HEREDITY,

in Relation to Mental Disease;

a Thesis for the

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of the

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presented by

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Fortes creantur fortibus et bonis :

Est in juvencis, est in equis, patrum

Virtus ; neque imbellem feroces

Progenerant aquilae columbam .

Horace, Book 4, Ode 4.

HEREDITY , IN RELATION TO MENTAL DISEASE.

For the student of mankind there can be no more absorbing study than the subject of Heredity, a problem whose laws underlie the whole nature of our being. It is not wonderful, then, that from the earliest times its phenomena should have attracted the attention of philosophers and thinkers. The works of ancient writers teem with references to the subject. The following quotation from the Old Testament is one of many that might be given from the Scriptures:-"I, the Lord, thy God, am a jealous God, visiting the iniquities of the fathers upon the children to the third and fourth generation, etc."

Burton's "Anatomy of Melancholy" is a storehouse of quotations from ancient authors, many of them showing that the phenomena of heredity have been well appreciated in all ages and that they have formed the basis of laws governing the social system. I give a few extracts in illustration.

"Such as the temperature of the father is, such is the son's; and, look, what disease the father had when he begot him, his son will have after him, and is as well inheritor of his infirmities as of his lands. And where the complex-

ion and constitution of the father is corrupt, there, (saith Roger Bacon) the complexion and constitution of the son must needs be corrupt; and so the corruption is derived from the father to the son. Now this doth not so much appear in the composition of the body, according to that of Hippocrates, in habit, proportion, scarrs, and other lineaments; but in manners and condition of the mind."*

From Ludovicus Mercatus he quotes:-"madness after a set time comes to many, which he calls a miraculous thing in nature, and sticks for ever to them as an incurable habit. And, that which is more to be wondered at, skips in some families the father, and goes to the son, or takes every other, and sometimes every third, in a lineal descent, and doth not always produce the same, but some like, and a symbolizing disease." "For these reasons, belike, the church and commonwealth, humane and divine laws, have conspired to avoid hereditary diseases, forbidding such marriages as are any whit allyed."**

"So many several ways are we plagued and punished for our fathers defaults; in so much that (as Fernelius truly saith) it is the greatest part of our felicity to be well born; and it were happy for humane kind, if only such parents, as are sound of body and mind, should be allowed to marry."†

*Burton, "Anatomy of Melancholy", 16th Edition, p.137.

**p.137. †p.139.

In ancient Greece the Spartans destroyed those children that did not come up to a proper standard of health. Burton mentions* how the Indians of old, and many other well-governed commonwealths, made away with any child that was crooked or deformed in body or mind, and he quotes from Hector Boethius that similar laws existed even in Scotland at an early period.

"This was done for the common good, lest the whole nation should be injured or corrupted. A severe doom, you will say, and not to be used amongst Christians, yet more to be looked into than it is. For now, by our too much facility in this kind, in giving way for all to marry that will, too much liberty and indulgence in tolerating all sorts, there is a vast confusion of hereditary diseases, no family secure, no man almost free from some grievous infirmity or other."†

In modern times investigations into the laws governing heredity have been more thorough and more scientific and much has been elucidated with regard to it; but the truth of the last quotation from Burton is as apparent to-day as it was when it was written -more than three centuries ago ; and yet how little advance there has been in our efforts to combat the propagation of hereditary diseases, i.e. by prohibiting the marriage of persons who inherit such tendencies.

* Burton, p. 140.

† Burton, p.140.

This paper is intended to deal chiefly with the hereditary transmission of mental disease; and its conclusions are based on a statistical review of 1200 cases of hereditary insanity admitted into the Cumberland and Westmorland Asylum ("Garlands") during a period of 30 years(1865-1895). So far as I can ascertain , no analysis of such a large number of cases of hereditary insanity has hitherto been made by any one observer ; there is therefore ground for the hope that results of value may accrue from such an investigation.

One of the most important contributions to the subject of hereditary insanity is contained in a paper by the late Dr Hugh Grainger Stewart which appeared in the Journal of Mental Science*in 1864; that paper was based on the statistics of 447 hereditary cases admitted into the Crichton Royal Institution, Dumfries ; the patients belonged mainly to the middle and upper classes of society, with a smaller number of pauper cases. The cases I propose to review were almost entirely paupers admitted from the general population of Cumberland and Westmorland. Private patients often come to an asylum from a considerable distance and from beyond the limits of the district in which the asylum is situated ; inferences drawn from the tabulation of such

* "On Hereditary Insanity", by H.Grainger Stewart, M.D., Journ.Ment.Science, Vol. 10, p.50.

cases are scarcely likely to give so reliable a picture of the characteristics of insanity in any district, as when the cases analysed stand for almost the entire insane population of all the districts from which the patients come.

I propose to a certain extent to follow the methods used by Grainger Stewart, but shall endeavour also to throw some light on additional points not touched on by him.

The subject must be approached from several standpoints, and I propose to deal with it under the following headings , considering at the same time various side-issues that arise.

1. The proportion of cases of insanity in which there is hereditary predisposition to the disease.
2. The degree of relationship to the hereditarily predisposed of those members of a family previously affected.
3. The influence of sex in transmitting insanity.
4. The influence of sex in receiving insanity.
5. The frequency of the different forms of insanity in those hereditarily predisposed.
6. The forms of insanity in the ancestors of those hereditarily predisposed.
7. The exciting causes of insanity in those hereditarily predisposed.

8. The number of attacks in those hereditarily predisposed.
9. The age on first attack in cases of hereditary insanity.
10. The domestic condition of those having hereditary insanity.
11. The proportion of recoveries and deaths in cases of hereditary insanity.
12. The duration of life in hereditary insanity.
13. The causes of death in hereditary insanity.
14. The duration of the attack in cases that recover.
15. Illustrations of heredity.
16. The theories of heredity.
17. The question of marriage in relation to hereditary insanity.
18. Prophylaxis of hereditary insanity.

Summary.

1. The proportion of cases of insanity in which there is hereditary predisposition to the disease.

The 1200 cases under review represent all the cases admitted into Garlands Asylum during a period of 30 years (1865-1895) in which there was ascertained a hereditary history of actual insanity in the family. It must, however, not be understood that these 1200 cases include all the patients admitted who inherited the predisposition to insanity. In reality the number of cases with neuropathic heredity should be much greater. In the first place it is often very difficult to ascertain reliable particulars about the family history of pauper patients. Secondly, in many cases of an undoubtedly hereditary nature, though there may hitherto have been no actual insanity in the family, yet the unsoundness of the stock may have previously evidenced itself by other allied nervous disorders, such as epilepsy, chorea, neuralgias, spasmodic asthma, etc.; I have not included such cases in tabulating the present series. For these reasons it is impossible to state accurately the proportion that the hereditary cases bear to the total admissions during the same period, only a very rough estimate can be given. The total admissions during the 30 years numbered 3907, giving the proportion of hereditary cases as 30.7 per cent. of the total.

Authorities vary very greatly in the proportions at which they estimate the frequency of hereditary predisposition in cases of insanity ; some have put it as low as 5 per cent., while ,on the other hand, some* maintain that at least 90 per cent. of the insane have a heredity of insanity. Grainger Stewart found that 49.6 per cent. of the cases admitted into the Crichton Institution had a history of hereditary insanity or eccentricity ; but , as already stated, a majority of his patients belonged to the middle and upper classes of society , about whom more reliable facts as to ancestry can usually be ascertained than in the case of paupers.

It is evident that in a computation of this kind a great deal depends on the personal equation of each investigator (i.e. on what he considers sufficient evidence of neurotic heritage), and also on the thoroughness or otherwise of the knowledge about the family history of the patients.

* cp. "Heredity in Mental Disease", by J.F.Briscoe, Journal of Mental Science, Vol.42, p.759.

2. The degree of relationship to the hereditarily predisposed of those members of a family previously affected.

A history of insanity in relatives, whether in the direct line or collateral, has been considered sufficient evidence of hereditary predisposition to warrant the case being included in my list. Naturally a history of insanity in the direct line is the strongest testimony; but, failing this, the occurrence of insanity in collateral relatives is also of great importance. It is well recognized that it is not actual insanity that is transmitted from parent to child, but an inherent flaw in the nervous organization which renders the individual liable at some critical period of his life to an attack of mental disease. This flaw need not necessarily make itself felt during the life of an individual who has inherited it ; it may lie dormant for one or more generations, till in some subsequent descendant it is called into active being - it may be as the result of an unsuitable marriage of the tainted parent, or it may be from mere stress of environment. Ribot writes graphically of " the wonderful tenacity of heredity. Its law is absolute transmission ; and , in spite of all the obstacles which tend to weaken or destroy it , it struggles on without truce or pause , losing much of its strength as it advances, dissipating itself, so to speak, so as to

appear no longer to exist, and yet, when we see the same characters reappear, sometimes after a hundred generations, here is, indeed, matter for reflection. It may be said that heredity verifies in its own way the axiom - Nothing is lost." *

Though the parents, or more remote ancestors in the direct line, so far as can be ascertained, may have shown no sign of mental disease, the neuropathic heredity may be evidenced by insanity in collateral relatives, i.e. in uncles or aunts of the patient, or, again, in the children of those relatives, i.e. in cousins of the patient. Insanity in cousins only is less reliable evidence of hereditary predisposition, as the flaw in them may have been imported into the family from outside by a faulty marriage ; some authorities(e.g. Bucknill and Tuke†) would exclude such evidence entirely ; still insanity in cousins does afford a degree of probability of neurotic inheritance, especially if associated with insanity in others of the stock. Again, in the absence of a history of direct transmission, insanity in brothers or sisters of the patient affords strong presumptive evidence of an inherited flaw, more particularly

* quoted from "Heredity ; a Study", by R.A.D.Lithgow, p. 30.

† "Psychological Medicine", 2nd Edit., p. 266.

if at the same time there is insanity in other collateral relatives.

The following table shows how the insanity was distributed amongst the relatives of the 1200 hereditary cases. Each case is noted once only; where more than one relative was affected, that one has been selected whose insanity throws most light on the transmission of the disease to the patient under consideration (as a rule the nearest of kin affected).

Table 1.

	Males	Females	Total
Grandparents insane	25	19	44
Parents insane	193	219	412
Brothers or sisters insane	130	188	318
Uncles or aunts insane	114	122	236
Cousins insane	28	43	71
Nieces or nephews insane	9	8	17
Relatives, degree undefined *	56	46	102
Total	555	645	1200

3. The influence of sex in transmitting insanity.

The following table shows from which side of the family the predisposition was inherited.

Table 2.

	Males.	Females.	Total.
Cases hereditary on the paternal side	170	147	317
Cases hereditary on the maternal side	136	185	321
Cases hereditary on both pat. and mat. sides	23	26	49
Not defined from which side	226	287	513
Total hereditary cases	555	645	1200
Total admissions in same period	2019	1888	3907

The hereditary predisposition to insanity is strongest when it is inherited from both parents ; this double heritage was ascertained in 49 cases, or 4.09 per cent. of the total number. Table 3. gives details of those cases.

Table 3.

	M.	F.	T.
Both paternal and maternal grandparents insane	2	0	2
Father and mother both insane	7	14	21
Father insane, also reversional or collateral maternal H.P.	5	4	9
Mother insane, also revers. or collat. pat. H.P.	0	2	2
Pat. and mat. revers. or collat. H.P. combined	9	6	15
Total	23	26	49

Where father and mother have both suffered from insanity, the prospect for the children is indeed gloomy.

Turning now to a comparison of the paternal and maternal influence in transmitting insanity, we find from Table 2

that the actual numbers of cases hereditary on the paternal and maternal sides respectively are nearly equal , with a very slight preponderance on the maternal side.

Table 4.

