but any excess of wholesome blood accrues over-fleshiness is bound to follow. The degree in which blood can exceed the due proportion one cannot indicate in feet and inches, but one may detail by argument. When no morbid sympton has so far arisen in the grossening body of the animal the amount of moisture is at that point within the limits of health. We have shown elsewhere that one must postulate a wide range for the healthy constitution, and here it is obvious that in almost all our arguments we have steadily assumed the well-tempered and intermediate nature as a sort of standard for the rest, and have regarded as badly tempered all those who diverged from this. This we could not have done had not the healthy constitution admitted of degrees. There is a healthy and there is an unhealthy faultiness of temperament: the unhealthy is that which has diverged most widely from the correct temperament; the healthy that which has diverged but little. Here again

it is impossible to define the amount in feet and inches, but a good enough indication of the healthy faultiness of temperament is the absence of obvious damage to any function of the living being. All the interval between perfect fulfilment and obvious damage of function is the range between health and a faultiness of temperament compatible with health. Beyond this lies the faultiness of temperament which involves ill-health: I mean in those instances in which it is through faultiness of temperament that the living being becomes unhealthy; for ill-health comes not merely through faultiness of temperament, but by way of many other states which I shall deal with more fully in my study of the "Variation of Diseases".

We must now resume our original argument. As long as the innate heat maintains the correct temperament in its perfection an increase of the moist element within the limits of health makes the subject not fat but fleshy - the fat increasing with it slightly but the flesh in much greater measure. So, correspondingly, if the moist and dry exactly maintain their due proportion towards each other, but the subject is less hot his body is bound to become fat rather than fleshy. If, again, the hot element is increased while the other pair of contradictories remains in due proportion this person's body will be more deficient in fat than in flesh. Similarly, if the dry should happen to predominate while the other pair of contradictories remains in due proportion the body will tend to be both lean and hard. Such were my statements; and it is now clear that the existence in living bodies of the faulty temperaments that were simple was not merely a theoretical demonstration, but that their indications are clearly present not merely in respect of heat, coldness, softness and hardness but in all the other variations of the habit of the body as a whole. Those in respect of fineness and grossness we have just described. We must now discuss the rest.

The hot and dry temperament is hairy; and this to the maximum. The temperament which is hot but intermediate in respect of the other pair of contradictories is moderately hairy. So, too, with that which is dry, but well-tempered in respect of hot and cold; for this blend also is moderately hairy. All the cold blends are scant of hair, whether their share of moisture is moderate or immoderate. The cold and moist temperament shows hairlessness at a maximum, and

to a less degree that which is cold, and less again the temperament that is at once cold and dry. Yet one might suppose that just as it is impossible for grass to spring up, grow, and flourish in dry earth, so would it be for the hair in the skin. But it is not so. Earth is called dry qua earth, and skin qua skin. Thus the dryness of earth is absolutely wanting in moisture, but dryness in the body of a man and of similar animals is not; and it is beyond everything favourable to the growth of hair. From the testacea and crustacea, e.g. oysters, crayfish and crabs; from horny-scaled creatures such as snakes; or from scaly ones like fish not a hair can grow; for it is the fact that the skins of these are completely dry like a potsherd or a rock. In soft-skinned creatures such as man, the drier and hotter the skin the more feasible is the growth of hair. To take up their own challenge and use the earth as a parallel, it is not in dry parched earth, nor in moist and marshy earth that grass can grow, but it is when the excess of moisture begins to be exhausted that grass springs up from the earth; and it continues to grow when the earth is drying: moderately in the spring, quickest of all and most luxuriantly at the beginning of summer, and it withers when the earth is absolutely parched in the height of summer. And here, if you like, you may, as I showed in the preceding argument, liken the spring, as being the best blended of the seasons, to the nature of the skin; especially mid-spring, for at that time the earth lies midway between marshiness and dryness. That part of spring which passes into summer begins to show an earth that is drier than the mean, and still more so when summer begins.

The skin that I call hot and dry you may most fittingly compare with that state of the earth which is present at the end of spring or the beginning of summer. At midsummer it becomes absolutely dry like the testacea and not at all like human beings, swine, donkeys, horses or any other hairy animal. Hence, if our friends intend to compare the skin with the earth they will find that even on these lines the argument squares with our former statements. But they, tricked by their own ambiguous terms, lead themselves astray. When we said that the hair grew thick and long in the hot and dry skin we were, of course, referring to men or hairy animals; not to oysters or crabs. A certain amount of transpiration is always going on in every skin, the heat drawing up with itself from the interior a good deal of moisture. Now in those in whom the skin is moist and quite soft like freshly coagulated cheese, the tracks of the effluent

particles do not persist, and those parts of the skin which were temporarily separated come together again. In those, however, where the skin has become hard like cheese that has firmly set, it is perforated by the rush of the particles that pass out from it, and since it cannot come together again owing to its hardness the tracts are preserved and increasingly channelled out by the continuous impacts of the particles passing through. Now, if that which passes through is vapour or purely moist the vapour indeed has an easy and unimpeded exit; but that which is moist is often held up in the smaller pores and some of it is forced to double back again to the deeper parts. If the exhalation is as it were murky, thick and earthy, it is likely to be often wedged in the narrow exit and to be unable either to return easily inwards or to be evacuated. Then a similar exhalation, rising up from the deeper parts, impinges upon this and thrusts it on, and another again on this and so on; and so, observe, many murky exhalations are wedged one against another and in time become linked and joined together and form a continuous structure, such as a column of smoke is in extra-corporeal things, except that the denser it becomes the more completely it is gripped and compressed by the narrowness of the exit. And when such a structure has quite blocked the pore, it is then violently impinged upon by waste matters of similar character to inself, which can find no exit, and is thrust onwards in the pore as a whole; so that having now become tough, it is forced to protrude from the skin. That part of it which is wedged in the pore is comparable to a root of grass or of a plant, while that which projects from the skin is comparable to the plant itself.

Hair is black when the exhalation has been combusted by the strength of the heat and the waste matter has become quite smoke-like; yellow when it has been less burnt up, for at that stage the obstruction is a sludgy waste product of yellow bile, not of black. White hair is a product of phlegm. Sandy hair is in its origin intermediate between a phlegmatic and a bilious sediment as in colour it is intermediate between white and yellow. Curly hair is the result either of dryness of the temperament or of the pore in which its roots lie. Dryness causes it in the same way as in leather that has been long dried by fire: though why should we instance leather when we see how hair itself if brought near a flame immediately curls up? It is

+ literally "leather-like"

for this reason that all Ethiopians are curly haired. The nature of the pores in which its roots lie causes it in the following way. Often the exhalation is unable to force a straight passage out owing to its feebleness, and so moulds the pore after the pattern of its own convolutions. Sometimes, though the exhalation is vigorous, it is denied a straight course because the nature of the skin is harder than it should be, and it is bent sideways, just as outside the body we may see not merely vapour or smoke but even actual flames deflected to either side when they are debarred from passing upwards. It is just the same with the exhalation of the body. When it is for any reason prevented and hindered from passing onwards it makes for itself a passage slantwise through beneath the skin until after a while it gathers, breaks through and exhales to the exterior. Sometimes the obliquity in the hair roots comes about from a combination of the two causes - a want of vigour in the primary exhalation that fashioned the pore, and a dryness of the skin. And the shape they assume during the formation of the root that shape they are likely to retain; for hair like all other hard dry substances it is impossible to straighten unless we first soften it. This, then, is the origin of hair.

We must next discuss the causes of all the attributes incidental to the blends as far as concerns those differences in the hair that depend on age, place and physique. Egyptians, Arabs, Indians and all nations that live in a dry, hot place have black, short, dry, curly and brittle hair. Those who, unlike these, inhabit a moist, cold place, as the Illyrians, Germans, Dalmatians, Sarmatians and all the Scythian tribes have moderately long, fine, straight and sandy hair. Those who are intermediate between these and occupy a well-blended land have hair which is very luxuriant and strong, moderately dark, neither coarse nor fine, neither quite curly nor quite straight. So again with the different ages of life: babies have hair like the Germans, men in their prime like the Ethiopians, and youths and children hair which resembles in strength, diameter, length and colour that of those peoples who inhabit a well-tempered land. So, too, in respect of differences in physique the condition of the hair varies as it does with the different ages and climates. Very young children have scanty hair because they have so far no pores in the skin nor any sooty waste matters. As they approach adolescence they develop small, weak hairs, and as grown men they have hair which is stronger, abundant, long and dark, since they have by now a multitude of pores and are loaded with murky waste matters owing to their dryness

and heat. The hairs of the head, eyebrows and eyelids are already present even in our childhood, for they originate not like grass, but like the plants that are formed by nature primarily and they are not the necessary consequences of the temperaments. This we showed in our "Use of the Parts". But even here, though their existence is indeed the work of nature, their blackness, sandiness or other differentiation is a necessary consequence of the temperament of the particular stage of life. They are generally somewhat sandy because that which is blocked in the pores is not yet black; for the moisture is ample, exit easy, and the combustion feeble. They are, moreover, luxuriant and moderately coarse owing to the abundance of the waste matters that nourish them. For though the part of the body in which they arise is dry - for the whole skull is bony - and the skin that clothes the skull is as much drier than that of the rest of the body as it is harder, yet a great quantity of murky waste products comes to the surface not only from the parts about the brain, but also from the whole body, so that the skin of the head is in infants similar to what the whole body is in grown men.

It is therefore natural that some people whose skin originally tended to dryness should go bald with advancing years. We have shown already that as men grow old all their parts grow dry; and in many the skin, if dried unduly, becomes testaceous. In such a skin nothing can grow, as we have already agreed. Furthermore, the palms of the hands as also the soles of the feet are hairless and smooth owing to the dryness and denseness of the tendon which extends beneath the skin in those parts. Those whose scalp has not gone the length of complete dryness have hair which is feeble and quite white, or as we say, grey. It is feeble owing to lack of its appropriate nourishment and white because that which nourishes it is as it were a sort of mouldy phlegm grown putrid through age. For when the pore is still patent and the waste matter is scanty and viscid and is thrust forward feebly by the heat it then undergoes something akin to putrescence, and the elderly tend rather to baldness on the sinciput and to greyness on temples. This is because the first is the driest of all the regions of the head, for the skin in this quarter overlies the bare bone: the temples on the other hand are moister, for there big muscles underlie the skin, and all muscle is fleshy and flesh is moister than bone and skin.

The above statement we must study with exactness so that we may not unconsciously misapprehend it and deceive ourselves as many of those with a big reputation as admirable physicians do deceive themselves by jumping to the conclusion that anyone who is bald is of dry temperament throughout his entire body. Such a supposition it would be improper to make absolutely, and it would be preferable first to lay it down that in some men the body is all of one even temperament, while in others, and these not a few, its state is otherwise. In these some of the parts are moister than the due proportion, others colder; others drier; others hotter, while others again are completely well-tempered and duly proportioned. The very greatest attention must be given to this point whenever there is a question of the body's temperament; for if it is consistently symmetrical as a whole and preserves completely the due proportions of the parts one to another in length, breadth and depth, then such a body is likely to be equally tempered throughout. If, on the other hand, a body has a big chest, neck, and shoulders, but poor, puny hips and thin legs, how can it be equally constituted in all its parts, any more than one that has big legs and broad hips but a narrow chest can be evenly tempered in its parts? Some bodies have a very big head, others a small one, like a sparrow's. As for the legs, some are knock-kneed, others bandy: the extremities are in some slender, in others broad. In some, as I have said above, the chest is broad, in others narrow like a lath: in fact such persons are called lathy. When their shoulder-blades are quite bare of muscle and sloping like wings, people of this physique are called "Winged" by the physicians and the seriousness of such a malformation when their chest has lost practically all room for the accommodation of the lungs and heart is obvious to anybody. The body shows in its parts other such conditions by the score whenever it diverges from the natural proportion and is involved from the beginning of its fetal life in some irregular faultiness of temperament. Hence, in such matters it is improper to argue from one part to the whole.

