A Lecture ON SANITY AND INSANITY.

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BY

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*The President, His Grace the Duke of Northumberland,
in the Chair.*

INTRODUCTION.

WHEN your Secretary did me the honour of asking me to give the annual lecture to the Royal Sanitary Institute, I chose the subject of "Sanity and Insanity" for two reasons: firstly, because the alarming increase of cost to the ratepayer for the maintenance and housing of the insane, together with the prospective cost of segregation and maintenance of the feeble-minded, has during recent years aroused public opinion regarding insanity and its prevention in a way that purely altruistic feelings for suffering humanity could not have done. Secondly and mainly, because in my capacity as pathologist to the London County Asylums I have been engaged for many years past in the study of the causes of insanity, and my exceptional experience of the subject may be of interest as well as of practical value.

I am continually asked whether insanity is not greatly on the increase. Before answering such a question, it is as well to know exactly what constitutes insanity at the present time. It is often difficult to draw the line between sanity and insanity. It may, however, be asserted that a person is insane who by virtue of mental defect or mental disorder no longer feels, thinks, or acts in conformity with the usages and customs of the society in which he lives. An individual is judged to be sane or insane by his conduct, but behaviour by itself, without consideration of the social environment, is an insufficient criterion. Thus, the behaviour of a person of the upper classes which is in correspondence with the customs and social usages of the lowest classes would be regarded as insane, or, to say the least, eccentric. Again, a person of the lowest classes who impersonated, or who attempted to impersonate, the customs and social usages of the upper classes would in all probability be a lunatic or a criminal. He would be regarded as a lunatic if, owing to a loss of the auto-critical faculty, he did not know the quality of his acts. The knowledge of the quality of his acts is the legal phraseology employed in the cases of crime and responsibility, but lunatics may know the quality of their acts, and it is often difficult to decide whether a man is so far sane as to be responsible for his actions. Signs and symptoms of early insanity which might be unnoticeable or even disregarded by a legal expert mean a great deal to a medical expert—for example, in cases of crime committed by general paralytics in the early predemential stage: the unequal, irregular pupils, inactive to light; the presence of lymphocytes in the cerebro-spinal fluid, together with the characteristic biochemical reaction indicative of antecedent syphilis, can only be discovered and their meaning appreciated by the medical expert, who from the presence of these signs is able to assert with confidence that there is organic disease of the central nervous system, and therefore, however sane the man may appear, he is in all probability not responsible for his actions.

More difficult to decide is the question of crime and responsibility in those cases of anomalous epilepsy in which psychic equivalents take the place of convulsive seizures, for they are apt to be attended by criminal impulsive acts; being of the nature of automatism, the "quality of the acts" is in such cases not known, neither is there recollection of them. In the intervals the individuals so affected may be perfectly sane and responsible for their actions; therefore great difficulties can arise regarding responsibility and crime in such cases, and it is no wonder that difference of expert opinion is usually obtainable in

such cases, likewise, and for the same reasons, in cases of periodic or recurrent insanity. In systematized delusional insanity fixed ideas of persecution may lead to criminal acts, notably homicide, as in the case of the murderer of the actor Terriss. He meant to kill Terriss when opportunity offered; a supposed injury, magnified by continual introspection, impelled him to an act of vengeance. The question arises, Was he sane enough to be responsible for his acts and therefore deserving of capital punishment? "In fact, can we assume that a man, having an insane delusion, has the power to feel, think, and act in regard to it reasonably, so that at the time of the offence he ought to have and to exercise the knowledge and self-control which a sane man would have and exercise?" (Maudsley). In the true insanities there are no physical signs indicative of a disease of the brain, as in general paralysis; nor should we by examination of the cerebro-spinal fluid during life or of the brain after death be able to recognize any morbid change which could be associated with the mental disorder; consequently we can only appreciate whether an individual was sane enough to be responsible for his actions by a full consideration of what the man was born with—his inheritance, nature—and what has happened since birth—his nurture. The existence of epilepsy or insanity in the ancestral stocks would assist in forming a judgement, for, as I hope to prove, a *neuropathic heredity is the most important cause of insanity*. Again, if there was proof that he had auditory hallucinations, his insanity could not be contested, for of all the symptoms of mental disorder the "hearing of voices" is the most frequently met with. Yet, if hearing of voices and seeing visions in days gone by had been sufficient grounds for segregation, what would have been the effect on progress and civilization? At all periods in the history of civilization we find that new religions, social progress, or scientific discoveries, which led to the sudden or gradual overthrow of established customs, usages, and traditions, were regarded as either works of the devil, of wicked men, or of madmen.