Total Admissions 3907.	
Paternal Influence	Maternal Influence
317	321
Percentage on Total Admissions	
8.1	8.2

The majority of observers appear to consider that the maternal influence is more potent than the paternal in transmitting the tendency to insanity. Bucknill and Tuke * quote from Baillarger that "the insanity of the mother, as regards transmission, is more serious than that of the father ; not only because the mother's disorder is more frequently hereditary, but also because she transmits it to a greater number of children."

Thurnam's statistics† tally closely with mine ; viz:-

Table 5.

Thurnam.	
Paternal Influence	Maternal Influence
39	40
Percentage on Total Admissions	
8.5	8.5

* Op.cit. p.269. † "Statistics of the Retreat", Table 14.

I also give Grainger Stewart's results , as well as those of Brigham quoted by him :-

Table 6.

Brigham.		Grainger Stewart.	
Paternal	Maternal	Paternal	Maternal
79	91	82	68
6.7%	7.7%	9.1%	7.5%

Brigham's statistics show more markedly the greater potency of the maternal influence , while Grainger Stewart is the only authority who has found the paternal influence the stronger.

From a study of all those statistics we must for the present conclude that insanity inherited through either parent seems almost equally dangerous for the children, but that, on the whole, the insanity from the mother is slightly more liable to be transmitted.

Another question to be considered here is whether the insanity of one parent is more dangerous to children of one sex than of another.

From Table 2. we can extract the following :-

Table 7.

Paternal Influence		Maternal Influence	
Male	Female	Male	Female
170	147	156	185
Percent.on total admissions.		Percent.on total admissions.	
8.4	7.7	6.7	9.8

It is thus shown that insanity inherited through the father is slightly (.7 per cent.) more dangerous to the sons than to the daughters, while insanity inherited through the mother is markedly (over 3 per cent.) more dangerous to the daughters than to the sons. Thurnam, Grainger Stewart, and Brigham (quoted by Grainger Stewart) all obtained similar results.

Table 8.

	Paternal Influence		Maternal Influence	
	Male	Female	Male	Female
Thurnam *	8.5%	8.1%	7.6%	9.3%
Grainger Stewart	9.4%	8.7%	7.1%	8.1%
Brigham	7.07%	6.3%	5.9%	9.5%

* Op.cit., Table 14.

4. The influence of sex in receiving insanity.

The female sex is markedly more liable to suffer from hereditary insanity than the male, as is shown by the next table.

Table 9.

	Males	Females	Total
Total number of admissions	2019	1888	3907
Cases with hereditary predispos.	555	645	1200
Percentage of hereditary cases	27.4	34.1	30.7

The statistics of Thurnam, Grainger Stewart, and other authorities, show similar results, but, as a rule, the diversity between the proportions in the two sexes has been stated to be less marked than that given in the above table.

5. The frequency of the different forms of insanity in those hereditarily predisposed.

Table 10.

	Total Admissions	Hereditary Cases	Percentage of hereditary cases.
Congenital Imbecility	126	44	34.9
Epileptic Insanity	154	35	22.7
General Paralysis	251	45	18.6
Mania	2234	717	32.5
Melancholia	892	310	34.7
Dementia	270	51	18.8
Total	3907	1200	30.7

Table 10. gives the total number of admissions of each class of cases during 30 years, with the number of instances in each class in which hereditary predisposition to insanity was ascertained . The highest ratio of hereditary cases is found in Congenital Imbecility (with and without epilepsy); taking Epileptic Imbecility separately, it was found to yield the highest proportion of all; but the series of cases of this class is so small as to render exact inferences unreliable. Melancholia gives the next highest ratio of hereditary cases. In an analysis of 730 cases of Melancholia published by me some years ago *, hereditary

*Journ. Ment. Science, Vol. 40, page 11.

predisposition was ascertained in 38.2 per cent.; in the present series the selection of hereditary cases was more rigid, and a few cases in which there was slight doubt as to its presence were excluded; this, and also the fact that the present series of cases of Melancholia is considerably larger, have given a slightly lower proportion of hereditary cases ; the proportion , however, still remains high .
The proportion of hereditary cases in Mania is over 2 per cent. lower than in Melancholia. There is a considerable drop in the proportion of hereditary cases in Epileptic Insanity(Mania and Dementia); next comes Dementia; while General Paralysis has the lowest proportion of all.

The order of sequence as regards frequency of hereditary predisposition thus is :-

1.Congenital Imbecility, 2.Melancholia, 3.Mania, 4.Epileptic Insanity, 5.Dementia, 6.General Paralysis.

Grainger Stewart's results were as follows :- Dipsomania 63.4%, Melancholia 57.7%, Mania 51% , Moral Insanity 50%, Monomania 49%, General Paralysis 47.6%, Dementia 39.5%, Imbecility 36% .

Esquirol (quoted by Grainger Stewart) found 48.6 per cent. of the cases of Melancholia hereditary, as compared with 24.9 per cent. of the cases of Mania.

Leaving out of account cases due to accidents at birth or to serious illnesses or injuries during infancy ,

Congenital Imbecility is frequently a sign of origin from an excessively faulty stock ; the flaw in the nervous organization is so great that it makes its appearance at an early period of the life of the organism ; it is not to be wondered at that a history of hereditary predisposition to mental disease is very common in such cases. Imbecility with epilepsy represents a still greater departure from the normal, and therefore, as one would expect, shows the highest proportion of hereditary cases.

Most authorities agree that Melancholia is more frequently hereditary than Mania, and it is well known that Dipsomania is very frequently hereditary. Owing to insufficient data, I have not tabulated cases of Dipsomania separately, but have included them amongst the cases of Mania.

As already mentioned, however, it is not actual insanity, or any special form of it, that is transmitted from one generation to another, but a flaw in the germ plasm , which, if it become manifest at all in a member of a new generation, need not necessarily appear in the same guise as it did in preceding generations. Nor do members of the same generation of a family always exhibit the same form of mental aberration ; some may throughout life show average or even exceptional mental development - every now and then a genius crops up in families with a history of mental instability ; one or more may be imbecile, another may be

melancholic and suicidal , a daughter may have puerperal insanity at successive confinements ; other members of the family may never exhibit signs of insanity, but may be subject to neuralgia, chorea, spasmodic asthma, or other nervous ailments ; or, again, one or more individuals, though they may never be actually insane, may throughout life be eccentric or cranky, irritable or highly immoral, or may in other ways give evidence of their ill-balanced nervous system. The law of variations goes hand in hand with the law of heredity ; the offspring never exactly resemble each other or their parents. "A predisposition to insanity", says Maudsley*, "not being the heritage of something definite and known passing from one generation to another in a definite and constant way, but rather of an uncertain bundle of obscure tendencies which break up into various distributions, therefore it is impossible even to guess with any confidence what the issue shall be in a particular case."

* "Pathology of Mind", page 51.

6. The forms of insanity in the ancestors of those hereditarily predisposed .

It is often impossible to ascertain the form of insanity in the ancestors of those hereditarily predisposed to the disease, and I am unable to give complete statistics on this point. However, in 532 cases out of the 1200 I am able to specify forms of insanity that had previously occurred in relatives, direct or collateral ; in a good many instances more than one form of insanity had previously occurred in the family, but, to simplify matters, I only quote the form that occurred in the relative nearest in the direct line to the patient.

Table 11.

ıtal Disease	Mental Disease in Relatives of Patients.							
ın Patient.	Mania	Melancholia	Suicide	Dementia	Epilepsy	Imbecility or weak-mindedness	G.P.	Total
ag.Imbecility	10	2	1		1	13	1	28
ilep.Imbecil.	4	2	1		2	2		11
ilep.Insanity	1		4	1	8	4		18
n.Paralysis	2		3			4		9
mia	111	27	104	4	10	33	3	292
lancholia	31	25	85		7	10	1	159
mentia	3	4	5			3		15
Total	162	60	203	5	28	69	5	532

A glance at Table 11. shows that one form of insanity in a patient may have been preceded in another member of the same stock, not only by the same form of insanity, but also by almost any other variety of mental disease . The most noteworthy fact to be derived from this table is the frequency with which suicide precedes, or is contemporaneous with, insanity in a family. Out of those 532 cases, no fewer than 203 had had relatives who had committed, or had attempted to commit, suicide . The proportion of suicides in Cumberland is very high ; according to Morselli*, Cumberland has the fourth highest suicide-rate amongst the Counties of England, the annual average of suicides in this county being 96.2 per million inhabitants . As shown by Table 11. , suicide occurred in the same family tree as each of the different forms of insanity there classified. Suicide and Dipsomania may, however, be classified together as the two forms of neurotic heritage that have the strongest tendency to be transmitted unchanged from one generation to another. Of the 85 melancholiacs who had a hereditary history of suicide, 61 (or 71.7 per cent.) had themselves the suicidal tendency.

The suicidal impulse is very frequently present in cases of hereditary insanity considered generally; it existed in 381 of the 1200 cases (31.75 per cent.).

*"Suicide", by H. Morselli; 2nd edit., p. 189.

The different forms of insanity may all occur in the members of the same family tree at one period or another, and it is interesting to trace in a stock the progress of the neuropathic diathesis. A flaw in the nervous organization of a family may become intensified in successive generations as a result of unsuitable marriages and antagonistic environment; or, on the other hand, owing to favourable combinations of circumstances, the flaw may gradually fade away till at last only healthy members of the family are produced - still retaining, however, the latent tendency to disease, which unfavourable conditions may once more call into active existence. When there is progressive deterioration of the mind in successive generations, (i.e. when the conditions are unfavourable to the organism), the march is onwards to complete destruction of the mind, i.e. to amentia or dementia. In such a family, associated with attacks of insanity in many of its members, it is not uncommon to find dotage set in unusually early in those members who do escape having outbreaks of active mental trouble.

In his Presidential Address at the meeting of the Medico-Psychological Association in 1888, Dr Clouston gave a graphic description of "the genesis of dementia hereditarily", his summary of his remarks on this head being as follows :- "Typical secondary dementia is always hereditary, and its

genesis can be traced through the stages of hyper-activity, hyperaesthesia, diminished inhibition, instability, melancholia, mania, and alternation in different generations, or in members of the same generation affected in different degrees." *

In many cases the origin of hereditary neurosis in a stock can be traced to alcoholic excess in one or more ancestors, where one can find no history of previous insanity ; in other cases inherited drunkenness often goes hand in hand with a neurotic heredity.

Along with hereditary predisposition to mental disease , there may exist in a family the predisposition to other bodily diseases. Thus in many cases of the present series there was a family history of phthisis as well as of insanity, and a considerable proportion of the deaths in the hereditary cases resulted from tubercular disease. Both these diatheses indicate an increased vulnerability and lowered vitality of the individual and an association between them is not surprising ; some members of a family may develope tubercular disease, others may be subject to attacks of insanity, or the two diseases may co-exist in one person.

* Journ. Ment. Science, Vol.34, p.347.

7. The exciting causes of insanity in those hereditarily predisposed.

On the whole the alleged exciting causes, moral or physical, of attacks of insanity do not seem to vary greatly in proportion in the hereditary, as compared with the non-hereditary, cases. I find, for instance, that the proportion of cases in which alcoholic excess preceded the attack has been much the same in the hereditary cases as in all cases together :-

Table 12.

	Total Admissions	Hereditary Cases
	5907	1200
Alcohol the exciting Cause	488	147
Proportion per cent.	12.4	12.25

Hereditary insanity is prone to show itself at critical periods of life, such as the puerperium; thus I find that amongst the females the proportion of cases of puerperal insanity has been appreciably higher in the hereditary series than in the total admissions :-

Table 13.

	Total Female Admissions	Hereditary F. Admns.
	1888	645
Cases of Puerperal Insanity	145	60
Proportion per cent.	7.6	9.3

In looking through those cases I have found it noted in repeated instances that the mother or other relative of a woman suffering from puerperal insanity has been afflicted with the same malady ; and in a considerable number of other cases it has been stated that the mother of a patient admitted with hereditary insanity suffered from puerperal insanity at the time of the patient's birth.