Even those who set up as physiognomists do not in all instances give their opinion on absolute grounds. They, too, have learnt by experience. If a man is very hairy on the chest they dub him high-spirited: if on the thighs, lecherous; yet the cause they do not assign. For in saying that he is like a lion on the chest and a goat on the thighs they have not got down to the prime cause. It is the business of the argument to find out why a lion is high spirited and a goat lecherous. The

facts are, so far, as they state; but the reason why they leave untouched. Now, the scientist here, as in all else, tries to discover the reason why. Since the parts vary in the condition of their temperaments not only in the lion and the goat but in very many other animals, different animals are adapted to different functions. Aristotle gives a long and excellent account of these matters; but what really concerns us at present is already plain - that in investigating men's temperaments we must consider each part by itself and not suppose that because so-and-so has a hairy chest his whole body is bound to be on the dry and hot side, but rather that the hot element is most copious in the heart and that therefore he is high spirited; also that it is possible that the reason why the whole of a man's body is not hot and dry is simply that in that particular region the hot element evaporates most freely and is voided to the atmosphere. If the temperament of the body as a whole is consistent then in such persons the whole chest would necessarily be very broad, the veins broad, the arteries big with a big and violent pulsation, the hairs abundant throughout the entire body, and those of the head very luxuriant; dark and curly in early manhood; and with advancing age baldness would ensue. Furthermore, in those in whom the temperament is consistent the body as a whole will be tense, well-knit and muscular and the skin harder and darker as well as hairier. Similarly if the opposite condition obtains in the chest and the temperament is consistent throughout the body - i.e. if all the parts are somewhat moist and cold - then the chest in such persons will be narrow and hairless, just as the whole body will be deficient in hairs, the skin smooth and fair, with hair of a sandy tint, particularly in youth, and they do not go bald in old age. Also they are inevitably fearful, unenterprising and timid, with small inconspicuous veins, fat, feeble of sinew and muscle, ill-knit and rickety in their limbs.

If, however, any variation of temperament occurs in the parts it is no longer possible from any one of them to give a decision on the body as a whole. It is better to go into each by itself and consider the temperament of the stomach, the lung, the brain, and each organ separately and by itself. These you must ascertain from their functions; for it is impossible to discover their temperament by palpitation or inspection. You must also investigate the condition of the parts that surround them. Of these the outermost is the skin. This, even in our well-tempered latitudes, does not absolutely reveal the

nature of all the subjacent parts, but merely of those which in temperament resemble the skin. In the regions to the north and the south, owing to the hot element of the northerners being overpowered by the external cold that surrounds them and driven inwards; and that of the southerners being attracted by the surrounding heat so that it moves forward to the skin, the state of the skin is no accurate guide to the temperament of the deeper parts. In badly tempered districts the body has no consistent temperament owing to the difference between the superficial and deeper parts. Thus among Celts, Germans and the Thracian and Scythian tribes, the skin is cold and moist, and it is, therefore, soft, fair and hairless. As for the innate heat it all retreats to the viscera along with the blood, and is there stirred up, congested and brought to the boil and hence they are high-spirited, audacious and precipitate in their resolves. In Ethiopians, Arabs, and all the peoples of the south the nature of the skin is hard, dry, and dark, as you would expect from its being thoroughly heated by the hot climate and the determination of the innate heat to the surface. The body as a whole is very scantily endowed with innate heat: it is hot with a foreign and acquired heat.

This point, too, has been very well and elaborately defined by Aristotle. Him above all we are bound to heed, and whatever body is in question, we must consider whether its heat is native or acquired. Thus all things undergoing putrescence are hot with an acquired heat, but cold in respect of native heat; and the bodies of those who inhabit a southern country are hot with an acquired heat, but cold in respect of native heat; and amongst ourselves in winter the natural heat is greater and the acquired less, while in summer the acquired heat is greater and the innate less. All this must be clearly distinguished if you wish to form a correct opinion of a temperament. If the skin tends to be dark it does not absolutely follow that the man as a whole tends to be hot, unless all the other points are in keeping. If one man passes much of his time in the sunshine and another in the shade, the first will be darker in colour and the second lighter; but this is no indication of a change in the temperament as a whole. The skin indeed will be drier when sunburnt and moister when shaded, but there will be no corresponding change in the temperament of the liver, heart or other organs.

It is best, therefore, as we have said above, to have at your fingers' ends those points that are

peculiarly diagnostic of the temperament in each individual part. If the stomach, for example, concocts well, it is well tempered; if badly, it is not. If the eructations that it generates are reeking or heavy its heat is immoderate and fiery. If they are sour the heat is weak and feeble. Similarly, in those who easily concoct beef and all things indigestible, the heat is immoderate: feeble in those who fail to concoct these but who can concoct rock fish and the like. Here, again, you must further consider whether the gastric symptom is not the result of the afflux of some humour from elsewhere. In some people there is a flux of phlegm which passes down to the stomach from the head: in others of yellow bile from the liver. The latter indeed is rare and happens to very few, but in very many phlegm does travel down from the head: above all in Rome and similar damp places. Moreover, even what is rare is worth observing and you must regard nothing as unimportant, and neglect nothing. I am, myself, acquainted with some very phlegmatic subjects in whom an abundance of yellow bile collects in the stomach and this they have to vomit by drinking a lot of water or wine before meals. If they ever take food without first vomiting, the food goes wrong and they have headache. These patients some considered to be of a bilious nature; and yet they were soft and fair all over, scant of hair, fattish, deficient in veins, muscle and blood, and not over hot to the touch. Others, again, I know who never vomited yellow bile, but were obviously lean, hairy, muscular, dark, with prominent veins, and quite hot if one touched them. Eudemus the philosopher was one of these.

Here, however, an anatomical question crops up, and by not recognizing this some physicians get into dreadful difficulties over the discordance of the symptoms, for they do not know that the duct by which the liver discharges bile into the stomach is in some people double and in others single; as you can observe in dissections of quadrupeds. Usually, indeed, it is single and implanted into that part of the bowel between the pylorus and jejunum, which they term an outgrowth of the stomach. If it is double it empties into this outgrowth by its greater opening, and by the other or smaller into the fundus a little above the pylorus. Very rarely the upper portion is found to be the larger and the lower the smaller, but in those persons in whom it is larger the stomach is filled every day with an abundance of bile which they have to vomit before meals, and their health is impaired if they retain it. In those in whom the duct is quite single all the bile flows down to

the jejunum. How, then, are we to distinguish between the two? For I do not propose to vivisect human beings. In the first place by the general temperament of the body, as I have explained just now; and the second place by the dejecta. Thus Eudemus consistently voided pure bile from his belly because he accumulated much bile and none of it entered the stomach. As for the others, who though their habit of body is phlegmatic yet vomit bile, their evacuations of bile are very scanty. Little yellow bile is found in them and of this the greatest part enters the stomach. Over and above these there are diagnostic indications of a third kind in the vomited matters themselves. Thus where the bilious waste matter is formed in a stomach whose temperament tends towards heat its appearance is greenish. It is absolutely yellow or at least quite pale in those in whom it trickles in from the liver; and those in whom this green bile forms in the stomach must certainly have eaten not wheaten bread or pork or anything of that nature but something that was of necessity hotter than these and whose juices were not healthy. When the bile enters the stomach from the liver the vomit is yellow or pale even though the juices of the diet taken are most healthy and perfectly digested, and the yellow vomit is more copious in those with good digestions and much more still in those who have long fasted. Green bile is formed in the stomach only in those with poor digestions. Furthermore, anxiety, anger, grief, toil, exercise, sleeplessness, fasting and privation cause a greater collection of the humour of yellow bile in these cases because they produce a larger amount in the liver. There is yet another. When the tendency to biliousness results from the parching and fiery nature of the gastric heat, wheaten bread, pork and beef will be more easily digested than rock fish; but if there is a flux from the liver no difference in digestion will attend the change of food. Thus then we distinguish what is due not to the temperament but to some extraneous cause.

In the same way if any flux of phlegm from the head to the stomach causes heartburn here, too, we must on the same lines differentiate this from any special ailment of the stomach. Similarly, with headaches we must determine whether they are due to an error in temperament proper to the head itself, or to the waste products of the stomach. Furthermore, it is best to investigate the temperament of the brain by itself, and not from the condition of the body as a whole: The investigation of its temperament by itself is bound up with greyness of the hairs, catarrh, cough, coryza and

abundance of saliva; for all these features show that its state tends to the cold and dry, and still more so if it falls into these conditions from any chance cause. Baldness on the other hand accords with dryness, and a free growth of hair is indicative of a well-tempered brain.

This then, the examination of each part separately, is the way one should always investigate a temperament, and one should not venture to give a verdict from one point on all, as some do when they assert that those with snub noses are moist, and those with hook noses dry, and those with small eyes are dry and those with large eyes moist -- though this is a disputed point with them. Some of them, positing that the eyes belong to the moist parts, assume that a moisture of temperament predominates in those in whom they find the eyes are big. Others, again, assert that it is due to the force of the hot element exhaling with excessive mass and volume during the initial formation of the body that makes not merely the eyes but the mouth and all the openings bigger, and that hence it is an indication not of moisture but of heat. Both are wide of the mark, first for the particular and general reason that they have the presumption to give from a single part a verdict on the body as a whole, and secondly on other grounds in that they take no heed of the formative faculty in nature which is active and forms the parts in harmony with the habits of the soul. As for this faculty even Aristotle was undecided whether it had not some diviner origin and was due to more than the hot and cold and dry and moist. It seems to me, therefore, that they err who so precipitately give judgment on fundamentals and ascribe the formative power to the qualities alone. One may suppose that the qualities are instruments but that that which forms is other than they. But since it is possible without going into these great questions to diagnose, as we have shown above, a moist, a dry, a cold and a hot temperament they make a mistake in disregarding their appropriate indications and pursuing speculations that lie outside the scope of reasonable enquiry and which have to this day been matters of uncertainty even to the most distinguished thinkers. Because children tend to have snub noses and men past their prime hooked ones, this is no reason for thinking that all snub-nosed people are moist and hook-nosed people dry. It is possible that this is due rather to the formative faculty than to the temperament. And supposing it were an indication of the temperament it would indicate merely the temperament of the nose, not of that of the body as a whole. It is nonsense, too, for them to say

that the nose is pointed, the eyes deep-set, and the temples hollow in temperaments that are naturally dry, since this happens also as the result of diseases which cause wasting and an immoderate depletion of the body. Often this happens: often again it does not. And you may see a soft, fatty, fair and fleshy habit of the whole body with small eyes or a pointed nose; and a dry, lean, dark and hairy habit with big eyes and a snub nose. Hence, if you must, it is safer to make a snub nose or a hook nose proof of moisture or dryness respectively in the nose alone, and not on such evidence to give an opinion on the temperament of the person as a whole.