Nietzsche, who himself became mad, pleads thus for the benefit of madness in his work, *The Dawn of Day*:

It was insanity almost everywhere that paved the way for new thought and cast off the spell of an old custom and superstition. Indeed, history shows that men of earlier ages were far more inclined to believe that wherever traces of insanity showed themselves a certain proportion of genius and wisdom was likewise present.

All the greatest benefits of Greece have sprung from madness, said Plato, setting on record the opinion of the entire ancient world. Let us take a step further. All those superior men who felt themselves urged on to throw off the yoke of some morality or other had no other resource, if they were not really mad, than to feign madness or actually to become insane. And this holds good for innovators in every department of life, and not only in religion and politics. Even the reformer of the poetic metre was found to justify himself by means of madness. Almost all the eminent men of antiquity have given themselves up to this dreadful mode of reasoning and secret doctrine of artifice, and dietic jugglery grew up around this subject and was handed down from generation to generation, together with the feeling of the innocence and sanctity of such plans and meditations. The means of becoming a medicine man among the Indians, a saint among Christians of the Middle Ages, an Angkok among Greenlanders, a Pagee among Brazilians, are the same in essence. Senseless fasting, continual abstinence from sexual intercourse, isolation in a wilderness, ascending a mountain or a pillar, sitting upon an aged willow that looks out upon a lake and thinking of nothing but what gives rise to ecstasy and mental derangement.

That eminently sane and great philosopher, Galton, remarks:

Great men may be even indebted to touches of madness for their greatness, the idea by which they are haunted and to whose pursuit they devote themselves and by which they rise to eminence having much in common with the monomania of insanity.

Striking instances of great visionaries may be mentioned who had almost beyond doubt those very nervous seizures with which the tendency to hallucinations is entirely connected. Indeed, it is remarkable how large a part in history and epochs of national life the visionary temperament has played. Martin Luther, Mahomet, and Emanuel Swedenborg were all visionaries, and the extraordinary genius of the last-named, after a hundred years have elapsed, has now been recognized. But times have changed, and it is not fashionable now as in ancient times to see visions and hear voices, for it might be considered clear proof of insanity; yet a number of healthy people exist who see visions, but they keep quiet, because in our

TABLE I.—Comparative Statistics for London and other Large Towns.

Town.	In County and Borough Asylums, Registered Hospitals, and Licensed Houses.	In Metropolitan District Asylums.	In Workhouses.		Residing with Relatives and Others.	Total.			Per 1,000 Estimated Population.
			Number.	Percentage to Total.		Males.	Females.	Total.	
London (Administrative County)	19,563	6,844	250	0.9	165	11,966	14,856	26,822	5.5
Birmingham	1,669	—	146	8.0	17	930	902	1,832	3.3
Bradford	566	—	201	25.9	10	400	377	777	2.6
Bristol	875	—	538	35.1	122	673	862	1,535	4.1
Cardiff	652	—	25	3.1	118	390	405	795	4.1
Croydon	439	—	34	7.2	1	193	281	474	2.9
Hull	589	—	37	5.7	28	297	357	654	2.4
Leeds	1,115	—	171	12.9	37	669	654	1,324	2.7
Leicester	678	—	58	7.6	28	356	408	764	3.1
Liverpool	2,817	—	356	11.2	19	1,410	1,782	3,192	4.2
Manchester	1,751	—	578	21.7	7	1,137	1,199	2,336	3.6
Newcastle	836	—	2	0.2	13	488	363	851	3.0
Nottingham	808	—	206	18.4	103	519	598	1,117	4.2
Salford	668	—	254	27.5	3	501	424	925	3.8
Sheffield	1,018	—	253	18.9	65	650	686	1,336	2.8
West Ham	998	—	32	3.0	25	475	580	1,055	3.3