8. The number of attacks in cases of hereditary insanity.

Table 14.

Hereditary Cases	1200
First Attack	761 or 63.4 per cent.
Not First Attack	439 or 36.5 per cent.

I am unable to give similar statistics with regard to the total admissions to the Asylum during those 30 years; Thurnam,* however, gives particulars about 469 admissions of all classes of cases, as follows :-

* "Statistics of the Retreat", Table 12.

Table 15.

First Attack	358 or 76.3 per cent.
Not First Attack	111 or 23.7 per cent.

Compared with Thurnam's statistics of cases generally, the proportion of relapses in hereditary cases is much greater than in the general run of cases. This statement is corroborated by the statistics of Grainger Stewart :-

Table 16.

	Hereditary Cases Percentage	Non-hereditary Cases Percentage
First Attack	64.6	80.0
Not First Attack	35.3	20.0

Hood's statistics* differ somewhat from Thurnam's with regard to cases generally ; his results were :-

Table 17.

First Attack	67.6 per cent.
Not First Attack	32.3 per cent.

*"Statistics of Insanity", page 77.

These proportions approximate more closely to my results in hereditary cases, but still show an appreciable excess of relapses on the part of the latter. In my analysis of 730 cases of Melancholia*, the following results were obtained:-

Table 18.

	Hereditary		Non-hereditary	
	No. of cases	Percent.	No. of cases	Percent.
First Attack	215	77	555	78.7
Not First Attack	64	23	96	21.3

The relapses in cases of Melancholia were only slightly more frequent in the hereditary than in the non-hereditary cases. Comparing Table 18. with Table 14. , one would infer that, while hereditary Melancholia is slightly more prone to relapse than the non-hereditary form, hereditary Mania is markedly more liable to relapse .

* loc. cit.

9. The age on first attack in cases of hereditary insanity .

Table 19.

Ages.	Hereditary Cases		Thurnam Cases generally
	No. of cases	Percentage	Percentage
Under 10 years	49	6.4	0.9
10 to 20 years	54	7.1	12.7
20 to 30 years	206	27.1	32.5
30 to 40 years	166	21.8	20.0
40 to 50 years	136	17.9	15.9
50 to 60 years	75	9.8	10.6
60 to 70 years	44	5.9	6.03
70 to 80 years	27	3.5	0.9
80 to 90 years	4	.5	.2

Table 19. shows in decennial periods the ages at which the insanity first appeared in the 761 cases of hereditary insanity that were admitted suffering from their first attack ; for comparison Thurnam's statistics of cases generally* are quoted alongside ; this is not altogether a satisfactory mode of comparison of hereditary with non-hereditary cases, but I am unable to give in a similar fashion the ages at the origin of the attack of all the cases

* "Statistics of the Retreat", page 71.

admitted to this Asylum during the same period of 30 years.

As a more reliable comparison in this respect between hereditary and non-hereditary cases, I again quote the results obtained by me in my analysis of 730 cases of Melancholia :-

Table 20.

Age Periods	10-20	20-30	30-40	40-50	50-60	60-70	70-80	Total
Hereditary Cases	7	49	54	68	63	30	8	279
Percentage Proportions	2.5	17.6	19.4	24.3	22.6	10.7	2.9	100
Non-Hereditary Cases	11	61	107	92	97	66	17	451
Percentage Proportions	2.5	13.5	23.7	20.4	21.5	14.6	3.8	100

These figures show that on the whole the hereditary cases are apt to suffer earlier in life than the non-hereditary ; 20.1 per cent. of the hereditary cases admitted were under 30 years of age when attacked, as compared with 16 per cent. of the non-hereditary ; 13.6 per cent. of the hereditary cases were above 60 years of age when attacked , as compared with 18.4 per cent. of the non-hereditary.

Turning again to the age on first attack in all classes of hereditary cases combined, Table 19. shows that in the hereditarily predisposed the first attack of insanity may set in at any period of life . In the largest proportion

of cases the attack comes on in the third decade(20-30), and the proportion gradually diminishes in each subsequent decade. The high proportion of cases in which the attack came on before the age of 10 years is owing to the cases of Congenital Imbecility being included ; the inherited flaw in such cases must be very great, and therefore it shows itself at an early stage in the individual's life-history.

On the other hand persons hereditarily predisposed to insanity may remain sane during the greater part of their lives and have an attack of insanity late in life .I have made an analysis of 200 consecutive cases of senile insanity admitted into the Cumberland and Westmorland Asylum during 10 years(1886-1896), taking solely those cases in which the first attack of insanity came on after 60 years of age . Hereditary predisposition to insanity was ascertained in 55 of these cases, i.e. in 27.5 per cent. This is a much higher proportion of hereditary cases in senile insanity than that given by Clouston*(13 per cent.), and considerably higher than that given by Bevan Lewis†(22 per cent.). The percentage of hereditary cases ascertained here in all forms of insanity has already been stated as 30.7 per cent. The difficulties in ascertaining particulars about the ancestry

*"Mental Diseases", 4th Ed., p.625. †"Text Book of Mental Diseases", p.409.

of the aged poor are very great, and, were it possible to obtain more accurate information , it would probably be found that the proportion of hereditary to the total cases of insanity occurring in the aged did not fall far short of the corresponding proportion at all ages combined.

An inherited flaw in the organism frequently tends to make its appearance in the descendants at the same period of life as it originally developed in the ancestors. When, from unfavourable combinations of causes, the inherited flaw is gaining in intensity as it passes onwards from generation to generation, the mental breakdown is apt to appear at an earlier age and in a more aggravated form in each succeeding generation, till finally there is reached the stage of congenital imbecility with subsequent extinction of the race. On the other hand, when, owing to the introduction of healthy blood into the stock and also owing to the environment being favourable, the inherited flaw is becoming neutralized, then we frequently find that the attacks of insanity are milder and come on later in life in each new generation, and that at last there comes a generation the members of which remain sane throughout life.

Melancholia, hereditary or otherwise, is more essentially a disease of middle and advanced life than is Mania ; hereditary insanity coming on early in life is more prone to take the form of Mania; in the later stages of life

hereditary insanity is proportionately more liable to be of the melancholic type.

10. The domestic condition of those having hereditary insanity.

Table 21. gives the condition as to marriage of the 1200 cases of hereditary insanity and also of the other cases admitted during the same period.

Table 21.

	Hereditary Cases		Non-Hereditary Cases	
	No. of cases	Percentage	No. of cases	Percentage
Single	616	51.3	1250	46.1
Married	482	40.1	1101	40.7
Widowed	102	8.5	356	13.1

It will be observed that the proportion of unmarried persons is considerably higher in the hereditary, while the proportion of widowed is markedly higher in the non-hereditary, the proportion of married being almost equal in the two series; probably the reason of the difference between the hereditary and the non-hereditary cases in this respect is to be found in the tendency of insanity to come

on at an earlier age in those hereditarily predisposed. Grainger Stewart obtained similar results, but the differences between the two series of cases were less marked.

11. The results of treatment in hereditary insanity.

Table 22.

		Males		Females		Total	
		No. of cases	Percent.	No. of cases	Percent	No. of cases	Percent.
Total	Hereditary Cases	555		645		1200	
Discharged							
	Recovered	294	52.9	345	53.4	639	53.25
	Relieved	61	10.9	66	10.2	127	10.5
	Unimproved	17	3.06	21	3.2	38	3.1
Still under							
	Treatment	70	12.6	59	9.14	129	10.75
	Died	113	20.3	154	23.8	267	22.25

The proportion of recoveries in cases of hereditary insanity is considerably higher than in non-hereditary cases. The general recovery-rate in Garlands Asylum during those 30 years was 44.6 per cent. (males 41.16 per cent., females 48.7 per cent.). The recovery-rate in the hereditary cases is 8.6 per cent. higher than the general recovery-rate; the difference is especially marked in the proportions of

recoveries in the male sex. In my analysis of 730 cases of Melancholia, I found a recovery-rate of 60.2 per cent. in the hereditary as compared with 56.5 per cent. in the non-hereditary. The higher recovery-rate in hereditary insanity is partly, but by no means entirely, due to the higher number of readmissions of cases with hereditary predisposition.

The death-rate is lower in hereditary than in non-hereditary cases. The proportion of deaths calculated on the total admissions during the 30 years was 28.5 per cent., as compared with 22.2 per cent. in the hereditary cases. In the 730 cases of Melancholia, the hereditary cases showed 17.9 per cent. of deaths, the non-hereditary 21.3 per cent.

12. The age at death in cases of hereditary insanity.

The following were , in decennial periods, the ages at death in the 267 cases of hereditary insanity that died in the Asylum, contrasted with the ages at death of all the cases that died in the Asylum during a period of 10 years (1885-1894).

Table 23.

Age Periods	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	Total
No.of deaths in hereditary cases	1	26	54	58	38	47	36	7	267
Percentage	.37	9.7	20.2	21.7	14.2	17.6	13.4	2.6	100
Total deaths (10 years)	4	35	82	94	90	84	86	21	496
Percentage	.8	7.05	16.5	18.9	18.1	16.9	17.3	4.2	100

It will be seen from an examination of the above table that, on the whole, the duration of life in those suffering from hereditary insanity is shorter than it is among the insane generally. In the former class 51.9 per cent. of the deaths occurred before the age of 50, as compared with 43.3 per cent. of the deaths of all classes of cases ; only 16 per cent. of the hereditary cases reached the age of 70 before death, as compared with 21.5 per cent. of cases generally.

13. The causes of death in hereditary insanity.

Table 24.

	Males	Females	Total
Cerebral and spinal diseases	47	39	86
Thoracic diseases	41	72	113
Abdominal diseases	6	9	15
General diseases	19	34	53
Total	113	154	267

Of the deaths due to cerebral and spinal diseases, 39 resulted from General Paralysis, 8 from cerebral haemorrhage, 11 from softening of the brain, and 6 from epilepsy. Phthisis Pulmonalis caused 56 deaths, while other tubercular diseases accounted for 4 more deaths. Tubercular diseases thus caused 22.4 per cent. of the total number of deaths. Out of a total of 1162 deaths in Garlands Asylum during the 30 years from 1865 to 1894, tubercular diseases were the cause of death in 178 instances, i.e. in 15.3 per cent. Of the 1200 cases of hereditary insanity , exactly 5 per cent. died in the Asylum from tubercular diseases; of the total number of admissions of all classes of cases during the same period, 4.6 per cent. died from those diseases.

Persons suffering from hereditary insanity, therefore, appear

to be distinctly more liable to suffer from tubercular disease than are persons suffering from non-hereditary insanity. The other causes of death do not seem to call for any special comment, except the fact that 10 deaths were due to cancer ; these have all been included amongst the deaths due to "general diseases", although in the majority of instances one or more abdominal organs were affected. Cancer thus accounted for 3.7 per cent. of all the deaths. In the same period 45 patients in the Asylum died from cancer, i.e. 3.8 per cent. of the deaths of all classes of cases ; so that the proportions of deaths from cancer amongst cases generally and in hereditary cases are practically identical. Cancer, therefore, does not seem to have any special relation to hereditary insanity, though the number of cases has been rather small to permit of reliable inferences being drawn.

14. The duration of the attack in cases of hereditary insanity that recover.

Table 25.