In the same way it is wiser to investigate the individual temperament of the eyes and every other part whatsoever rather than wrest from one part proof of the temperament of the body as a whole. Whether we are to assume that grey eyes indicate the predominance of moistness or of heat or of both, even so they would be evidence for the temperament of the eyes alone and not for that of all the corporeal parts. Nor though the legs are dry and lean is the temperament of the body as a whole dry throughout; for certain people who are quite fleshy, fat, big, paunchy, soft and fair, have legs like this. If, however, the body is of consistent temperament all through those with thin legs are dry throughout and those with big legs moist. Also those with sharp hooked noses are dry and the snub-nosed moist; and it is the same with the eyes, temples and all the other parts. But where the temperament is not consistent and identical in all the parts it is idle to pronounce on the whole from the nature of a single part. This is what leads the bulk of our friends astray when they venture to pronounce on the whole temperament not only of men but of all living things merely from the indications present in the skin. If the skin is hard it does not follow that the living thing is dry: it may be that the skin alone is dry And, similarly, if it is dark or hairy. In the same way even if the skin is soft or fair or hairless it does not follow that the living thing as a whole is moist. No; if it is of consistent temperament throughout it is reasonable that each of the other parts should be of the same nature as the skin; but if not, not. Oysters for example have a body which is very moist. Their skin, however, is very dry -- for their shell corresponds to our skin, and their name is derived from that fact: all such creatures being called "testacea" or "shell-skinned" because their skin is just like a shell. The "crustacea" or soft-shelled, e.g. lobsters, cray-fish

and crabs, have a hard skin but their temperament in all other tissues is moist. Often the reason why living creatures have moist flesh is simply that nature deposits all their hard, earthy element in their skin. Hence you are not to suppose that because the skin is dry in oysters therefore their flesh is dry, nor because their flesh is watery and mucoid are you to conceive that their skin resembles it. The right way is to judge each part on its merits.

Such, then, are the errors of those who have bequeathed us treatises on the temperaments. They make another over and above in that they do not remember the very proper advice of Hippocrates that we must consider the results of change. Often the indications now present are due to a temperament that is past: not to one now existing in the body. Suppose now a man of sixty is very hairy: this is not because he is hot and dry now, but because he was so once, and the hairs then formed remain just as the grass that sprang up in the spring often remains in summer. In some, as time goes on, it happens that they gradually lose their excessive hairiness as the hairs fall out owing to extreme dryness: in some they remain for a very long time, if they have not through course of time been sufficiently desiccated and if their original growth was strong, like that of plants deeply rooted in soil If, therefore, someone is very hairy we are not to think him for that reason melancholic. If he is in his prime he is not yet melancholic; if past his prime he has become so; if an old man he is so no longer. Melancholic temperaments originate from combustion of the blood. The man who is hot and dry will, if we bear in mind the previous argument, speedily be very hairy, but he will not become melancholic all at once, for in extremely hot temperaments the density of the skin, by preventing the exit of the grosser waste matters, necessitates their combustion; so that in these persons the waste matter that produces the hairs already resembles that which will be present in the vessels later.

This then is another point neglected by the authors quoted, and there is the further one that they give an unqualified opinion on the temperaments from the nature of the waste matters. They hold that the temperaments are related to the nature of the waste matters. This, however, is not quite true. It is possible for phlegmatic waste matter to collect without the part being moist. Cold it must be, for from no other source can phlegm arise; but it need not be moist; for it is

possible for it to be dry. What misleads them is easily seen. They fail to observe that phlegm is formed not from our bodies but from our food. If, therefore, the body fails to deal with the food administered to it, and this food, let us say, is moist in nature, it is not surprising that the waste matter it produces should be similar to the food. They must not, therefore, assume that as the body is dry the waste matter must be dry also. If someone tended right from the first to be cold and dry in temperament he is not atrabilious but phlegmatic in his waste matters If, however, he became cold and dry as the result of change he is at once and of necessity atrabilious too, just like the man who though previously hot and dry produces from combustion of the blood an abundance of black bile. Such a person in addition to being dry and cold straightway acquires the atrabilious state as well. If, however, he were cold and dry from the beginning, even though his habit of body would be fair, soft and hairless, deficient in veins, ill-knit, lean and cold to the touch, and his moral nature unenterprising, cowardly and poor spirited; his waste matters would not be atrabilious.

On all these points, then, the bulk of physicians go wrong through deviating from the specific diagnostic points, and going astray after accidentals which are usually but not universally present. On the same grounds, too, they hold that what warms always dries. I have decided to close my second volume at this point with this one addendum as a sort of final flourish or coping stone to my argument. Because, whenever they pour hot water on inflamed parts, they see the moisture visibly evacuated from them they think that the desiccation of everything by heat is proved not merely when the heat is combined with dryness, but also when combined with moisture. But it is one thing to evacuate from something the moisture scattered in certain interspaces, and another to render drier its specific temperament. A faultiness of temperament of an irregular type exists in inflamed parts. The homogeneous particles, though in process of change and modification, have not yet departed from their specific nature, whereas all the interspaces are already loaded with flux. Hence everything that is hot and moist in temperament is added to what is so affected and evacuates the waste matter that has occupied the spaces between the homogeneous particles; but it is so far from drying the particles themselves that it actually imparts some of its moisture to them. These are the facts. What I have said demands proof, but as I think it would be too long to be incorporated in the present work, and as it demands

an audience acquainted with the action of drugs, I postpone its immediate statement. When, however, I have completed my third volume on temperaments and have expounded the whole system of what is potentially moist, dry, cold and hot, I have decided to write next a complete book on the irregularities of faulty temperament. This will complete all our work on the temperaments, and will give us a good start for the system of therapy.

BOOK III.

We have already said that everything actually hot, cold, dry and moist we so designate either because it has acquired the quality completely, or from the predominance of one of the qualities, or by comparison with the mean of its class, or with some chance substance or other. We have also explained the best way of accurately differentiating them. It remains for us to discuss what things are so potentially; first explaining what we mean by "potentially". The explanation is short, simple and obvious. Whatever is not yet that which it is said to be, but is destined to become so, we say is so "potentially", and we call the newly born human being rational, the bird a creature of flight, and the dog good for hunting (as each of them is assuredly going to be if no external causes prevent), just as though each of them were so already. Hence I conclude that all the above are so potentially and not actually. "Actually" implies something perfected and already in existence. "Potentially" means something imperfect and still about to be, and, as it were, with an aptitude for coming into existence but not existing yet. The baby is not yet rational, but is about to be so. The puppy is not yet good for hunting, since so far he cannot even see, but he is called so from the potentiality he has for hunting when he is perfected. Hence, it is most legitimate to call only those things potentially so-and-so whose own nature comes to perfection if no external causes prevent, and, secondly, those things which are the proximate source of what is coming into existence. It makes no difference whether we say "proximate" or "proper" or "peculiar" for all these indicate a cause that works directly and not through an intermediate change; as for example when you say that blood is potentially flesh since it needs the minimum of change to become flesh. On the other hand the food digested in the stomach is not the proximate source of flesh: it requires the blood as an intermediate stage. Barley cake and wheaten bread are still more remote, for these need three changes to become flesh. Nevertheless even these are said to be potentially flesh, and anterior to these air, fire, water and earth, and the common source of these. In using these terms the question of degree is of course always understood. The first and most legitimate application is to those things that are themselves said to be potentially so and so; and in the second degree to that which is their proper source - as for example when you say that a smoky exhalation is potentially flame, or vapour is potentially

air. And sometimes even what is classified on accidental grounds is said to be potentially so and so: as for example when you say that for a young well-nourished man a cold bath is warming, not through its own potentiality but through one that is accidental.

If it is proper to designate and investigate what is potentially hot, cold, dry and moist in these various ways in what sense do we call castoreum, euphorbium, pyrethrum, soap-wort, carbonate of soda or copperas hot, or wild lettuce, hemlock, belladonna, a salamander or opium cold? Do they come under the usages already mentioned or are they used in some other sense hitherto undefined? Bitumen, resin, and pitch are potentially hot because they readily become hot in actuality, for they very easily take fire and if applied to our bodies warm them most unmistakeably. Alum, on the other hand, copperas, mustard, carbonate of soda, iris, spignel, and costus and pyrethrum when applied undoubtedly heat us, some more and some less, yet they lack the capacity for taking fire. Or do those who merely consider the point of prompt combustion delude themselves? For what they ought to consider is not this but whether they are reducible to ashes, seeing that ash no less than flame means fire. Flame results from the combustion of air or of some airy substance: ash from that of earth or something earthy. So far indeed our argument seems to hold together; for it is evident that all the drugs which when lighted easily take fire are also warming to ourselves, except when they are not easily admitted into the body owing to their coarseness. We shall be more precise on these points in our "Action of Drugs", but it is the fact that all those things that obviously heat the body readily take fire. "How is it then", say they, "that if we touch them they are not obviously hot?" Why they should ask this I do not know. If we had said that each one of the things instanced was actually and already hot it would of course be remarkable if it were not obviously hot to the touch. But as it is we are speaking of them as hot potentially, from their potentiality of easily becoming hot, and therefore it is not remarkable if they do not as yet heat those that touch them. Just as logs do not increase a fire until they have been got hold of and modified by it - which is a matter of some time - in the same way drugs, too, do not increase the heat in living things unless the drugs have been first modified by that heat. True that a person warming himself at a fire or in the sun is heated in a different way from one

heated by any of the drugs quoted above. Fire and sunlight are actually hot, but none of the drugs is. Hence they cannot make us hot till they are actually hot themselves, and actual heat they acquire from ourselves, as dry rushes do from fire. So, too, logs, though they are all cold in their own nature are transformed into fire; those that are dry and small with ease, while those that are moist and large need a longer time.

It is therefore not remarkable that drugs must first be crushed up small and fine, and secondly must be in contact with our bodies if only for the briefest time if they are to become hot. If you would have them to be obviously hot without first crushing them up or warming them you are, in my opinion, forgetting the meaning of potentially hot. At any rate you are testing them for actual heat. And again, it is not remarkable that they must first be heated if they are to heat in return. This happens, too, in our simile of the logs, for when the flame is dying the logs that were previously made hot by it maintain and increase it. Hence it is not unreasonable that in living creatures, too, the heat uses these drugs as a pabulum just as the flame uses the logs. And this is just what we see happening. But if the body is thoroughly chilled and you powder very fine any of these drugs you please and dust it on, it does not get warm at all and hence we give the chilled parts a very good rubbing with these drugs, thus combining heat with rubbing and also rarefying what was previously densified by the cold, so that the drug may penetrate and may, by coming into contact with the person's innate heat, undergo change and become hot. For if even the tiniest particle of it acquired actual heat it would spread it in continuity to the whole, just as when you kindle the end of a torch from a tiny spark: the fire spreads easily to the whole torch and no longer needs the spark. Anything potentially hot has not so far an excess of hot over cold in its make-up, but it is already approaching that point, so that it needs little external reinforcement for it to predominate, and this reinforcement vigorous rubbing is sometimes enough to supply, and sometimes fire or one of the naturally hot substances combined with this.