matter-of-fact days it is not considered correct; but should it become popular to see visions, a human faculty which has always been existent would again be evoked and made manifest, and as of old without safeguards would tend to run into extravagant, eccentric, and insane conduct.

Dryden was quite right, therefore, when he said that

Great wits are sure to madness near allied,
And thin partitions do their bounds divide.

Still, as Maudsley and Clouston point out, it is the inborn tendency to a variation from the normal ordinary individual in which the association especially occurs. Thus, "great wits" are not always allied in essential kind to madness, but they are both apt to occur in the same families and stocks.

NON-REGISTERED INSANITY.

There are two very numerous classes of individuals whose conduct is anti-social and who are at present not registered or controlled. They are, first, the chronic incurable inebriate, dangerous to himself and society and responsible for a large proportion of the crimes of violence, consequently a perpetual danger to the community. Secondly, the higher-grade imbecile of feeble will power, slender sagacity and energy, and lack of moral sense. These latter form a large proportion of the chronic inebriates who are on the black list; a daily quantity of alcohol which taken by a normal individual produces no irresponsibility is sufficient to make them disorderly, drunk and incapable, and a menace to society in many ways. Again, the feeble-minded swell the ranks of criminals, and especially are they found among the unemployed, because unemployable; again, many imbecile women not having sufficient intelligence or desire to earn an honest living, lead immoral lives and have numerous illegitimate children. The great army of prostitutes for the same reason is partly recruited from feeble-minded women. Although the feeble-minded may be met with in all grades of society, they are especially to be found among the submerged denizens of the one-roomed tenements of our large cities. Unlike the more intense forms of mental deficiency, these defectives are fertile and procreate; seeing that "like tends to beget like," it will be a good thing for society when they are registered, and those who are unfit for social privileges are segregated in early life. The sooner the truth of the adage that "a silk purse cannot be made from a sow's ear" is recognized the better—seeing that every child in a defective school

costs the ratepayer three times as much as a healthy child, and the results are in no way commensurate with the cost.

Now the feeble-minded are more numerous than is generally supposed, for a special investigation made by the Royal Commission on the Feeble-minded in England and Wales disclosed the fact that 4.6 per 1,000 of the total population, or 0.46 per cent. of mental defectives, were not at present registered; they are therefore even more numerous than the registered insane. It has been calculated that if the same percentage holds good for the population of London with its 4,522,961 inhabitants, there would be 20,805 unregistered mental defectives. Now the accompanying table (Table I) and curves (Fig. 1) show that the proportion of registered lunatics in London, is considerably higher than in England and Wales.

Fig. 1.

The above diagram (Fig. 1) is taken from vol. xxi of the "London Statistics." It shows the number of pauper lunatics and all lunatics per 1,000 of the population on January 1st, of each of the years 1890-1910, in London as compared with England and Wales.

This marked difference in the percentage may be due to the fact that in London a larger proportion of the mentally defective are registered than in England and Wales, and therefore there are fewer of the feeble-minded at large; or it may be that the causes which make the registered cases of lunacy higher in London than in England and Wales make the unregistered feeble-minded proportionally more numerous. But no investigation has been made to show that there is a proportional increased ratio of feeble-minded to the general population in London as compared

with the total population of England and Wales. Compared with other cities and towns London is unusually high in its percentage of registered insanity (Table I), but this may be due to the more ample provision for accommodation of registered lunatics.

REGISTERED INSANITY IN LONDON.