Length of Residence	Hereditary Cases Recovered		General Recoveries for 10 years(85-94)	
	No.of cases	Percent.	No.of cases	Percent.
Under 1 month	4	.6	13	1.8
1 month & under 3 months	128	20.	170	24.1
3 months & under 6 months	206	32.2	215	30.5
6 months & under 9 months	117	18.3	105	14.9
9 months & under 12 months	60	9.4	50	7.1
1 year & under 2 years	79	12.4	80	11.2
2 years & under 5 years	33	5.1	47	6.7
5 years & under 10 years	9	1.4	20	2.8
10 years & under 15 years	1	.15	3	.4
15 years & under 20 years	2	.3	2	.3

I constructed the above table with the view of ascertaining whether in hereditary cases the attack of insanity is liable to be of longer or of shorter duration than in non-hereditary cases; but a comparison of the two columns does not bring out any very striking differences in this respect. In the hereditary series there is a smaller proportion of very short attacks getting well within three months of coming to the Asylum; on the other hand, during

the next nine months a considerably larger proportion recover of the hereditary cases than of cases generally. Of the hereditary cases that recover 80.5 per cent. do so within a year after admission, as compared with 78.4 per cent. of cases generally.

15. Illustrations of Heredity .

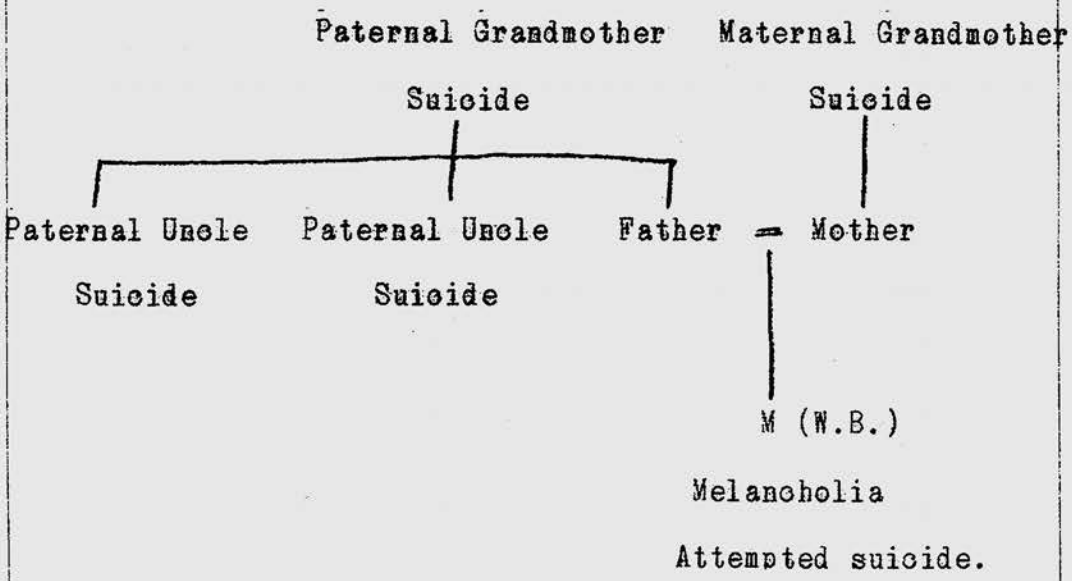
It may prove of interest to quote from the records of Garlands Asylum cases illustrating the hereditary transmission of insanity. During the 36 years that this Asylum has been in existence a considerable number of families have had several of their members in two or more generations under treatment here.

I do not attempt to quote the following examples of the results of heredity in any very definite order.

Where the persons noted have been under treatment in this Asylum initials are given.

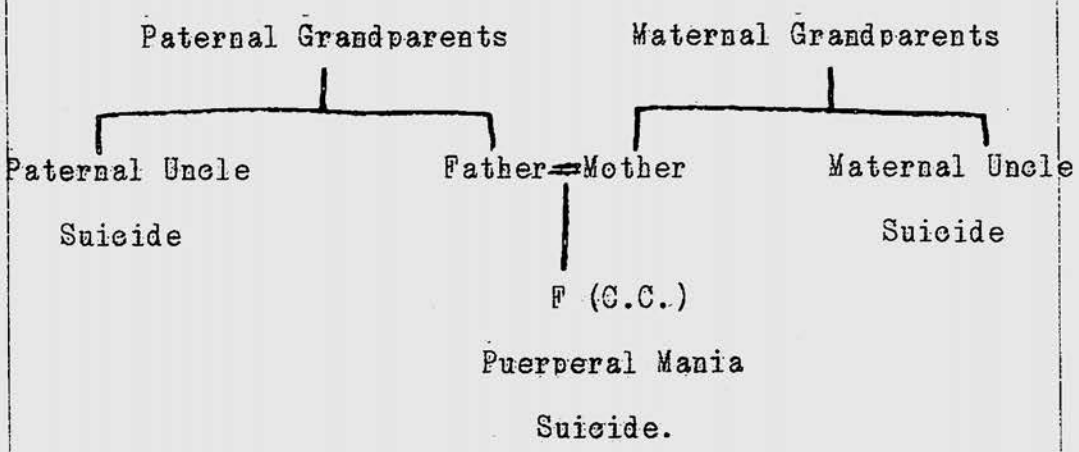
M = male. F = female.

(1).



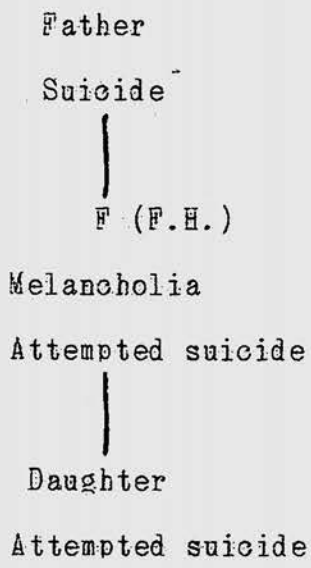
A remarkable illustration of the hereditary nature of suicide ; in this instance it was inherited through both parents. W.B. first suffered from Melancholia and attempted suicide at the age of 20 ; he recovered, but was subsequently readmitted at the age of 33 ; he died within a few months of his second admission to the Asylum, from an epileptiform fit with acute cerebral congestion. No doubt the neuropathic diathesis inherited from both parents was intensified in him and led to his early breakdown.

(2).



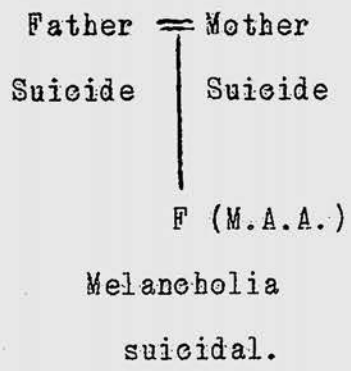
Another instance of the hereditary nature of suicide; in this case, also, derived from both parents.

(3).



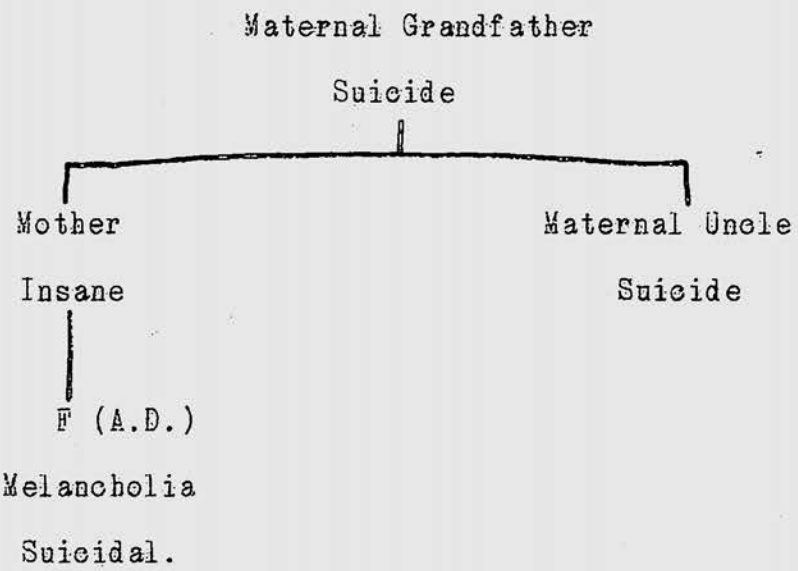
Transmission of suicide in the direct line through three generations.

(4).



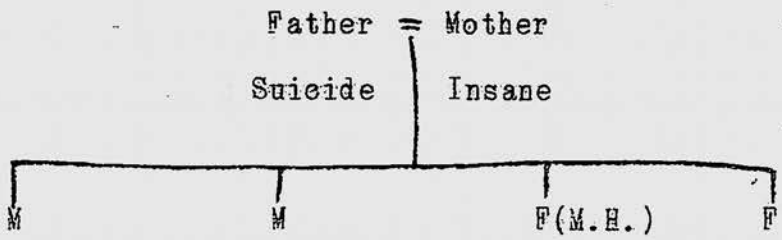
M.A.A. has been twice in this Asylum suffering from Melancholia ; first attack at age of 23, second at age of 27 ; she recovered from both attacks. Her father and mother were cousins, both committed suicide.

(5).



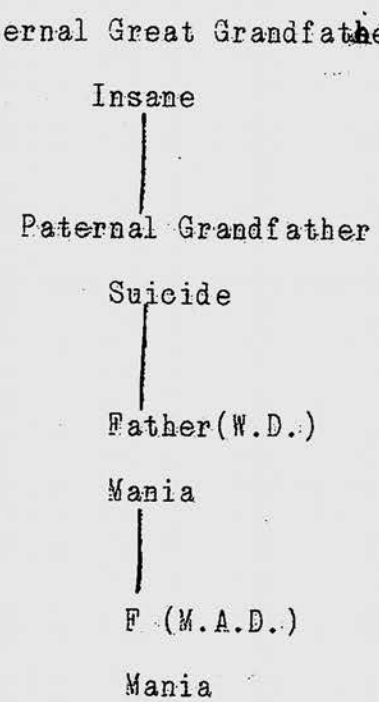
Another illustration of the hereditary nature of suicide.

(6).



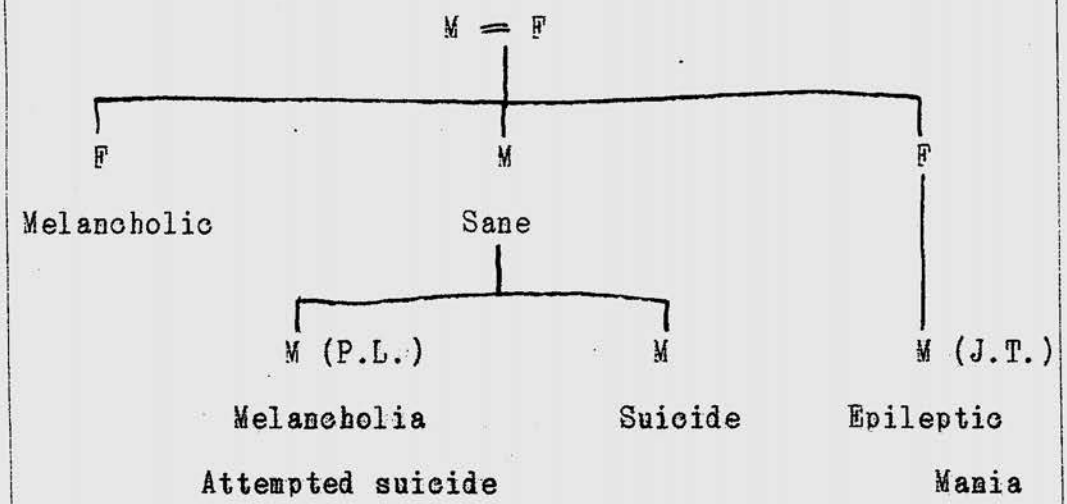
It has been shown (cp. page 16) that the insanity of the father is more liable to be transmitted to the sons and the insanity of the mother to the daughters ; the above genealogical tree shows suicide in father and sons, with insanity in mother and daughters.

(7).