There is, therefore, nothing odd in the aptitude that some things have for giving a return of heat to our bodies the instant they touch them, while others take longer to do so; for some thing when brought into contact with fire take fire at one - e.g. a lamp-wick, a thin torch, pitch and dry reeds - others, like green

wood, are not reduced unless they are in contact with it for a long time. But it would be better if I were to state the argument whose proof I shall give in "The Natural Faculties", but which for my present purpose I would here use hypothetically. This is that every body has four faculties: first, that which attracts kindred elements, second, that which retains them, a third which modifies them, and over and above these a fourth which gets rid of those elements which are foreign. We hold, too, that these faculties are inherent in the whole essence of each single body -- that essence which we affirm is a blend of hot, cold, dry and moist. Whenever the body changes what is in contact with it in respect of any one of its qualities we must assume that from that moment the thing in process of change can no longer function in respect of its entire essence, nor can it be assimilated. The result is that what has been so changed can never nourish any part of that which changes it; but if this changes it completely, i.e. by acting on its entire essence, then it can assimilate it to itself and be nourished by that which has undergone the change; for nourishment is nothing but complete assimilation. This being stated, let us take up our argument again where we left it. Every animal is nourished by nourishment that is akin to itself, and the nourishment that is akin to each is all that which can be assimilated to the body in process of nourishment. Hence, all the substance of that which nourishes must acquire a sort of a community and similarity with all the substance of that which is being nourished. Of course, here also a good deal of difference of degree is present; for certain things are more akin and similar and others less; so that some require a more vigorous and prolonged elaboration, others a feebler and less prolonged: the flesh of birds requiring less, pork more, and beef more again. That which requires least change of all for assimilation is wine: hence it nourishes and strengthens very quickly. Of course, even wine must come into contact with the digestive organs, the stomach, liver and vessels, so that it may first be elaborated in them and then be able to nourish the body. Before it undergoes its change in these it cannot become nourishment for the animal, even though it were applied externally to the skin for a whole day and night. And still less could wheaten bread, or beet or barley cake nourish if applied externally. All those things, then, that are completely assimilated are called nourishment, and all the rest drugs. The nature of drugs, too, is diverse. They either remain in the condition in which they were

ingested and overpower and change the body in the same way as the body changes food (and such drugs are clearly noxious and destructive of the animal's nature); or they may, through the agency of the body, undergo a rudimentary change and then go putrid and corrupt; whereupon the body goes putrid and corrupt with them. These, too, are noxious. In addition there is a third variety of drugs which give a return of heat to the body, but do it no injury; and a fourth which after acting and being acted on are in time reduced and completely assimilated. These happen to be both drugs and nourishment.

Nor is it at all remarkable that certain things if they get the least start diverge very widely from their original nature. Many such examples at any rate can be observed in things external to the body. Thus all through Mysia and Asia ~~Minor~~ houses have been on occasion burnt down in this way. There is a collection of doves' dung quite rotten and heated, sending out a vapour and very hot to touch. Near enough to touch this there is a wicket with timbers freshly plastered with plenty of resin. Well, in midsummer a scorching sun striking on them ignites resin and timber, and then other doors near by and wickets newly smeared with resin easily catch the fire and spread it to the roof. When once the flame has caught this it quickly extends over the whole house. It was in some such way, I judge, that Archimedes, as they say, set the hostile triremes on fire with fire sticks. Wool, tow, a lamp wick, fennel and anything that is similarly dry and loose in texture are easily kindled by a fire stick. Even stones, when rubbed together, kindle a flame, and particularly if you smear them with sulphur. Medea's application was something of this sort. At least anything smeared with it takes fire when heat strikes it. It is prepared from sulphur and moist bitumen. In fact one fellow showed this as a trick. He put out a lamp, then lit it again by putting it to a wall. Another put it to a stone. But wall and stone, as it happened, showed the marks of sulphur, and when this was observed there was no longer anything marvellous in what happened.

All these drugs are not yet completely hot but are very fitted to become so, and hence they are called potentially hot. As for these, then, there is no difficulty, nor is there in explaining why wine when drunk warms the body well, but does not warm it when

applied to the skin; for we showed just now that it was not simply as a hot drug, but as appròpriate nourishment that it warms the body. For just as the fitting nourishment of fire will increase the fire, so too will the appropriate and cognate nourishment of bodies naturally hot assuredly strengthen them and increase the innate heat. This feature is common to all food, but the special peculiarity of wine is the quickness of its change, as in a torch, a lamp wick, tow, and pitch. And, keeping to our illustration of fire, let us instance once more damp logs, which are indeed a nourishment of the fire, but not at once and instantly, and so when they are thrown on to the fire they damp down ~~and~~ the blaze, particularly if it is small and feeble, and risk its extinction. So, like--wise, in living things all the foods that need time to be completely assimilated and nourish the body induce for the moment an obvious chilling rather than warmth. Yet in time even these are heating like the other foods if they do but acquire the power of nourishing the body; for all nourishment in virtue of its own nature will increase the animal heat. If, however, it were swallowed indeed as nourishment but were not reduced and assimilated then we should have what Hippocrates spoke of - nourishment in name but not in fact. For since nourishment is a word with three meanings, as the master taught when he said "Nourishment is that which nourishes; nourishment is also that which is equivalent to nourishment, and that which is to become nourishment" - that which is already nourishing and accruing, and not waiting to become nourishment is legitimately termed nourishment, and it undoubtedly heats the body nourished. The other two do not since they are not strictly nourishment at all: one being an equivalent of nourishment, the other about to become nourishment. But this notwithstanding, wine itself does not always heat the animal body just as oil does not always kindle a flame, even though it is a most appropriate nourishment of fire; for when you pour oil in great abundance on a small and feeble flame you are more likely to smother it and put it out altogether than increase it. So in the same way wine, if drunk in quantities too great to be dealt with, is so far from heating the animal body that it generates the most frigid disorders: for example, apoplexies, hemiplegias, torpors, comas, paralyses, epilepsies, convulsions and tetanus, all of them cold disorders, are the result of immoderate potations; for as a general rule you will find that everything which heats when ingested as food

will on occasion also chill; just as a flame is sometimes not increased but actually extinguished by the self-same material. All this seems to fit in with our conclusions about the elements and the temperaments.

One point may perhaps appear to conflict with them; and that is that certain articles of food when applied to the skin eat into and ulcerate it - mustard, for example, and pickle, garlic and onions. And yet this, too, is in harmony with our original assumptions; for since they undergo change and modification when concocted in the stomach and made into blood in the vessels, and since, moreover, they do not remain in one place but are carried everywhere and disseminated to many, and moreover, since they are mixed with many humours and with the food taken along with themselves, and, furthermore, since their coction and breaking up is prompt, so that the appropriate part of them is assimilated and the waste and acrid matter excreted by the belly, urine and sweat - for all these reasons that which on the skin causes an ulcer, when eaten does not. In fact I imagine that if any one of these conditions - the primary change, for example - held good for such drugs it would be sufficient to keep the inside from damage. For it is plain that if the mustard does not remain what it was before ingestion you cannot expect its virtue to remain either: still less if it is also broken up and purged away. If it merely failed to stay long in one place, that again would suffice; for it is apparent that it has no power of acting even on the skin unless it has plenty of time. And, further, the mere fact that it is mixed with many other sorts of food is very important, and if you took it alone without the other foods you would find out what a biting pain it causes in the stomach. Furthermore, if you mix it with many bland juices and then apply it to the skin it will cause no bad results. Hence since each of the above conditions is enough in itself to prevent the mustard doing internally the harm that it does externally on the skin, still more effective, I imagine, will be the combination of them all; for it is modified by coction, is broken up and purged away, mingled with many other foods, disseminated in many directions, and carried everywhere, and in no part tarries long. That it would certainly ulcerate the interior of the body if it remained acrid you may observe from the ulcers that originate spontaneously. In many people there often occurs -- sometimes from noxious food, sometimes from a sort of corruption and putridity of the body itself - the condition

known as faultiness of the humours, and in these patients sometimes one of the internal organs ulcerates; but as a rule, since nature clears away the waste matters of the part to the skin surface, this breaks down into a crop of contiguous ulcers. Thus cancer, phagedaena, eating herpes, carbuncles, and the so-called Cheironian and Telephian sores, and scores of other forms of ulcer are bred from this faultiness of humour. All this is clear enough; and also the reason why some drugs do us no injury externally but very great harm when swallowed. Some often do damage when taken internally and often are beneficial. Some are not only injurious internally but externally as well. To put it briefly, nothing is capable of functioning internally and externally in the same way. The froth of a mad dog, the venom of an asp or viper, which are believed to be injurious merely by falling on the unbroken skin do not, when they are merely in contact with it, have the same potency as when they are absorbed. Nor again need we be surprised that the potency of certain drugs fails to penetrate; for they are not bound to be all equally strong; and if many of the drugs taken internally do good when taken at the right time and in the right dosage and in the right combination, and harm when taken at the wrong time and in big doses and uncombined, there is here no flaw in the argument; for the very same holds good with food and fire and, I may say, with everything that comes into relation with the body. For example, we sometimes require a moderate blaze, and if we avail ourselves of it get great benefit from it even though if it is immoderate it burns us. So, too, with a cold drink. If moderately cold it is beneficial; if immoderately, harmful in the extreme. Is it, therefore, surprising that a drug which is potentially so hot that, if given in a big dose when the body is fasting, it eats into it and consumes it, should, in very small quantities and combined with correctives of its strength, not merely do no harm but even good by warming it? Opium, for example, whether from Cyrene or Media or Parthia one cannot take by itself without suffering for it: but if taken in very small quantities or in combination at the right time it is of great service.

All those things, then, that heat the body have, after undergoing in it, as we said before, the first stages of change, the capacity for giving heat back to it again. Those, however, like opium, which chill are not changed in the least by the body. They promptly overpower and change it, even though you give

them hot; for their own nature is cold, like water. This point, like many others, has been well put by Aristotle, who says that some hot, cold, dry and moist bodies are what they are essentially, others accidentally. Thus water is essentially cold; accidentally it is sometimes hot. But that acquired heat is quickly lost, while the natural coldness remains. Hence, just as hot water when flung on to a flame puts it out, so, though you give poppy juice as hot as you please, you chill the patient's heat and induce the risk of death. All these drugs then are given in small doses and with something that can correct their excessive chill and they are then sometimes of service to our bodies, as I shall describe in my book on drugs. Most certainly the preparation of cantharides is very useful in dropsy, even though cantharides as a rule causes cystitis. But when it is corrected with combined drugs and exhibited to a body containing much fluid it depletes that body through the urine. Hence, with all the things that are called potentially hot or cold you must very carefully consider whether they are of the nature of those things that have the faculty of nourishing; or whether they undergo a rudimentary modification merely, and, after being modified in respect of their own nature, affect the body in some degree; or, thirdly, whether they are not modified by the body at all. For, if they belong to the class of things that nourish, they warm if digested, and, if not, they chill; if to the class of things that are a little modified, at any rate they warm; and if of those that are not modified at all they are extremely chilling.

As I have said, one must be very careful and distinguish the essential from the accidental not merely in things hot and cold but equally in things moist and dry. Some of these, though their essence is dry, take on the appearance of moistness when melted by excessive heat: for example, bronze and iron; or if, like ice, they are essentially moist, the association of absolute cold makes them appear dry. Hence, in all these matters you must not form your judgment on a single point, as we have said already, but you must further consider how they stand with regard to heat and cold. For if they have but a small share of heat and yet appear moist, then they are moist in virtue of their own nature; but if their share is ample, then they are dry, and whatever is liquid with boiling heat or frozen owing to absolute cold you must not consider moist and dry essentially. Here, therefore, you must differentiate the essential from the

accidental, and it must be with reference to this that you decide what is potentially hot, cold, dry or moist; for potentiality is to be decided in relation not to the accidental but to the essential. In every instance the one universal test for your decision is the rapidity with which each undergoes modification. "Hot", "cold", "dry" and "moist" are ambiguous terms, for sometimes they denote the predominating element and sometimes they imply the possession of the quality in its purity. Into whichever of the four the subject under investigation is readily transformed this it will potentially be. Thus oil is potentially hot because it easily becomes flame, and so with resin, pitch and bitumen; wine, too, because it easily becomes blood; and so with honey, meat and milk.