The registered insanity in London is 5.5 per 1,000 of the total population, and naturally there is a widespread belief that insanity is greatly on the increase. Let us inquire what are the causes of this great increase of registered insanity. Permit me first to call your attention to this chart which shows how it has increased in London while

Fig. 2.

the population has remained almost stationary; you will observe that up to two years ago there was a marked and steady increase of pauperism; then you observe there was a drop coincident with old age pensions, but you will notice that there is no corresponding drop in the curve of registered insanity; it has steadily risen during the last few years. Yet it is my opinion that this great increase of insanity is *more apparent than real* and for the following three reasons:

I.

The Standard of Sanity Raised.

Firstly, the standard of sanity has been raised; a great number of harmless idiots and weak-minded persons who formerly were allowed to roam at large are now gathered into asylums. Collective responsibility has replaced family responsibility, and the humane treatment and improved housing of the insane, with all the legal penalties attached to any cruelty, have removed the objections the public had to put away an insane relative or friend; consequently a very much larger proportion of persons are admitted to asylums and registered as insane than formerly. The following facts in support of this argument may be mentioned regarding registered insanity in the county of London.

Within the last fifteen years the asylum accommodation provided by the London County Council has been doubled; as the population of London has not increased to any great extent during this period of time, it may be assumed that this accommodation was necessitated either by inadequate accommodation previously or was necessary on account of an increase of registrable insanity. If now we look into the reports of the Asylums Committee we

find that in 1910 it is stated that over 99 per cent. of London's certified lunatics were at that time housed in the London County Asylums; prior to this many had to be boarded out or kept in the infirmaries. Correlated with the provision of adequate accommodation by the authorities, the necessity of discharging patients to make room for urgent admissions has steadily diminished in recent years; and probably this practically explains the fact that the number of patients discharged as recovered shows a constant and continuous diminution of numbers. In an admirable report by the Clerk of the Asylums, to which I am indebted for very much of this statistical information, it is stated that, out of the large mass of registered lunacy, only 2.39 per cent., according to the medical superintendents, have a favourable prospect of recovery, 5.42 per cent. are doubtful, and 92.19 per cent. are unfavourable.

II.

Declining Death-Rate of Registered Lunatics.

Secondly, an important cause of the increase of registered insane is that the death-rate in recent years does not approach anything like the high level of earlier years of London County Council management—for example, 1890–1897—and I attribute this in great measure to the diminution of deaths from dysentery, tuberculosis, pneumonia, septic and other microbial infective diseases. There is, in consequence, a tendency to silt up the asylums with chronic incurable cases. That this is so is shown by the fact that at the present time nearly one-half of the inmates of the London County Council Asylums have been resident more than ten years. Again, at the end of 1910 no less than 4,238 patients known to have been insane for more than twenty years were in the London asylums; moreover, such long-standing cases have been accumulating during the last four years at rates varying from 125 to 200 per annum.

III.

Registered Insanity in Aged Persons.

The third cause of the increase of registered insanity rests with those who certify paupers. The degree of mental unsoundness necessitating asylum treatment depends largely upon the provision obtainable for nursing and taking care of incipient cases of insanity and aged persons who are suffering from senile decay.

In the report of the Asylums Committee, 1910, p. 110, it is stated that as many as 4,762, or 23 per cent., of the inmates of the London County Council Asylums were suffering from dementia, senile and secondary; this indicates that a number of these aged persons who were formerly treated in the infirmaries are now sent to the asylums, where they can be better cared for.

Mr. Noel Humphry, I.S.O., in a valuable paper read before the Royal Statistical Society, argues that there is no proof of the existence of an actual increase of insanity in England and Wales, and he concludes, on the evidence of several interesting tables drawn from the statistics in the annual reports of the Lunacy Commissioners, the London Asylums Committee, and the Metropolitan Asylums Board, and from the census returns, that the increase is apparent rather than real for the same reasons that I have given regarding registered London lunacy.