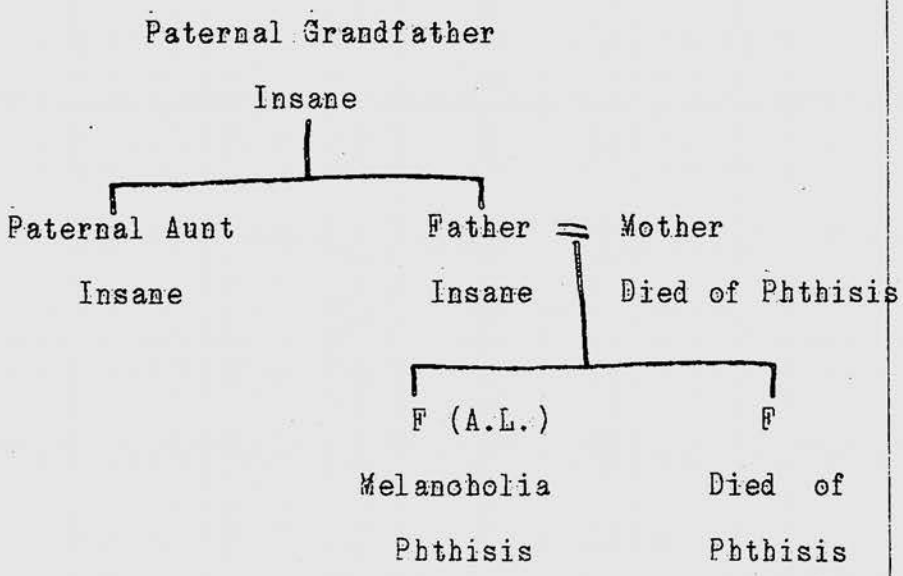
The preceding is an example of direct transmission of a tendency to mental disease through four generations. M.A.D. was admitted at the age of 17, suffering from Mania, with marked erotic tendencies ; her father, W.D., had his first attack of Mania at the age of 25 ; he had three subsequent attacks, from the last of which he has not recovered (after ten years' residence).

(8).



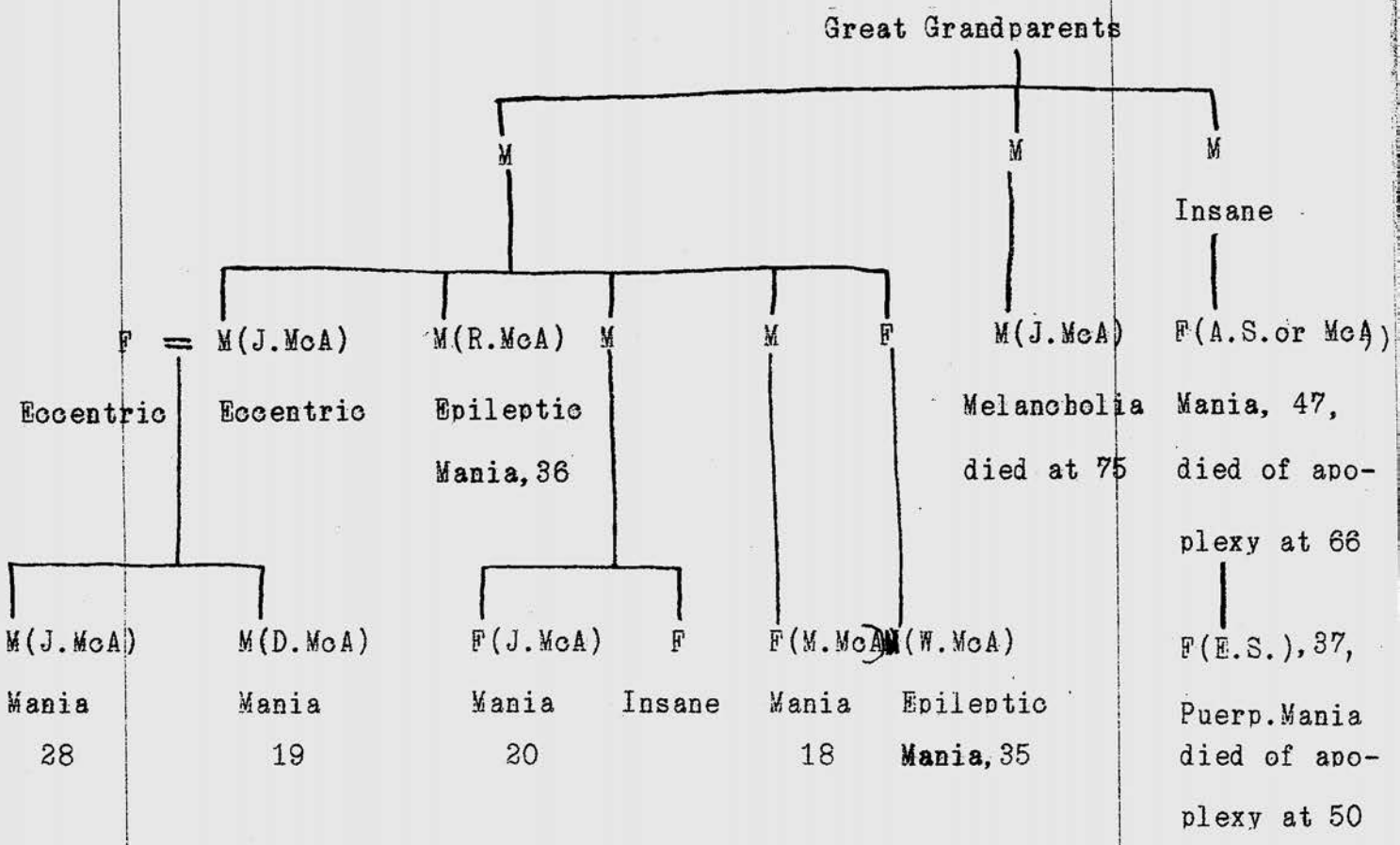
A strong neurotic strain becoming intensified and tending to cause extinction of the family ; two cousins (P.L. and J.T.) both in the Asylum ; P.L. strongly suicidal and probably incurable, J.T. suffering from epileptic mania and gradually becoming more demented.

(9).



An illustration of the evil results of marriage between members of families with hereditary diseases ; on the paternal side a strong history of insanity, on the maternal side Phthisis ; both diseases transmitted to the children.

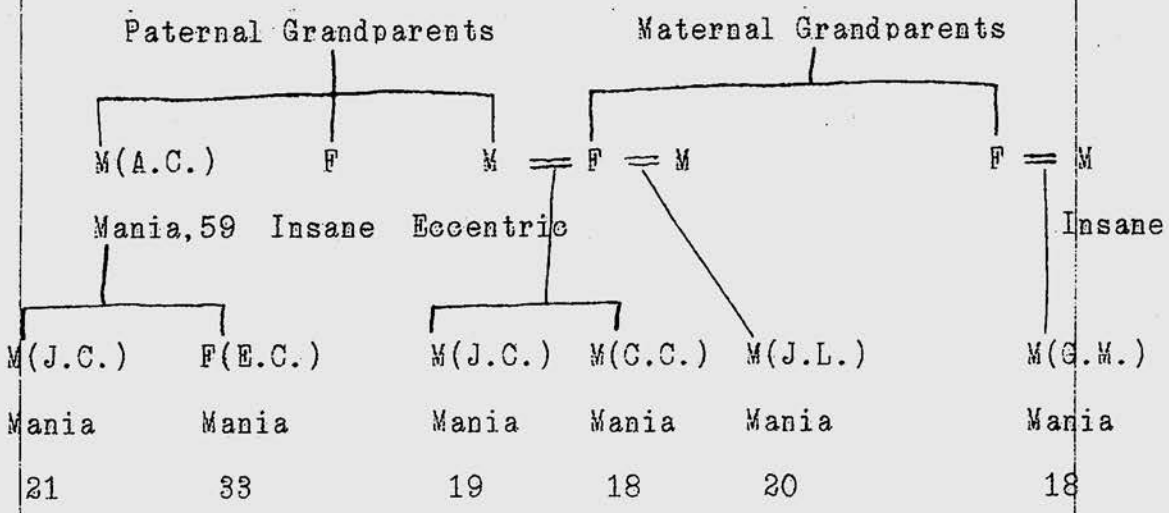
(10).



The genealogical tree of a family, a large number of the members of which have been under care in Garlands Asylum. The hereditary taint, though not ascertained further than two generations back, must have been very strong; seven members of one generation were either insane themselves or had insane progeny. The transmission of epilepsy is to be noted; also the fact that a mother and daughter both died of apoplexy - the mother at 66, the daughter at 50 ; the insanity of the mother first came on at the age of

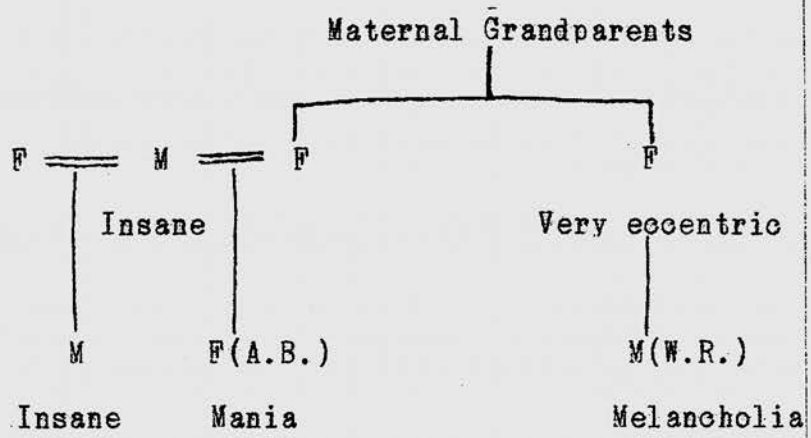
47, that of the daughter at 37 ; this follows the law that, when a hereditary taint is becoming intensified, it tends to appear at an earlier age in each succeeding generation. The ages are given at which the first attack of insanity came on in most of the members of this family.

(11).



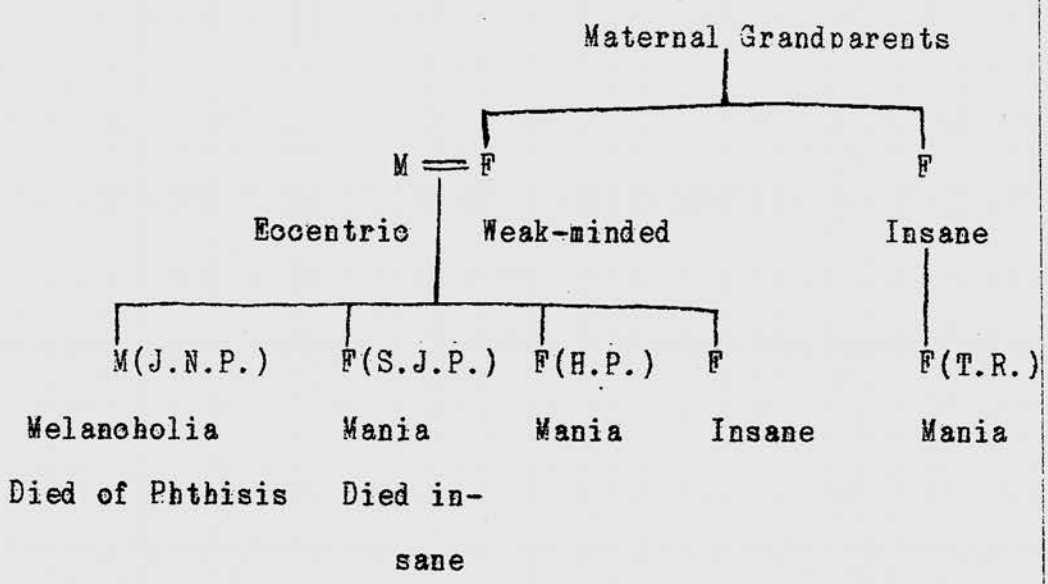
Another family numerous members of which have been under care in Garlands Asylum ; remarkable for the early age at which attacks of hereditary insanity have come on in many members of one generation ; also illustrates the fact of one woman having insane children by two husbands, J.L. is the half-brother of J.C. and C.C.; though no history of predisposition to insanity was ascertained in regard to this woman, it probably existed ; her sister married a man who developed insanity, their son also became insane.