Those things which are modified throughout their entire essence are nourishment for that which modifies them. Those which undergo and cause modification in respect of a single quality are drugs merely; and so, too, all those that, remaining unconverted throughout their entire essence, have an action on the body are likewise drugs, but dangerous drugs and destructive of the creature's nature. For this reason, I suppose, the whole genus of these is termed noxious; for we cannot say that such drugs are not generically noxious because when administered in minimal doses they do not cause any perceptible harm. On those lines not even fire would be hot nor snow cold, since even these in the tiniest amounts have no obvious effect upon our bodies. The hundredth part of a single spark is without doubt generically fire, but so far is it from burning or heating us that its touch would not even be perceptible. So, too, the hundredth part of a hail stone, so far from injuring or chilling, would not even be perceptible. Hence things noxious also are not to be judged on these grounds but by the antagonism of their general nature, and this antagonism is to be judged by the intermediate change. For example, of the elements water cannot change into fire nor fire into water, but both may be changed into air and air into either of them; but never the one into the other. Now the change of water into air is direct, as also is that of fire; but the change of fire and water into each other is not direct. These, then, are antagonistic and hostile to each other. In the same way opium is completely antaginistic to the human body, which has no power of affecting it even in respect of a single quality, still less in respect of its total essence.

This, then, is one genus of noxious things. A second consists of those which, receiving from our heat a sort of impetus to change, diverge thereafter into manifold modifications, by means of which it comes about that our nature is impaired. All such are generically noxious, even though owing to their minuteness they have no perceptible result. Those which eat into, corrupt, and liquefy the nature of our bodies are with reason called potentially hot: those which chill and mortify it cold. The former act upon and are acted upon by our bodies just as you might expect. When they are associated with a hot body and receive a sort of impulse towards modification from it some reach the extreme of heat and others of putridity. Naturally, therefore, they reduce animals' bodies to their own condition. Those that chill, even if you warm them before administration, give rise to much doubt of their real nature. If they have once become actually hot why do they not heat the animal? Or if they have not yet grown hot how is it that they appear hot? The answer to the riddle lies in distinguishing essential from accidental cold as Aristotle teaches. In things that are accidentally hot the acquired condition is speedily lost, so that they easily return to their original nature; and when things that are naturally cold but accidentally hot are associated with us two things are bound to happen: their acquired heat is lost, and their native temperament, being unaffected by ours, remains cold. And where is the marvel in opium, mandragora, hemlock, and so on, even though given hot, becoming cold a little later, when barley water, milk, gruel, and bread do the very same when they are flung into a stomach too feeble to digest them? Certainly there is often a copious vomiting of cold matters. More important still is the fact pointed out by Hippocrates that phlegm, though a fully formed humour, and generated from the food unconcocted in the stomach, yet seems cold to the touch not merely when lying in the stomach but also when it has been extracted from the vessels themselves by some purging drug. And though it is most viscid in its nature and hard to shift, still not even the violence of the extraction is able to heat it up. Is it, therefore, at all strange that opium, a drug so antagonistic to our nature, gets chilled at once, even if it is drunk hot, and chills the body with it? Being naturally cold it does not retain its acquired heat; and since its essence is not modified by us, but rather modifies and changes us, it is, I imagine, not heated by us, but reduces us to its own condition; and so, being naturally cold, it makes us cold, I fancy, as

well. Hence the argument presents no further difficulty; for that any of these naturally cold things when heated overlong diverges from its individual nature is a proposition that not merely offers no difficulty but one of which you are assured by what has been already said. For just as the salamander, up to a certain point, is not acted on by fire, but is consumed when overlong in contact with it, so mandragora, hemlock, opium and flea-wort still retain their native temperament after a short exposure to fire, but after prolonged heating straightway lose their virtue and are in no way capable of acting as before.

The nature of all such drugs is very antagonistic to human beings, and when I say 'nature' I mean the whole essence and temperament formed from the primordial elements of hot and cold and moist and dry. The nature of those things that most quickly nourish us is most akin to our own. All the rest fall short of these; some being more able and others less able to act upon and be acted upon by our bodies. Castoreum and pepper tend more to act on them; wine, honey and barley water to be acted upon. All these at any rate are both acted upon by and act on the body; for, roughly, whenever two bodies come into relation with one another and there is mutual striving and opposition in the matter of modification over a long period each of them is bound to act on and be acted on by the other. And possibly even when this goes on for a short time only that which is overborne has still some action on that which overbears it; but it is so small as to be imperceptible. Not even the keenest steel cutting the softest wax day and night can help being obviously blunted. Hence I take it that there seems to be truth in the saying - "Constant rain-drops wear the rock", for one sees this actually happen. But the fall of one or two in such cases leads to no visible result. For this reason, I imagine, some hold that certain things are not acted on at all by their environment; and often we must agree with their view, and usually say the same ourselves, except when, as now, we are applying our argument with extreme precision. In this sense the doctrine of the constant liability to be acted on, if you consider it theoretically merely, is capable of convincing proof; yet there is no need to employ it in relation to isolated actions. For if the effects upon ourselves are throughout so small as to cause no perceptible and obvious damage to any function, they may, I take it, quite well be neglected, and we may agree with those who maintain

that such effects do not exist. This holds good for practically all the things that nourish. They, too, work upon the human body, but at the moment have no perceptible and obvious effect. But when they accrue over a longer period they greatly modify and quite clearly change our bodies. Some, the very instant they come into action, produce clear evidence of modification, e.g. wild lettuce, by visibly refreshing those whose stomachs are inflamed and quenching their thirst, and by doing manifest harm to those whose stomachs are chilled. It is also a powerful aid to sleep, for the very reason that it is cold and moist in temperament, but cold and moist to man and to all else which it is adapted to nourish in the same way that green logs are to fire. Such foods as these, therefore, may reasonably have a double property; they influence our bodies like drugs, and they act as nourishment. During the whole period of coction they act as drugs; but when they have become food and are completely modified then they no longer have any opposing actions on us, and they increase the innate heat, as we have said before. This is the common function of all things that nourish, and if you bear always in mind the instance of the green logs you need not be surprised that what during coction and before it is modified and becomes food chills, after modification and when it has become food, warms. Hence all such things are employed by physicians in two ways - as food and as drugs. Suppose now there is an alteration for the hotter in the optimum temperament of someone's stomach. So long as the patient is still concocting the wild lettuce he will be cooled and will acquire the befitting temperament; but when he begins to derive nourishment from it, it will increase the substance of his innate heat.

This is, above all, a point where the bulk of the younger school of physicians seem to me to mislead themselves by not knowing that it is sometimes the quality of our heat that is intensified and sometimes its substance that is increased; nor that the ancients hold that the living body becomes hotter in either of the two ways. For certainly the body becomes hotter whether you intensify its heat or whether you increase the substance in which the heat is originally contained. Suppose now that in the animal's body the blood or, for the matter of that, the yellow bile is essentially hot, and that all the rest of the body, owing to these entering into its composition is hot accidentally. Are there not, therefore, two ways in which the animal is bound to become hotter - either by having acquired

a greater mass of the hot humours, or by an increase in their heat? To my mind this is quite obvious. Similarly, I judge, there will be two ways in which it may become colder - either by having generated the cold humours, e.g. phlegm and black bile - in greater abundance, or, if these all remain in their normal amount, by a change in their quality only. Is it, therefore, strange that a food which is cold in nature like wild strawberry or lettuce should flood the body with the quality of cold so long as it is undergoing coction, but that when coction is complete and it has become wholesome blood, the body should become once more hot hotter than ever through the generation of the humour ~~of heat?~~ And if neither of these things is impossible or strange then let those who will not admit that one and the same article of food can be used both as nourishment and as a drug hold their peace; for, just as it remains a drug throughout if it does not undergo coction at all, equally, if it does, it becomes both. Suppose now that wild lettuce or even its juice is not concocted at all; since its action on man is much the same as that of opium, if it is taken in big doses will it not in that case be merely a drug pure and simple? I think there can be no dispute on this. Hence wild lettuce undoubtedly has the virtue of a drug. On the other hand it also has that of nourishment; for often it does nourish. Hence it comprises both virtues in itself, but does not display both in the same way. When it acts on the man more vigorously than it is acted on it exhibits more strongly the virtue of a drug; when it is more acted on than active, the virtue of a food. Is it at all extraordinary that wild lettuce happens both to act and be acted on, when even the sword, as we said a while ago, has the property not merely of acting on the wax but of being acted on by it? Since, however, its active capacity is far greater than its passive the latter fails to be observed. But if you match the sword with the hardest steel then on the contrary it is clearly more acted on than active, although even then it has some action, but its capacity in this respect is so insignificant that it is overlooked.

We may then confidently pronounce that in all articles of food without exception there is an aptitude not merely for being acted on by our bodies but also for acting on them. And, further, with regard to some of them whose active capacity is conspicuous and plain we may say that they are not merely food but drugs. Wild lettuce, for example, is both nourishment and also

a cold drug: eruca nourishment and a hot drug; and if castoreum in the end undergoes coction even this would be both nourishment and a hot drug. Similarly with mustard and pepper; and of the grasses dill, rue, marjoram, penny royal, mint, savory and thyme. All these are both nourishments and hot drugs: - drugs while they are still undergoing coction and before they are converted into blood, but after conversion drugs no longer but nourishment - in the second usage of the word, of course, as something not yet nourishment, but virtually a nourishment.

Now, just as in regard to wild lettuce we posited above a belly unduly hot and another unduly cold, let the same two bellies be posited now for all things that are potentially hot. The one which is unduly cold all such things, so long as they are contained and undergoing coction in it, will heat, bring to a normal temperament, and benefit qua drugs. The other, the hot one, they will inflame and seriously injure; and these modifications they will effect in respect of its quality. But when their coction is complete and they have been changed and become wholesome blood they will increase the animal's innate heat in respect not of its quality but of its substance. For the rule is that whether the article of food be potentially hot or potentially cold, after it has become blood it will equally increase the innate heat; but as long as it is being transformed into blood but has not finally become blood it chills or heats the body like a drug. Our whole argument hangs, as it were, on one peg, and hence this must always be borne in mind, and we must remember all along that everybody has a special temperament which is akin to such and such a nature and alien to another, and that if it modifies into its own nature that which is akin it will thereby increase the substance of its own heat. If, however, it is itself modified one of two things will happen to it:- if that which changes it makes it hot it will acquire a certain heat: if it does not make it hot it will lose the heat it has. From this it is obvious that all such processes are relative; for it is in relation to the particular modifying nature that each of the ingested matters will render its account whether as a nourishment, or a drug, or both. For example, hemlock is nourishment to the starling: a drug to man; and hellebore is a nourishment to quails and a drug to man, for the temperament of quails is able to assimilate hellebore to itself, but a man's is not.

Hence it is quite clear that the criterion of what is moist, dry, cold or hot in relation to ourselves is not to be sought externally, but is accurately determined from their action on ourselves; and that this must be investigated first and foremost, and their external properties, if need be, secondarily. For if the action of the drug administered is unmistakeable and clearly to be perceived we must pin our faith to this and disregard all the other indications. If, however, it is doubtful and obscure, or complex or at all dubious, then we must judge it on the sum of its external characteristics; but even in this not on remote considerations but from the actual essence of the thing under investigation. The heat of oil for example is determined not because it is viscid or yellow or light, but from the ease with which it takes fire; for the characteristic of what was potentially hot was the readiness with which it changes into what is hot indeed. In the same way when the human body is concerned we do not ask whether what is administered is coarse or fine or moist or light or viscid or yellow, but whether it heats. And similarly we do not ask whether it is sweet or aperient or whether if poured on it makes the blood flow freely during venesection. All this is beside the point when our task is to consider if its use causes heat. If it did this markedly and violently, as pepper does, it would be obvious to all and there would be no question about it; but if not, then it naturally becomes a matter of enquiry; and as for rose-water and vinegar, it is a still more doubtful and contentious point with physicians whether they are potentially hot or cold.