(12).



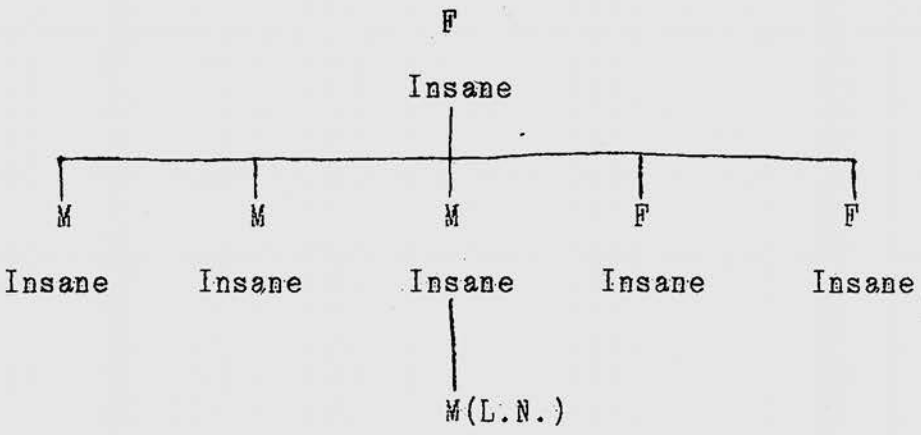
An instance of a man subject to insanity having insane children by two wives.

(13).



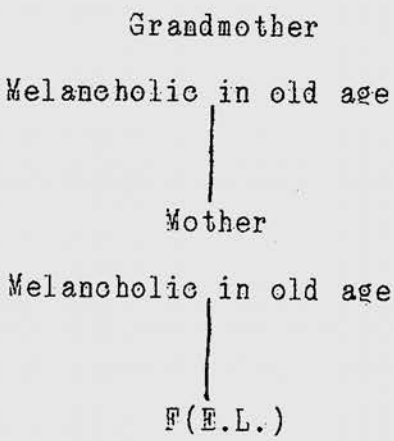
Another very insane family ; there is also a hereditary history of Phthisis, this also reappears(J.N.P.).

(14).



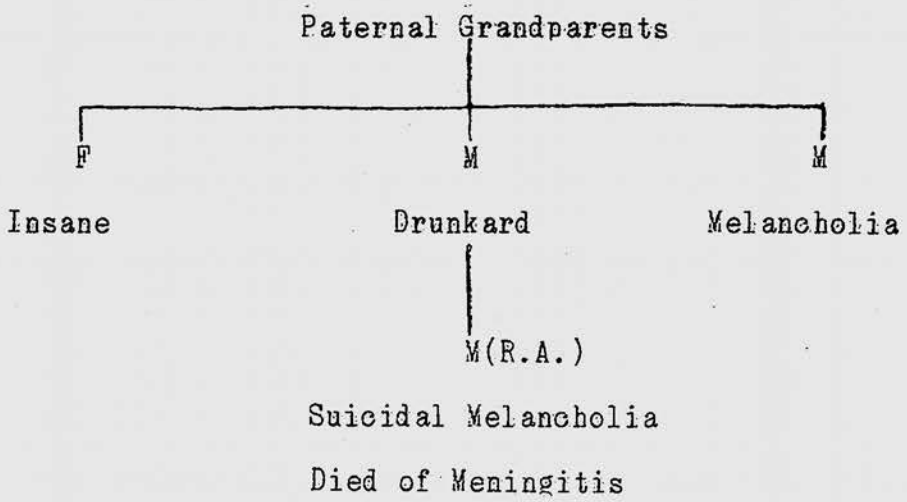
Direct transmission of insanity through several generations, ending in General Paralysis.

(15).



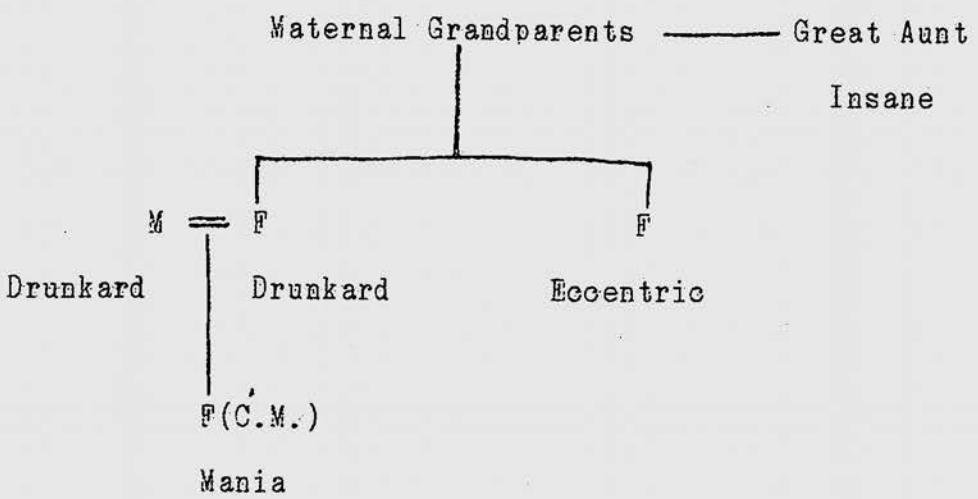
An instance of Melancholia coming on at the same period of life in three successive generations.

(16).



Drunkenness is at once a cause and an effect of race degeneration. Though the father of R.A. was never insane, he came of an insane stock and was a drunkard ; in the next generation the inherited flaw in the constitution reappears as insanity.

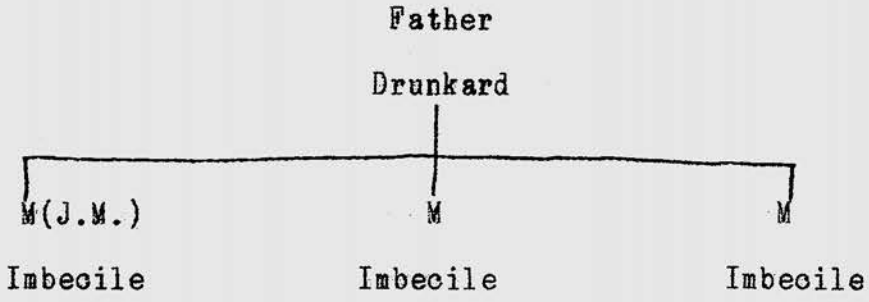
(17).



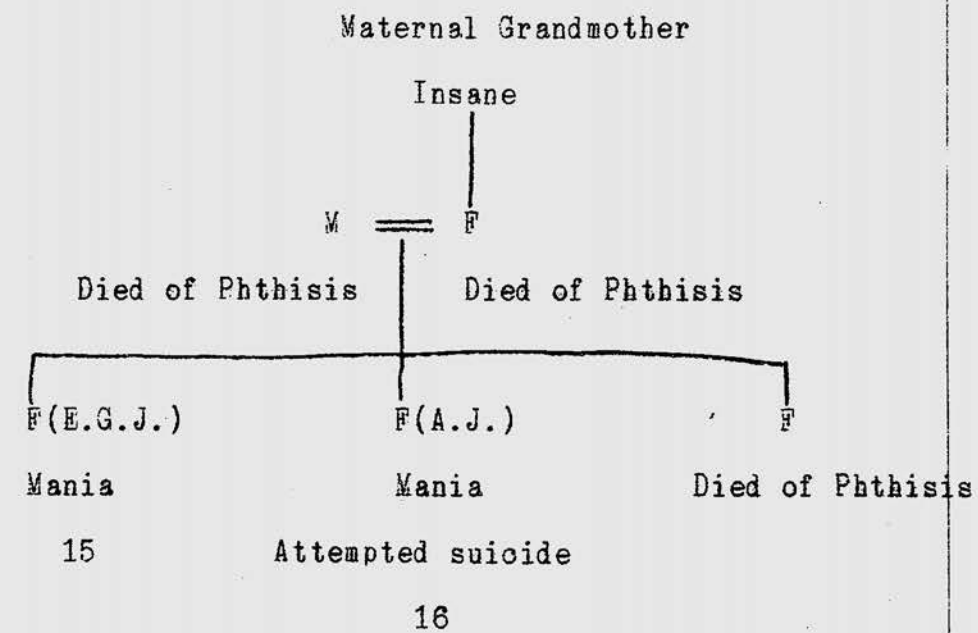
Another instance of the relationship between

drunkenness and insanity.

(18).

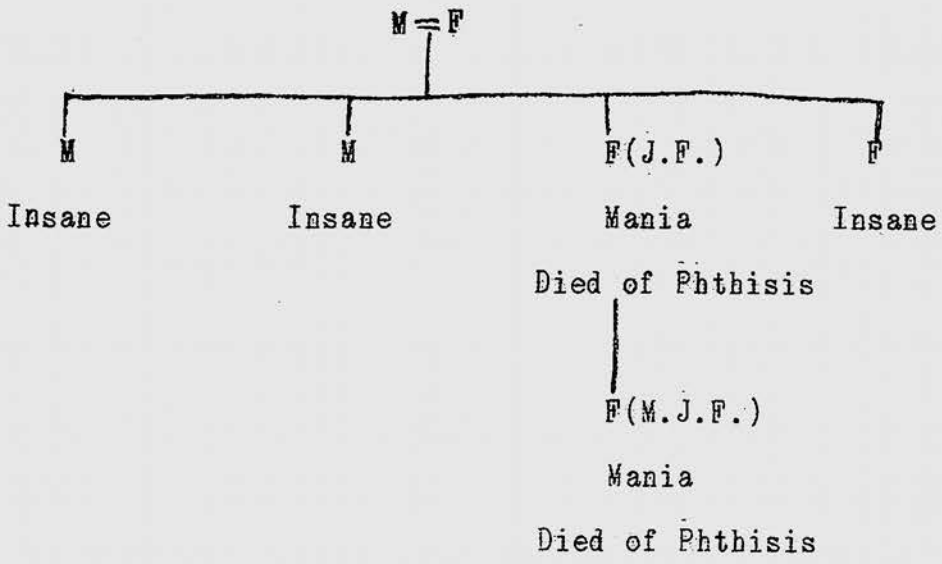


(19).



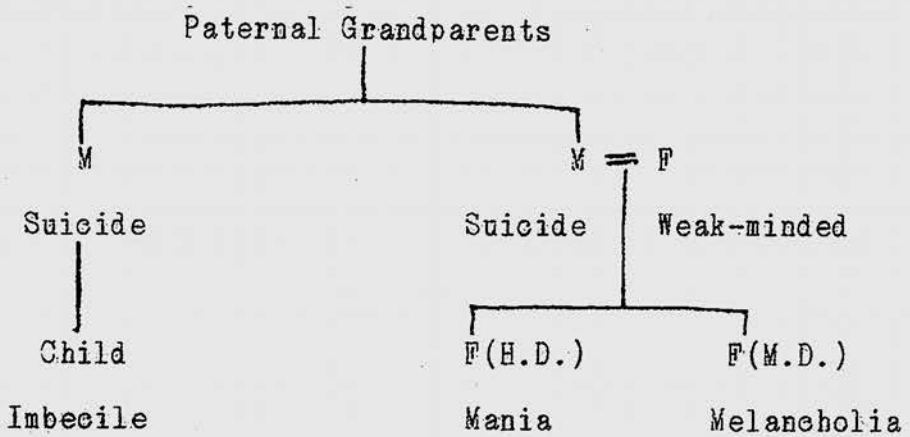
Association of Phthisis and Insanity hereditarily. A.J. and E.G.J. were twin sisters.