Hence for everything said to be potentially hot, cold, dry or moist we must frame clear and accurate definitions as we did previously for what was actually so. It will be best, I think, to begin with those that are self-evident, for anyone trained in these will easily run down the more obscure. First of all then when such and such a drug or article of food is administered to the body let it be free of all excess of acquired heat and cold; for the definition we laid down before when we sought to diagnose bodies that were moist or dry will be equally serviceable now for those that are potentially hot or cold. Whether the thing administered is potentially cold and you heat it to excess, or hot and you make it cold, it at first gives an impression derived not from its native temperament but from its acquired condition. In order, therefore,

that the nature of the thing exhibited may be studied in its true purity it should as far as possible be luke-warm and should not have acquired from external sources any marked modification towards excessive heat or cold.

In exhibiting the drug let your technique be first of all as follows: Do not, when studying its potentiality, administer it indiscriminately to every condition of body but to those that are as far as possible simple and typical. If a drug applied to a condition of body that is extremely hot gives the impression of chilling then it is certainly cold. Similarly if it is at once manifestly hot to a condition which is cold then this drug will be hot. But when it is manifestly hot to a condition that is hot, or cold to one that is cold we cannot for certain pronounce that the first drug is hot and the second cold; for sometimes, when the bodily condition is extremely hot and the drug moderately cold, the drug not merely fails to modify it, but in addition, by chilling and contracting all the external surface pens up the heat in the interior and prevents its transpiration, and as a result still further inflames the condition. So, too, if a drug when administered to a cold condition produces no heat we have to enquire whether it is due to the mildness of its heat that it had no action on a condition that called for heat in the extreme. Hence one must no more test the efficacy of drugs on these lines than by those actions that are accidental and not direct.

For the actions that are accidental the bodily conditions and lapse of time are decisive: the bodily condition if it is simple and uncombined; and lapse of time decides the issue as follows: If a drug manifestly chills or heats the instant it is administered then I think we may say it is intrinsically and essentially cold or hot: but if after a lapse of time, then it is perhaps to be classed as cold or hot on accidental grounds. Compare "In convulsions, at the height of summer, to pour plenty of cold water on a young man in good condition causes a reaction towards heat". But that cold water is not directly a heating agent is obvious from the effect it first produces, for it gives an impression of chilling, and in fact it does chill the skin all the time it is being poured on to it, and it does not cause heat in all bodies nor while the pouring is continued, but only in young men in good condition, and in the height of summer, and after the

pouring has ceased. So just as the immediate effect of cold water is to chill everything, animate or inanimate, hot or cold alike, with which it comes into contact, similarly if at any season, or in any make or condition of body the contact of cold water produced an immediate impression of heat, then one might reasonably investigate whether cold water was a heating or a cooling agent directly. As it is, since one sees that all things animate and inanimate are instantly and invariably chilled, while it is only in those who possess innate heat, and, as it were, a source of fire in their viscera, that its application sometimes causes a sort of reaction towards heat, I think it likely that it heats these as the result of accidental conditions and not directly. And how this comes about is obvious. By contracting the skin surface and penning up the hot element it causes a reflux of heat from the deeper parts: that heat which has both accumulated through lack of transpiration, retired to the deeper parts through the intensity of the surrounding cold, and been augmented by the internal humours. So after the heat has accumulated and been augmented and impelled powerfully to the surface then you have a reaction towards heat and a clear proof that cold water does not directly increase heat. Directly, it chills the skin, and chilling of the skin is followed by contraction and the withdrawal of the hot element to the deeper parts. Of these two processes contraction is followed by stoppage of transpiration, and the withdrawal to the deeper parts by the elaboration of the humours therein. Of these again stoppage of transpiration causes the accumulation of heat, and elaboration of the humours its further production; and each of these in turn is followed by an increase in the innate heat. Hence it is through the agency of each of these that cold sometimes increases the animal heat: directly, never.

Furthermore, the hot element sometimes accidentally chills through the agency of evacuation, as a poultice chills an inflammation. For when an inflammation is caused by a hot flux the appropriate remedy is evacuation of the waste matter, and this evacuation is necessarily followed by a chilling of the part that has become hot owing to the inflammation. Now, since in inflamed bodies there are two conditions present - a quantitative divergence from the natural state depending on the excess of waste matter, and a qualitative one depending on the heat - the cure of the one condition involves that of the other. Also it is an accidental result that drugs which evacuate the hot material also refrigerate the inflammation of the parts. Here,

therefore, one should endeavour to define, and try to discover from the quantum of the simple condition the quantum of the drug's activity. For example, if the condition is one of extreme heat then the drug also must be cold in the extreme. If the condition falls a little short of the extreme, the drug must do likewise, and if the condition is still further distant from the extreme of heat the drug must be proportionately distant from the extreme of cold. If you begin your investigation of drugs with this in view you will soon find out the native activity of each; for roughly if you administer any drug whatever to any simple hot disease you like, and the instant it is administered it produces an impression of cooling then that drug is potentially cold; and this is still more certain if after its first administration the effect remains the same all through. If it clearly cures the hot condition it is of necessity cold. When on trial it must, of course, be administered luke-warm, for the reason given already. When you are certain that it is a cold drug, then when it is given therapeutically it is best to give it cold, except when the drug is cold to the extreme but the disease is not hot to the extreme. We shall have more to say about this in our books on "Drugs" and "Systematic Treatment". Here it is enough to recognize that if a drug when administered to an uncomplicated hot condition immediately and thereafter produces on the patient an impression of chilling, well-being and benefit, then this drug is of necessity a cold one, even though in other cases it may sometimes appear hot; for if you examine these carefully you will find that it is not hot directly but as the result of some accidental. When we say 'directly' or 'primarily' or 'through no intermediate agency' we mean by these expressions the same thing, and all these words with their appropriate examples we shall put through their paces in our notes on "Drugs".

And now with a recapitulation of my previous remarks I shall endeavour to bring my present discourse to its befitting end. Since a "hot body" is a term with many meanings, denoting both the absolute quality (the element itself), and that thing in which the quality is predominant, and again that whose heat is relative either to the norm of its class or to some chance thing, so too that which is potentially but not yet actually hot we must conceive of and regard in many ways. Hence it is incorrect for some to think that because a certain thing does not quickly catch fire it is not potentially

hot in relation to ourselves. For if it is easily concocted and quickly becomes nourishment it would be hot in relation to ourselves, and if it heats when administered as a drug even then it would be potentially hot in relation to man. So for each species of animal "potentially hot" whether as drug or as nourishment is a word used in reference to that animal only. In fact, the whole question of potentiality is relative, and hence the intrinsic is to be preferred to any extrinsic test, and the one intrinsic test in each instance is that the thing promptly and patently becomes that which we said it was potentially. Anything is potentially fire if it takes fire quickly; and anything is potentially hot for man - one of the species in which heat predominates - if when administered to man it increases either the quality or the substance of his innate heat. And we must consider that the same also applies to everything that is called potentially cold, dry, or moist; for these likewise we must conceive of and regard as being so termed either in relation to the actual element or to the predominating quality. It is obvious too that the hand whose touch decides the question must be clear of all acquired heat or cold, as we have already postulated in regard to drugs.

A P P E N D I X.

The occasion of the two fore-going translations was a statement some years ago in the British Medical Journal that the "De Differentiis Febrium", "De Temperamentis" and "De Sanitate Tuenda" had never been translated into English. It was later that I discovered not only that the same statement applied to the bulk of Galen's work, but also that so far as the "De Differentiis Febrium" was concerned it was only partially true. "Nicholas Culpeper, student in Astrology and Physick", the 17th century physician known to readers of Kiplings "Rewards and Fairies", had already made an abstract of it with astrological and therapeutic additions of his own. It is appended as a curiosity, without alteration of the English or the Greek, and its chief interest is its date. After reading it, it is almost with a shock that one remembers that Culpeper came about 1,500 years after Galen, and less than 300 before ourselves. Galen is, it is true, no longer a God, and criticism is not sacrilege, but the whole [illegible] of Culpeper is Galenic, and where he somewhat petulantly differs from him one is scarcely confident that he alters to improve. We could scarcely have better evidence of the tremendous duration of Galen's reign than this quaint Treatise which links, as it were, Marcus Aurelius with Charles I.

FEBRILIA
OR A
TREATISE of FEAVERS
IN GENERALL.

BY NICHOLAS CULPEPER,
STUDENT IN ASTROLOGY AND
PHYSICK.

PRINTED FOR N. BROOKE AT THE ANGEL IN CORNHILL, 1656.

I revised this Treatise of Feavers;
the Method of which was Galens.
This I am confident, it con-
taineth most excellent Truths.

Nich. Culpeper.

CHAPTER 1.
A TABLE OF FEAVERS.

A Feaver is an unnatural Heat ingendred.
- In the Spirits.
- In the Humours.
- In the fleshie parts.

In the Spirits it causeth.
- Ephemeris, or an one day Feaver.
- Synochus non Putrida, or a Feaver lasting three or four days.

In the Humours it causeth a Rotten feaver, and the Humours Rot.
- Within the Vessels.
- Without the vessels.

Within the Vessels
1. Only one Humor and so by Putrefaction.
   - All the Humours rot and so Cause Sinochus putrida.
   - Of Choler, a continual Tertian.
   - Of Flegm, a continual Quotidian.
   - Of Melancholy, a continual Quartane.
2.

Without the Vessels by putrefaction.

- Of Choler, an intermitting Tertian Ague.
- Of Flegm that is
  - Sweet and intermitting Quotidian Ague.
  - Glazen, it causeth Epialos.
- Of Melancholy, an intermitting Quartane Ague.

In the fleshy parts it causeth

- Hective Feavers.
- Marasmos

CHAPTER II.

A Comment upon the Table of Feavers.

A Feaver is an unnaturall heat which taketh its beginning at the heart, and is spread from thence through the whole body by the arteries and veins, hurting or letting thereby the operation of the parts thereof.

The body of man is generally divided by Hippocrates into three parts: The things contained, the thing containing, and the thing that gives life and motion to both.

1. The things contained are humours;
2. The thing containing the humours is the flesh;
3. The spirits give life and motion to both.

In all these three, distinctly and severally, happen Feavers.

For if this unnaturall heat (for a man may be naturally hot, and is hotter at one time, then at another, yet hath no feaver) be kindled in the Spirits, it causeth either a feaver which the Greeks call ἐφημέρα in Latin Diaria, in English an one day feaver; because in this feaver, there chanceth but one fit; and that lasteth not above a day; For as a bottle filled with hot water heats the bottle, so the spirits being inflamed, heat the body; or

Sometimes it causeth a feaver, called συνόχος non putrida, and it commonly lasteth (if it be rightly handled) not above three days, the Latins call it diaria, but very improperly. Of this συνόχος there are three sorts.

Some continue with equal vehemence, from the beginning to the latter end; ὁμοτῶνος and ἀκμαστικος the Greeks call this.

Some always encrease by little and little, until the end; and such the Greeks call ἀναβάτικος and ἐπακμάστικος.

Again some decrease or diminish by little and little, and those the Greeks call παρακμαστικος

Moreover, if only one humour do putrifie and rot within the vessels, it causeth a feaver the Greeks call συνοχυς which is a continuall feaver;

for although there be remission in this feaver between the shaking fit, yet the feaver never leaves him, before he be either cured of it, or killed by it.

So that here in this lies the difference between Synochos and Synochus; the former hath no remission in the fit, but only one continued fit; the latter hath always remission or slacking, though no intermission as is in agues; in συνόχυς but one fit, in συνόχος many.

Of this συνόχος are also three sorts, for if the putrefaction be of choler only, it causeth a continuall tertian, called by the Greeks καῦσος.

If flegm putrifie within the vessels, it causeth a continual quotidian.

But if Melancholy, a continuall quartane.

Yet all these differ from intermitting Feavers, called (by the vulgar) Agues farre and wide, though the fits are distant alike.