(20).



Strong hereditary history both of insanity and phthisis. Another female relative, (degree of relationship not definitely ascertained), a congenital imbecile, died of phthisis in Garlands Asylum.

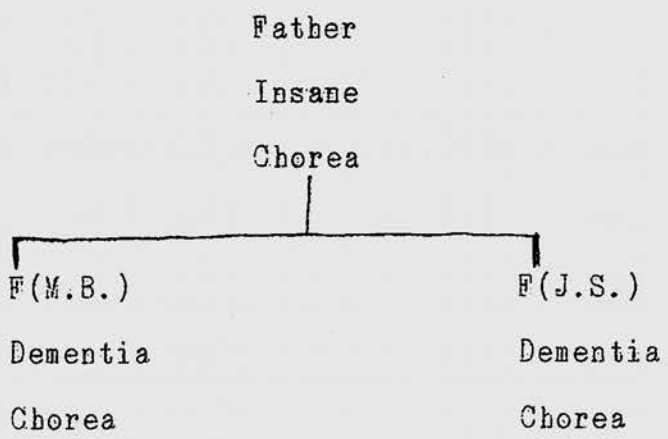
(21).



(21) contd.

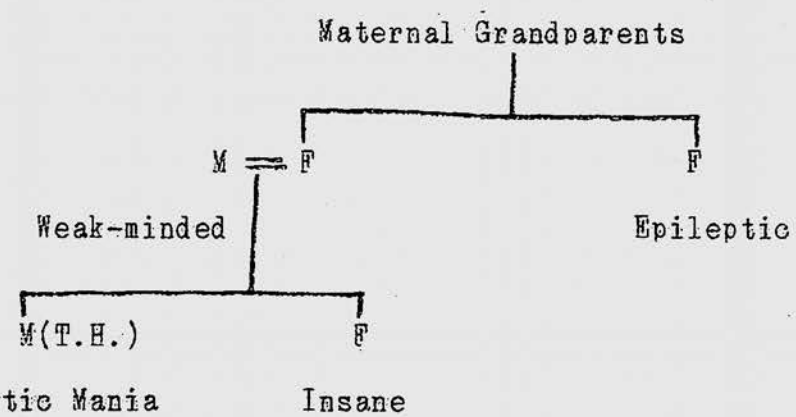
H.D. and M.D., two sisters and the only members of the family, have both been in Garlands Asylum ; they inherit insanity through both parents.

(22).



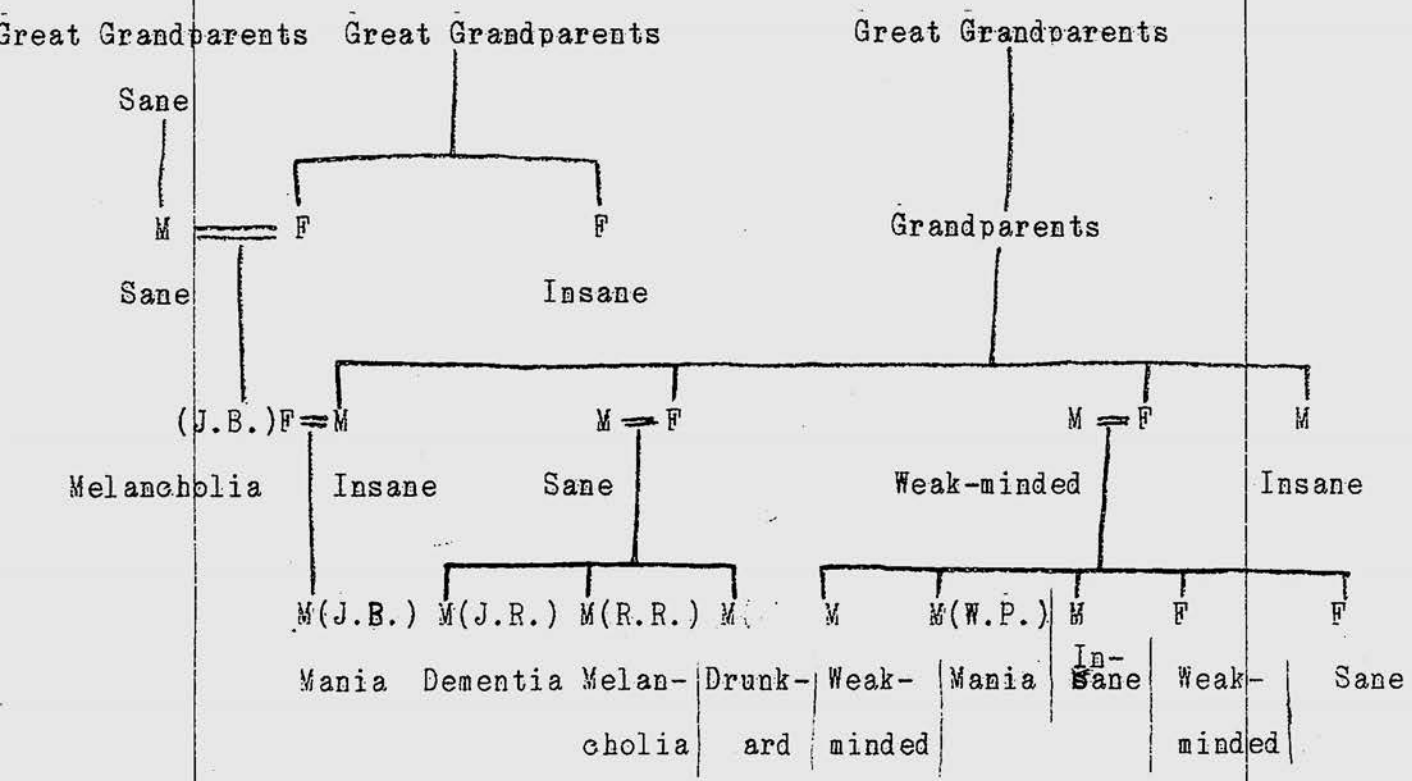
Hereditary insanity and chorea ; in all three cases the insanity and chorea came on in old age.

(23).



Inheritance through both parents; epilepsy from the mother's side.

(24).



A genealogical table showing the tendency of degenerate families to intermarry, and the resulting large numbers of the progeny who become insane.

16. The theories of heredity .

It is foreign to my purpose in this paper to expound the different theories of heredity, my object being merely to set forth facts that have been observed in relation to hereditary insanity. The theory requires only a brief reference.

Weismann's theory is that the germinal protoplasm is immortal and that it passes on unchanged from generation to generation, while the somatic protoplasm is mortal and dies with the individual ; he considers that the whole of the protoplasm of the egg-cell is not required to build up the new being, and that the superfluous part remains unaltered and forms the sexual cells of the new generation. Nussbaum's theory differs somewhat, in that he asserts that the egg at a very early stage divides into two portions, from one of which grows the individual, while the other portion forms the cells for the maintenance of the species, i.e. the sexual cells arise directly from the egg at the beginning of its development. Weismann * has shown that this does not always take place. Hertwig and Strasburger consider that the nucleus of the cell is the material

* cp. "The Biological Problem of To-Day", Hertwig, translated by P.C.Mitchell, page 18.

basis of heredity ; in other words, that "the substance which is the bearer of the hereditary character of a species lies not in the general protoplasm of the ovum and spermatozoon, but in their nuclear matter." *

As a consequence of his theory of the immortality and unchangeable nature of the germ-plasm, Weismann at first totally denied the possibility of the transmission of acquired characters, a doctrine which played so important a part in the Darwinian scheme of evolution ; but he has subsequently modified to a certain extent his views on this point. The results of observation certainly do seem to show that the inheritance of acquired variations does occur. It appears, therefore, reasonable to suppose that changes in the somatic cells induced by external agencies react to a certain extent on the sexual cells; grave changes in the parent body produce similar changes in the germ cells, each of which is supposed to be built up of an infinity of particles corresponding to the various structures composing the living body, and is endowed with the potentiality of being called at a future date into active existence as a member of a new generation. The qualities of the species are handed on unchanged in the germ-plasm from generation to

*loc.cit., page 21.

generation, and it is only strong antagonistic impulses from the cells of the parent body that can overcome those qualities inherited from the distant past, and thereby bring about the transmission of new or acquired characters to the next generation.

Dr Stearns, of the Hartford Retreat, U.S.A., in a paper† read before the British Medical Association at Montreal in 1897, strongly supports the doctrine of the transmission of acquired characters. He points out that modifications in the germ-plasm can be produced by currents or waves of nerve force or energy which are constantly passing to the ovaries (and similarly of course to the male organs) from the brain centres ; there is a very intimate relation between the brain centres and all the organs of the body, and these organs are absolutely dependent on such connection in discharging their function. Darwin assumed that there exist throughout the body infinitesimal lines or threads, by means of which gemmules are conveyed from the different colonies of somatic cells to the germ-plasm, in order to produce such representative modifications as may have occurred from external causes acting on themselves . The theory, however, of this action occurring through the

†"Heredity, a Factor in the Etiology of Insanity", Amer. Journ. of Insanity, Vol. 54.

nervous system seems a more probable one.

Stearns illustrates this point by referring to the effect of an attack of acute insanity in arresting the progress of menstruation, and argues that, if the functional activities of the ovaries can be thus affected by influences such as cold, shock, over-work, long continued exhaustion, imperfect nutrition, etc., which have their effects primarily and directly upon certain elements of the brain, then there is still more reason to anticipate some effect upon the product of that function. Thus, when from an attack of insanity or any other cause the energizing capacity of the cortical cells has become much impaired, there must result a corresponding change in the ovaries and their products, i.e. in the germ cells ; and, on the other hand, when there is increase in the function of the cortical cells, as in persons of vigorous intellect, then it is reasonable to expect that this also will tend to modify the elements which constitute the germ-plasm.

Probably this modifying action of the brain on the germ-plasm is more perfect in some persons or families than in others, hence these persons and families have the power of transmitting in an exceptional degree their characteristics.

Before a new organism is created , the two

forms of germ-plasm (in the ovum and spermatozoon) coalesce, and the more vigorous element of the two tends to impress its characteristics more strongly on the new being ; thus tendencies to disease may become eradicated when the germ-plasm from a very healthy stock combines with the germ-plasm from a tainted stock ; or, on the other hand, when the inherited tendencies to disease in a stock are very strong , these may have a preponderating influence on the future organism.

The offspring tends to inherit all the characters of both parents ; those characters that are common to both parents are transmitted unchanged ; but those characters that are contradictory in the two parents tend to neutralize each other, and it is here that the more vigorous element makes itself felt. The longer the characters have been transmitted in a stock , the more stable do they become and the more are they likely to impress themselves on each succeeding generation ; the more recently acquired the characters, the less liable are they to appear in the offspring when they are in antagonism to more stable characters in the other element of the germ-plasm. When the attributes of the two parents are contradictory, the result may be :- (1) the offspring may show the attributes of either parent solely ; (2) the offspring may exhibit the qualities of one

parent in some respects, and those of the other parent in other respects ; (3) the offspring may exhibit the qualities of one parent at one time of life, and of the other parent at another time of life.*

Though all the attributes inherited by an organism may from the above reasons not be exhibited during its lifetime, still the potentiality of these latent qualities exists in the individual and in his sexual cells, so that in a future generation, when a suitable union with the opposite kind of germ-plasm has taken place, these attributes may reappear , and we have a reversion to an earlier type. Such a reversion is likely to occur when an individual with these latent qualities marries another in whom the same qualities are either latent or patent. This reversion or atavism is frequently seen in connection with hereditary mental disease ; an individual, one or other of whose parents has suffered from insanity, may pass through life without showing any mental breakdown ; he marries a woman with similar heritage or whose sexual elements are not suitable to his, and in one or more of their children the mental disease reappears ; or the tendency may remain latent for several generations and subsequently reappear in another descendant.