For first, though the humours that cause them both, be the very same yet in these remitting feavers the humour is contained within the veins; but in intermitting feavers, commonly called Agues, it is dispersed through the members, and so through their violence of spreading, the Feaver intermits for a time.

Secondly, this continual, though remitting feaver, still remains between the fits, though not with the same violence, but an intermitting feaver or ague, totally to the Patients apprehension, ceaseth till the next fit comes.

Of which now a word or two.

This Feaver is very fitly called in Latin Febris interpolata, because the fits renew at their time; it is called by some Febris deficiens.

Of this also are three sorts:

1. Tertean
2 Quotidian
3 Quartan.

A pure intermitting Tertian is caused of choler rotting without the vessels.

An exquisite Quotidian is called in Greeke ἡμιφημέριον and is caused of sweet flegm putrifying or rotting without the vessels; For if the flegme that putrifie be glazen, it causeth a feaver called Epialos.

Epialos is a feaver, wherein a patient feels both heat and cold, immoderately in all parts, both at one time and at one place.

To this feaver belongs an accident called by the Greeks λυπηρία that is, when vehement heat is felt in the bowels and entrailes; and immoderate cold in the external parts.

An intermitting Quartan is caused of melancholy rotting without the vessels, is governed by Saturne, a planet slow, weighty and ponderous, and therefore the disease is commonly chronicall and lasting.

I come now to the last sort of Feavers, which the table shews to proceed of heat in the fleshy parts; and that is called Hectica febris, an Hectick Fever.

For as a hot vessel heats the water that is put into it, so a Hectick Feaver though the rise of it be in the flesh, after the third concoction, yet it heats the humours that the flesh containes.

This Feaver for the most part, without speedy cure, consumes the whole body, and then is called Marasmos; and this Marasmos, saith Galen, is incurable; but the good old soul was mistaken; for I have known it cured in more then one, or two; I have had it myself since the writing of this.

As for the Pestilence, it is also a Feaver and a shrewd one too; I have written of that already in a treatise by itself; and therefore no more of it now.

There are other feavers that come by reason of the inflammation of some member.

So that Feaver which comes in the filme that girdeth the ribs, is called Pluretia.

If from inflammation of the lungs, it is called Peripneumonia. If of the stomach, it is called Typhedes.

Some Feavers also are called Erraticae, that keep no certain time of coming at all, nor any order of fits and intermission; and such Feavers come commonly of Melancholy.

But in every Feaver you must consider diligently, whether the Feaver come by any disease, of any particular member; else you will erre egregiously in giving Physick.

These are all simple Feavers; some Feavers are compound, as diverse Feavers of a like nature joyne together: as intermitting Feavers with intermitting, etc. For example two intermitting Tertians, or two intermitting Quartanes joyne together in which last the party is sick two days and well but one; my own child at the writing hereof, had two intermitting Tertians, the one far more violent then the other, and they came at some twelve hours distance.

But sometimes an intermitting Tertian is joyned with a continuall Quotidian, and this disease is called in Greeke ἡμιτριτάιος and this only is known as yet of compound Feavers, of different natures; the other are still of feavers of like nature, as continuall Feavers with continuall, or intermitting with intermitting.

And thus much of my paraphrase, which though it be somewhat long, yet I account nothing tedious that is rational; I know many words might have been added, but not one might have been left out. For by ignorance in, or negligence of this, many lives are lost; which by due observance of this, might be preserved.

CHAPTER III.

Of ἐφημέρα or an one day Feaver.

Ἐφημέρα in Greek, in Latin Diaria, in English an one day Feaver, because it hath but one fit, which continueth but one day, if rightly handled; if not it turneth to other diseases.

It is caused when the breath is inflamed above nature, without any putrefaction; and this chanceth many wayes.

First, through binding or thickning of the skin which stoppeth the vapours that were wont to flow out by the pores, which being hot and sharp ingender a Feaver.

Secondly, by weariness.

Thirdly, by watchings, crudities and lack of digestion.

Fourthly, by sadnesse, care and sorrow.

Fifthly, by anger and vehement passion of the mind.

Sixthly, by feare.

Seventhly by hunger and drunkennesse.

Eighthly, by swellings and kernels about the throat; for all these heat the spirits and inflame them.

The signs are of two sorts.

First generall signes; whereby this feaver is known from any other Feavers.

Secondly particular signes, which shew from which of all these several causes the Feaver comes.

The generall signes are six--

1. They change the pulse, in greatness and swiftnesse, but it keeps that proportion, in order, softness,

and equality, it did according to nature.

2. The urine seldome or never returns from a naturall state.

A naturall urine is subrufe in colour, meane in substance, and if you shake it, it sparkles like sacke.

Yet I deny not but urines alter something according to the predominant complexion of the party, even in men of perfect health.

3. Their heat of body is gentle, pleasant and easie.

4. They end commonly by moist sweet sweats.

5. Vehement pain in the head and stomach, and other parts.

6. Abhorring of Meat and insatiable thirst.

The particular signes.

If it come of watching, there follows a naughty colour, swelling of the face, heavinesse of the eyes, that he can hardly lift them up, the haires of the eyelids are moist, and the pulse small; for watching hinders digestion, and causeth crudities, when these signes arise.

If it come of care or sorrow, the body is lean, if sorrow be the cause, the colour is cleerer; if care darker; hollownesse and drinesse of the eye, discoloured skin.

If of anger, the eyes seeme to stick out farther then they use to do, the face is red, and the pulse lofty.

If of sadnesse, the pulse is small, feeble, and rare.

If of feare, the face is pale, for feare sends the blood from the circumference to the center, the pulse is swift, unequall and sharp.

If it come through burning and heat of the Sunne their skin is hot and dry, and their head seemeth to burn, the eyes are red and troubled, and the veins in the temples, forehead and under their eyes are stretched and puffed up.

If of cold, there followeth heavy distillations and rheums, astringency, for cold bindeth and keepeth the vapours within the skin.

If of wearinesse, the skin is exceeding dry, and the pulse exceeding small.

If of drunkennesse or hunger, the sick may tell you.

If of Kernels or imposthumation of the throat, the pulse is great, swift and often, their face swollen, their urine pale.

For cure you must observe the generall rule *contraria contrariis medentur*.

Let their generall diet be meats of good juyce and easy of digestion.

Give such as have their disease of anger or sun-burning, cool and moist diet.

If of a cold, a diet that both moderately heat; against sadnesse and watching, a diet that moisteneth and provoketh sleep.

If of wearinesse, let them eat as much meat as they can well digest.

Moreover, you must regard the patient's strength, his natural temper, the time of the year, age and usuall custome of the sick, and accordingly order your Physick.

If the natural temper of the body be cholerick, you must feed them with meat at the beginning of the fit; for it is very subject, if the body be kept fasting, to turn to an acute rotten feaver.

See the body be kept laxative; if he go not naturally to stoole, provoke him with an emollient Clister.

Finally so soon as the fit begins to wane, bathe him in a warm bath, made with sweet hearbs boyled in water; for that will open the pores and let out the vapours

CHAPTER IV.

Of Synochus non putrida, being a Feaver which lasteth three or four dayes.

This Feaver is caused either because the small pores of the skin are stopped, or because the body itself is moderately thickened through cold, or after bathing, or by sharp binding medicines, heat of the sun, or any other thing that dries the skin.

It may be thus known.

First, by touching, for the skin is harder and more compact, then it was wont to be.

Secondly, by the heat which at first seems gentle and easie, but after you have held your hand a while, you shall feel it sharper.

Thirdly, the Urine is not much altered from its naturall substance and colour, for this disease lies in the spirits, not in the blood.

Fourthly, the body falls not away, but their eyes are swollen, and fuller of moisture then usually.

Fifthly, the pulse is equall, swift, vehement and frequent.

For cure of this disease you may safely draw out so much blood as age, strength, and the season of the year permit.

After bleeding, use things that clense and scour; such are Oxymel, Hysop, Origanum, Smallage and observe whether the heat abate by this dyet.

For if by the third day you find little heat left, you may safely bath him with such things as are scouring; such be Orris and Arristolochia roots, Smallage, Salt-peeter boyled in water and honey.

But if the Feaver then increase, or on the fourth day, then either you were at first mistaken in the disease or else the Feaver is altered, and some humour putrified.

CHAPTER V.

Of a rotten Feaver, called Synochus putrida.

Synochus putrida, is a Feaver which holds from the beginning to the ending without any great mutation or sensible change, and may well be called a constant or stable Feaver.

Of these are three sorts: I described them in the second Chapter.

This Feaver is caused by the rotting of all the humours equally within the vessels and especially in the great vessels about the arm-holes and share and this chanceth, when fervent heat is kept in by violent binding and stopping, which is within the body, for when heat and moist things cannot breath out, they putrifie and rot presently.

Therefore this feaver is seldome ingendered in thin spare folke, nor in cold bodies, nor old age, but in such as abound in blood, of grosse, fat, of fleshy bodies, or stuffed with hot excrements.

This is properly known from Synochus non putrida, because there are signes of rottennesse in the urine, and the pulse of a man sick of this, but not so in the former.

The other signs all agree with the former.

The cure of this Feaver must begin with blood-letting, and that in the beginning of the disease, if you can.

Cold drinke is most perilous in this disease; first because it causeth obstructions, and hindreth the attenuation of the clammy humours.

Secondly, cold drinkes hurt weak members; Some by drinking cold drinke in this feaver have gotten such sore throats, that they could not swallow; in some the stomach is hurt, that they could not digest; in some the bladder; generally that part that is weakest is most subject to hurt; and being hurt, cannot performe its proper office.

But blood-letting you may use at any time, if strength permit, provided it be not upon a full stomack.

Such as have this feaver have always loosenesse and sometimes vomit up Choler.

Let his drinke be barly water, sweetned with Drinke, Syrrup of Violets, and a little Oyle of Vitrioll to make it tart.

Let his diet be light of digestion, and let him eat it at his usual times of eating; for then it will digest best.

Also Oranges, Lemmons, Oxymel and Verjuyce are medicinall for him.

CHAPTER VI.

Of continual Feavers called by the Greeks Συνόχους

Συνόχους in Greeke is a continuall feaver, that hath some certain slacking between the fits; yet no absolute intermission, till the end of it, and by this only it is known from Agues or intermitting feavers; therefore I shall omit the signes till then.

This feaver is caused by rotting of one particular humour only within the vessels; I shewed it in the first and second Chapters, I remit you to that.

I shall only treat of that which is called of the Greeks καῦσος by it selfe, in the next Chapter, for that is the most dangerous, and wind up the rest together in this.

In the generall cure of feavers of this sort these things must be considered.

First, the Feaver.
Secondly, the rottennesse.

In the feaver two things must be considered.

First, How that part which is already kindled and inflamed, may be remedied.

Secondly, How that which is not kindled, may be letted and hindred from inflammation.

Also two things must be considered touching the rottennesse or putrefication.

First, how the humours already putrified may be healed.

Secondly, how those that are not putrified may be kept from putrefaction.

Haec, qui non animadvertit, errabit nimis.

In the beginning of the feaver, if strength and age permit, let blood; for that lets out the inflamed blood, and cooles the rest.

The body thus cooled, you must cure the obstructions, and that without heating the patient, lest you encrease the feaver, and cause more putrefaction.

This is best done by Clysters, and sweats; for Clysters take only the common decoction with Molossus, and Diacatholicon.

For sweats, you may use either Venice treacle, Matthiolus his great Antidote, Serpentary roots, Electuarium de ovo, Consideratis considerandis.

To stop and hinder the humours not inflamed from inflaming, use cooling juleps, made with Barly water, Harts-Horn, Ivory, Scorzonera roots, Zedoary, & etc, Syrrupe of Violets, & etc.

To prevent putrefaction, avoid all meats, I mean Flesh, and all broths of flesh.

To bring away humours already putrified, boyl a white Lilly root in White-wine, and let him drinke it.

For outward medicines, Vine branches, Water Lillies, Endive, Succory, Wood-sorrell, Sorrell, Lettuce, Knotgrosse, Vinegar, these or any of these beaten and the juyce mingled with oyl of Roses, and wool dipped in it, and applyed to the stomack mightily allayeth the heat.

But have a care by all means, that you do not apply this at the beginning of the Feaver, for then the heat flees inward, and this will add more violence to it, but only when the heat is come to the external parts, for then it cherisheth the Lungs and provoketh sleep.

Provoke sleep with Diascordium; if that prevail not, use Laudanum.

But have a care of Opiats at the beginning of the disease.

For cordials, Scorzonera-roots, Bezoar, Syrup of Citron-pills, and Syrup of Balm of Fernelius, Confection of Alchermes, and de Hyacintho, Electuarium de Ovo, any of these may be administered, consideratis considerandis.

CHAPTER VII.

Of a Quatidian Feaver or Ague.

It is caused of sweet flegme, putrified without the veins; it is called of the Greeks ἀμφιμερινα but if the flegm that putrifies be glazen (which is the coldest of all flegms) it engenders a Feaver called Epialos.

In this Feaver, called ἐπίαλος by the Greeks the patient feeleth vehement heat, and vehement cold, both at one time and in all parts of the body.

In the beginning of a Quotidian, the pulse is unequal, slow, little and weak, nothing like neither Tertian nor Quartane, neither for extremity of heat nor cold, neither do they thirst much, because the Vapour is moist and smoaky.

It most vexeth flegmatick persons.

But this also is completely, perfectly and speedily cured, by that excellent Herbe Cinquefoil, so used as before was specified.

As for all mixed kinds of AGUES, I need not write; but I command this as a sovereign cure for them all.

And (God willing) I intend to make proof of it, in continuall, Quotidians, Tertians and Quartains.

CHAPTER VIII.

Of an Intermitting Tertian Feaver commonly called a second dayes Ague.

Of all Agues this onely is mortall, yet the other two may turne to another disease that may kill, but they kill not themselves.

And this Ague though it be sometime mortal, yet it is of all other most frequent, and if rightly handled, easiest cured.

It vexeth young folks most.

I suppose the reason why this Ague is most frequent to be because Choler by reason of its heat, is most apt to stir with violence.

This disease is caused of Choler, pure, sincere and unmixed, carried with violence by the sensitive parts of the body.

This disease happeneth usually to persons Cholerick by nature, in their flourishing age, and in Spring time.

The signs of this disease are, a Vehement cold, rigour and Stiffnesse in the beginning of the fit; the patient thinketh his body is pricked; soreness of the bones, as though they were nipped, an exact order and equality of the pulse; for as the Feaver encreaseth the pulses are raised in strength, vehemency and frequency.

In the vehemency of the Feaver it causeth thirst, and burneth up the patient; his breath is swift, and hot as fire, and requireth drink immoderately; their Urine Cholerick, subrufe, and something yellow.

The longest fit of a Tertian endureth but twelve hours.

When these fits come sooner and sooner, the disease getteth strength over nature; but if later and later, the disease loseth strength.

Galen saith, men labouring of this disease, vomit choler.

At the writing hereof, and it is the Seventh of February 1643, I have cured above twenty of this disease, and it is like seen more, yet never knew nor saw any vomit at all.

When I was a boy, I had the disease constantly every Spring (though Galen saith it comes onely in the heat of Summer: Gal. ad Glauconem) yet never (to my memory) had so much as pronesse to vomit.

The usual cure of this disease, is by vomiting and sweating. But I have found out a more certain and speedy, and indeed never missing cure.

Let the air the sick abides in, be clear and penetrating.

Both this and Quotidian Agues I never missed cure, by giving onely Cinquefoil, gathered in the hour of Jupiter, if it be possible, he being above the earth, and truly I should think it were the better if the Moon were aspected to him, but I never observed it.

This I have given in Powder, both in common Vinegar and Vinegar of Squils; I have observed the number of the Leaves I have given, viz: one for a Quotidian, three for a Tertian, & etc., and I have observed it; I have given the decoction thereof, and all of them still did the cure in three Fits, sometimes in two; therefore I hold it the most soveraign Medicine for Agues in the world.

CHAPTER IX.

Of a Quartane Feaver or Ague.

This proceedeth of Melancholy putrifying and rotting without the veins.

This Feaver does not invade the sick with that rigour and stiffnesse that the former doth, but the cold is like the cold a man feels in an hard frost, as though it would break his bones, and doth not seem to prick him as the other doth.

Their Urine is White and Thin, & as it were, strained from some grosse matter.

It cometh commonly about Harvest, and stayeth (without cure) till next Spring; and is a stubborn Humour to be dealt with.

For many a time and often, this Ague by violent Medicines (as Vomits, & etc.) is turned to a double Quartane, and so the patient hath two sick dayes, and but one well day.

Saturn the causer of this Ague, is a sullen Planet, and the disease takes after him; therefore deal gently with it at first; you had better please a sullen potent adversary then displease him.

I never had any patient of this disease, since I knew the virtues of the Herbe Cinquefoil; it is very probable it will cure this, as well as other Agues. (Since I have done the cure with it.)

Yet if blood abound, you may let blood in this Ague; and if it look black, draw out good store.

+Also black Hellebore, corrected with Cinamon, may be given.

And white Hellebore, if it may be given inwardly at all, it may in this disease.

But let these be given on the well dayes for then they anger the Ague lesse.

+ I desire these Hellebores may be let alone in this disease for old Saturn will not be vexed.

In this Ague, you must have a great care of the Spleen, for that is the receptacle of Melancholy.

Therefore you may anoint the left side with oyl of Capers, Vng. ex succis aperitivis, or any opening splenetick Medicine.

CHAPTER X.

Of a burning Feaver, called Καῦσος.

Καῦσος in Greeke, is called in English a burning Feaver, or continual Tertian.

It is caused of Choler, rotting or putrifying within the veins, together with the blood.

Those that have this disease, their tongue is dry, rough and black, with gnawing of the Stomach, immoderate thirst, and watching; their dung is liquid and pale.

Let the place wherein the sick lies be cool, the air sweet; if it be not cool, make it so by art; of which you have examples in my Critica Cephalica, Vol. 3, lib. 2.

Let him drinke for his ordinary Drinke, water wherein Barly, Cinamon, and such herbs as cool and moisten, such be Lettice, Sorrell, Wood Sorrell Purslains & etc., have been boyled

Also Syrrup of Violets, Violet and Strawberry leaves, Water Lillies, and Verjuyce, Juyce of Lemmons and Oranges, are medicinall.

With the other medicines mentioned in the former Chapter; and bleeding.

If these medicines prevail not, but the Humours flow up, and lie heavy on the head, which you may know by their talking idly, you must apply Blisters to the inside of the wrests, and the inside of the Calves of their legs.

If that prevail not, but you perceive their case desperate, apply Pidgeons to the soles of their Feet.

But if in a desperate case it oppresse their Stomack or Heart, I have known six grains of Mercurius Vitæ cure them; yet in my opinion Lac Sulphuris had been better.

CHAPTER XI.

Of an Hectick Feaver.

An Hectick Feaver is a disease where an unnatural heat is kindled, throughout the fleshy and massie parts of the body.

They that have this Feaver feel no pain, neither do they know (the rules of art excepted) that they have any feaver at all, because all the parts of the body are equally hot, and so there is no reluctancy.

This disease is caused two wayes.

First, through want of Physick, or a skilfull Physitian in other Feavers, which having consumed the Humours seize upon the flesh.

Secondly, they sometimes begin of themselves, as of sorrow, anger, weariness, burning of the Sun & etc.

When these feavers consume and waste the body, (as indeed without speedy cure they always do) then Galen calls them μάρασμος and this Marasmos, saith he, is incurable: and to make this seem as though it were true, he tells a long tale of the snuffe of a candle; which, saith he, being put out, mutters to pieces, but if you put oyl to it, it makes it burn with more violence; so (quoth he) this feaver if you goe about to extinguish the heat, the party dies instantly but if you add moisture to him, his Feavour burns most violently.

But experience (the best Artist) makes no difference between Hectick Feavers, and Marasmos, but shews plainly that all Hectick Feavers are wasting, and also curable; therefore I shall leave Doctor Galen, and follow Doctor experience in this disease, and therefore now to the purpose.

The signes of this disease are these:

There eyes are wonderful hollow, as though they were shrunk in their head, their moisture is consumed so that you may see the bones of their Eye-brows stick out; there hangeth at the hair of their eye-brows gums or filth, as though they had gone a long journey in the dust; their skin is hard and dry, and their eyes wink often, as though they were sleepy, when indeed it is much otherwise with such as have this disease, for they can hardly be brought to rest, they pine to skin

and bone, and if you looke upon their belly, it looks as if it had no bowels in it; the pulse is weak and often, and continually after meat the feavers is increased, and the pulses are augmented in greatnesse.

The Cure consists in cooling and moistning, which must be done both outwardly and inwardly.

Let the Aire the sick abideth in, be cold and moist, if it be not so naturally, make it so by art, whereof you have examples in my Treatise called Crit. Cephal.

Let his meats be such as moisten, and breed good and active blood; such are Lamb-stone, Cock-Stones, Lobsters, Prawns, Eggs boyled soft, Partridge, Larks, & etc. For Herbes, let him use Lettuce, Endive, Succory, Spinage, Mallows, & etc.

Let his drinke with his meat be onely water wherein Cinnamon hath been boiled.

Let him drinke new milk abundantly, provided he hath no feaver or putrefaction, or rottennesse joyned with it.

He may eat freely Raisins of the Sun, and Almonds, Cherries, Prunes, Pomegranates, and figgs.

Let him eat often, and but a little at a time.

For Cordials, he may use Diarrhodon abbatis, Diatragacanthum frigidum, Diapapaver and species Cordiales temperatae Diamargariton frigidum.

For Syrrups, let him use Syrrup of Violets, Endive, Lettuce, Water-lillies and Vinegar.

Let him drinke Emulsions made of Barly water, almonds, the four greater cold seeds, and White Poppy seed, Sweetned with Sugar.

Lastly, let his body be kept continually anointed with pure Oyl of Olive, and nothing else.

Many in this disease vomit up all their meat so soon as they have eaten it (Which indeed I forgot before) in such cases make their Emulsion of Mint Water, instead of Barly water, as before; for only by this medicine alone have I known Galen's supposed incurable disease cured.

FINIS.

B I B L I O G R A P H Y.

The text for the De Differentiis Febrium is Kühn's, generally regarded as an unsatisfactory edition. There were a few obvious mistakes, but on the whole the condition of the text here seems more reliable than others have found it elsewhere.

The text for the De Temperamentis is the very good recent edition of Helmreich.

I have in various ways had much help from the following -

Allbutt:	Greek Medicine in Rome.
Brock:	Galen on the Natural Faculties.
Corlieu:	Les Médecins Grecs.
Daremberg:	Histoire des Sciences Médicales
	Oeuvres anatomiques, physiologiques, et médicales de Galien.
Eymin:	Medecins et Philosophes.
Jones & Withington:	Hippocrates, Vols. 1, 2 & 3.
Jowett:	Plato.
Mayor:	Ancient Philosophy.
Moon:	Hippocrates and his successors.
Moon:	Relation of Medicine to Philosophy.
Ross:	Aristotle.
Singer:	Greek Biology and Medicine.
Singer:	Short History of Medicine.
Thorndike:	History of Magic and Experimental Science.
Tylden:	Galen, an Essay.