*cp. Article "Heredity", by C.Mercier, Tuke's Dictionary of Psychological Medicine, page 583.

As already mentioned, attributes, such as an inherited mental flaw, tend to reappear at the same age in successive generations ; when the flaw is becoming intensified as it passes onwards, it is apt to appear at an earlier age and in a more aggravated form in each new generation ; and, conversely, when the flaw is gradually becoming eliminated, it tends to appear later and later in each new generation, till finally it does not appear at all.

I have also referred to the fact that it is not insanity itself that is transmitted, but an unstable condition of the nervous organization , which does not always exhibit itself in the same form ; insanity may appear for the first time in a family in which there have previously occurred allied nervous disorders, e.g. chorea, epilepsy , spasmodic asthma, etc. The different forms of mental disease are interchangeable ; dipsomania and suicide, as such, are, however, markedly transmissible, and may reappear generation after generation. So, too, the connection of insanity in a family with drunkenness and other vices must not be forgotten.

17. The question of marriage in relation to hereditary insanity.

This subject has been incidentally referred to in the preceding section ; it presents some additional aspects for consideration.

The offspring tends to inherit all the characteristics of both parents ; therefore, in order that healthy children only may be produced, it is necessary in the first place that both parents should be up to the normal standard of health. In addition, however, the sexual elements of the two parents must be suitable to one another ; for, where both the parents are quite healthy, it may happen that they either have no children at all or if they do have children one or more of these may show departures from the normal , this circumstance being due to the two forms of germ-plasm not blending properly to produce a stable organism ; while, to show that the fault lies not in one or other of the sexual elements but rather in their unsuitability to each other, the same woman may bear healthy children to another man and the same man may beget healthy children on another woman.

It is often said that the marriage of persons closely related leads to deterioration of the offspring and is a cause of sterility. Huth argues strongly against the marriage of near kin being a cause of sterility. Statistics

collected by him showed that " the highest degree of barrenness is in marriages between strangers, over twice as great as the barrenness in marriages between first-cousins born from marriages between cousins ! The next highest is between first-cousins once removed. The lowest of all are marriages between persons more distantly related than are second - cousins! The highest average of children is in marriages where there is relationship, but it is not defined, The next in first-cousins once removed. The lowest, in children of first-cousins with no relation ; the lowest but one in marriages between strangers!" *

Huth also arrives at the conclusions "(1) that any deterioration through the marriage of near kin per se, even if there be such a thing in the lower animals, is impossible in man, owing to the slow propagation of the species ; and (2) that any deterioration through the chance accumulation of an idiosyncrasy, though more likely to occur in families where the marriages of blood relations was habitual, practically does not occur oftener than in other marriages, or it would be more easily demonstrated."†

It would thus appear that, provided the stock be healthy, mere relationship of the parents is no bar to their having healthy progeny, but rather gives reasonable

* "The Marriage of Near Kin", A.H.Huth, 2nd Edit., page 195.

† Idem, page 343.

grounds for supposing that their sexual elements will be suitable to one another and that they will run less risk of being childless than in the case of marriages between total strangers.

It is different, however, when there is hereditary disease in the family ; then marriage between relations will probably lead in their children to intensification of the hereditary flaw , and such a marriage should not be entered into.

Many of the country districts of Cumberland and Westmorland have only recently been opened up into free communication with the outside world ; there for generations intermarriage between members of tainted families has been going on to a most unhealthy extent, and as a consequence numerous members of these families have suffered from insanity. In connection with this subject I quote some remarks by Dr J.A.Campbell :-

"To be tied to a limited patch of ground, in perhaps a remote district, and from urgent family reasons to have from generation to generation to labour hard on it, from early youth to old age, without scope for improvement, without stimulus other than the relief of daily necessities, with little or no hope of advancement of position or circumstances - with time and attention necessarily so taken up with the sordid realities of existence, and with little time

or opportunity to meet with fellow-men or women except in one's own very limited area - must have a generally benumbing influence., and prevent mental improvement, if not actually cause mental degeneracy. The natural desire also of increasing a small property by a marriage otherwise unsuitable, perhaps rather repellant to both parties, can well be understood, but the bad results of such unions can scarcely be estimated. I know one district in Cumberland where many small landowners exist, where most of them are nearly related, where several of them are now in the asylum, where many more are mentally defective, and where several families are becoming extinct, apparently the result of intermarriage ; and that the small property question has been a malific influence in this result is to my mind beyond question." *

Putting aside the question of consanguinity, there remains the subject of the marriage of persons with a history of hereditary insanity. It would no doubt be best for the race that individuals with such a history should not marry at all, but I fear it is beyond the bounds of possibility to hope for this. Certainly an individual who

* Presidential Address delivered in the Section of Psychology, British Medical Association, 1896.

has himself (or herself) suffered from an attack of insanity, the tendency to which has been inherited, should not marry; the risks to posterity are too great. A person who inherits the tendency to insanity and who is resolved on marriage should, if possible, select as a partner a member of a healthy family with no predisposition to nervous disease., so as to minimize as far as possible the risks to the progeny. Where there is unsoundness in the families of both the contracting parties, marriage should be absolutely prohibited.

It is an easy matter, however, to formulate these rules, but unfortunately it is practically impossible, as society is at present constituted, to insure that they will be carried out. As Professor Mierzejewsky pointed out in speaking of "Mental and Nervous Diseases in Russia"., "marriages contracted between individuals subject to mental and serious nervous diseases are very dangerous on account of the following circumstances :- (1) such marriages very often occur because of the sympathy and impulses frequently existing between degenerate individuals of both sexes ; (2) besides, such marriages are for the most part very abundant in posterity, and therefore contribute greatly to the contingent of degenerated individuals." *

* Journal of Mental Science, Vol. 34, page 132.

18. Prophylaxis of hereditary insanity.

Medical men are from time to time consulted as to the upbringing of children in one or both of whose parents there has been insanity or an inherited tendency to it. The offspring of such marriages should receive special attention. They should be placed in as healthy an environment as possible, should live much in the open air, should be made to partake largely of fattening foods, and should not be forced to work too hard at school. At the critical periods of life, at puberty, during adolescence, after childbirth, and at the menopause, extra precautions should be taken. If there is a specially critical period ~~in the~~ in the life-history of members of such a family, i.e. if in previous generations or in other members of the family there has been a definite time of life when the attack of insanity has first set in, then such individuals should be particularly careful as to their habits and mode of life when this critical period approaches. They should endeavour to lead well-regulated lives, avoid exciting occupations and arduous brain-work, and whenever they feel at all run down in health they should if possible take a good holiday in the country. Nor should the importance of always having a good night's sleep be forgotten ; whenever such persons begin to pass

sleepless nights, they should for the time discontinue all work and seek complete change of air and scenery. Unhappily it is only the well-to-do who can follow out all these axioms, and even in their case medical men are often only consulted when it is too late and the attack is already in progress. Suitable means must be taken as early as possible to combat the attack either by placing the patient in an Institution or by private treatment. The marriage of such persons should be discouraged ; by marriage extra risks are incurred both for the individuals themselves and for the offspring of the union. Unfortunately, advice on this point is not always asked, and where it is asked the advice given is often only followed if it suits the inclination of the contracting party. If the person has decided on marriage , he will be well advised if he selects as a wife a member of a healthy family without any neurotic tendencies.

It will be a good augury for the future of the race when the State steps in and forbids the marriage of persons who have marked hereditary predisposition to mental and nervous diseases.

Summary.

The principal points brought out in the statistical portion of this paper may now be briefly summarized.

(1). Authorities vary greatly in the estimates they give of the frequency of hereditary predisposition in cases of insanity. In the Cumberland and Westmorland Asylum 30.7 per cent. of all the cases admitted showed a history of previous insanity in the family.

(2). A history of insanity in relatives, whether in the direct line or collateral, may be deemed sufficient evidence of hereditary predisposition. It is not actual insanity that is transmitted, but an inherited flaw in the nervous organization; this may remain latent for one or more generations and subsequently reappear (reversion).

(3). Hereditary predisposition to insanity is strongest when it is inherited through both parents.

(4). The maternal influence is very slightly more potent than the paternal in transmitting the tendency to insanity.

(5). Insanity inherited through the father is slightly more dangerous to the sons than to the daughters; insanity inherited through the mother is markedly more dangerous to the daughters than to the sons.

(6). The female sex is markedly more liable to suffer from hereditary insanity than is the male.

(7). The order of sequence of the different forms of mental disease amongst the cases admitted into the Cumberland and Westmorland Asylum as regards the frequency of hereditary predisposition which they exhibit has been as follows :- 1.Congenital Imbecility, 2.Melancholia, 3.Mania, 4.Epileptic Insanity, 5.Dementia, 6.General Paralysis.

(8). The suicidal impulse is very frequently present in cases of hereditary insanity.

(9). Suicide and Dipsomania have a marked tendency to be transmitted unchanged from one generation to another.

(10). In most cases , however, the form of insanity in the descendants shows great variations from that which occurred in the ancestors, and different members of the same family or generation may exhibit widely different varieties of mental disease or other nervous disorder. Insanity, the tendency to which is inherited, may have been preceded in the family, not by actual insanity, but by other forms of nervous disease.

(11). In successive generations the propensity to mental disease may become gradually intensified ; finally a state of amentia or dementia is produced, with a tendency to bring about extinction of the family. On the other hand the the tendency to mental disease may become gradually eliminated in the course of generations.

(12). The origin of hereditary neurosis in a family can sometimes be traced to alcoholic excess in the ancestors.

(13). Hereditary predisposition to insanity in a family is frequently associated with the tubercular diathesis.

(14). The exciting causes of attacks of insanity seem on the whole to be of much the same nature in the hereditarily predisposed as in those without predisposition.

(15). Hereditary insanity is specially prone to show itself at critical periods of life ; thus puerperal insanity is proportionately more frequent in the hereditarily predisposed than in those without predisposition.

(16). Relapses are more frequent in cases of hereditary insanity than in non-hereditary cases.

(17). Hereditary cases are apt to suffer somewhat earlier in life than non-hereditary cases.

(18). Attacks of hereditary insanity may come on at any period of life. Even in senile insanity the proportion of hereditary cases does not fall very far short of the proportion existing in cases at all ages combined.

(19). Hereditary insanity frequently makes its appearance at about the same period of life in successive generations. When the taint is becoming intensified it tends to make its appearance at an earlier age in each succeeding generation ; and, conversely, when the taint is becoming eliminated, it tends to appear later in life in each

succeeding generation.

(20). The proportion of unmarried persons is considerably higher amongst those suffering from hereditary insanity than amongst those without predisposition.

(21). The recovery-rate in hereditary cases of insanity is considerably higher than in non-hereditary cases.

(22). The death-rate is lower in hereditary than in non-hereditary cases.

(23). The duration of life is somewhat shorter in those suffering from hereditary insanity than it is in the insane generally.

(24). A larger proportion of deaths occurs from tubercular diseases in cases of hereditary insanity than in non-hereditary cases.

(25). The duration of the attack of insanity in hereditary cases that recover does not seem to differ very much from that in non-hereditary cases.

Though this paper has in many respects followed the lines of previous investigations, still an examination of such a large series of cases in this method must yield results of value and must add to the sum total of our knowledge.

The laws of heredity, and the evil results that follow neglect of their teachings, cannot be too strongly reiterated. It is to be hoped that before long the day may come when the people themselves will sufficiently realize the dangers that are incurred for posterity by the marriage of persons with marked hereditary tendencies to mental and nervous disease. Till that day arrives, or till the State prohibits by law such unions, it must be the duty of medical men to inculcate these views on the minds of the public, to discourage unsuitable marriages, and, where children are born with neurotic heritage, to minimize as much as possible, by a healthy environment and a thoroughly regulated mode of life, the liability of such progeny to attacks of mental disease.