These curves, showing the relationship of registered lunacy, pauperism, and population in the county of London, demonstrate a stationary population with an enormous increase of registered lunacy, and it might naturally be supposed that this was clear proof of the increase of insanity in the population of London; but this increase is correlated with the increase of housing accommodation. Nevertheless, there is truth in the opinion expressed by Sir George Savage, in his Lumleian lectures, 1907, that "there is a steady increase in the number of insane, and that this increase shows a definite relationship to the progress of civilization." At a first glance it might be supposed that the rise of pauperism as shown in the curve (Fig. 2) bore some relation to this increase, but recent years show a marked drop coincident with the granting of old age pensions; nevertheless, this drop in pauperism is not attended by a fall in insanity, for the registered insanity curve steadily rises. I do not think, however, we can expect old age pensions to have any appreciable effect on the admission of the aged insane paupers to asylums, because the conditions of dwellings are so different in cities to rural districts.

Mr. Burns was reported recently to have stated that 70 per cent. of the vagrants of this country were at one time of the year in London; probably a number of such vagrants are mental defectives; moreover, lunatics or potential insane persons are liable to become stranded in London. The pauper population undoubtedly contributes a much larger ratio of lunatics to the public asylums than the non-pauper population. For a glance at Table II shows not only how variable is the percentage for the different boroughs of the county of London, but how much higher a percentage

TABLE II.—A Return showing the Ratio per 1,000 of all Pauper Lunatics chargeable to Unions and Parishes in the County of London on January 1st, 1910, to the Estimated Population in April, 1909.

Union or Parish.	Estimated Population. (April 6th, 1909.)	Total Pauper Lunatics—that is, those in London and other County Asylums, in Licensed Houses, in Imbecile Asylums, in Work-houses, and with Relatives and Friends. (January 1st, 1910).	Ratio per 1,000 of Population.
Hampstead	88,728	231	2.6
Lewisham	185,184	513	2.8
Wandsworth	500,444	1,718	3.5
Fulham	158,208	586	3.7
Paddington	145,251	555	3.8
Hammersmith	121,701	485	4.0
Woolwich	146,700	591	4.0
Islington	336,983	1,448	4.3
Greenwich	194,549	884	4.5
St. George's Union ...	121,618	612	5.2
Kensington	185,360	982	5.3
Camberwell	270,059	1,436	5.3
Mean ratio	—	—	5.61
Lambeth	310,239	1,730	5.7
Bethnal Green	128,720	769	6.0
Hackney	273,023	1,672	6.1
Poplar	167,146	1,035	6.2
St. George-in-the-East ...	47,288	301	6.4
Mile-End Old Town (Hamlet of)	110,104	715	6.5
St. Marylebone	125,336	817	6.5
Chelsea	71,292	469	6.6
Stepney	55,076	366	6.6
Berrondsey	128,735	916	7.1
Shoreditch	116,680	837	7.2
St. Pancras	228,394	1,808	7.9
Westminster	32,321	262	8.1
Southwark	198,431	1,671	8.4
Holborn	127,856	*1,102	8.6
St. Giles and St. George...	28,067	258	9.2
Whitechapel	73,416	701	9.5
Strand	18,161	220	12.7
County	—	561	—
Total	4,698,070	26,377	5.61

* Including one female chargeable to the Borough of Holborn (formerly charged to Gray's Inn).

there is in boroughs with a poor population. You will be struck by the relative low percentage of Hampstead 2.6 per 1,000, Lewisham 2.8, Wandsworth 3.5; whereas we find in St. Pancras 7.9 per 1,000, Westminster 8.1, St. Giles in the Fields and Bloomsbury 9.2, Strand 12.7. The explanation of the high percentage of these latter (excepting the Strand) is that the pauper population is largely composed of the denizens of one-roomed tenements, and in districts

where we should, owing to improvements and the pulling down of slum property, expect a diminution of pauperism and insanity, there is no decrease, and in many instances an increase. Owing to better and cheaper means of locomotion, an increasing number of the better classes and more desirable members of the lower classes have migrated to the suburbs, the result being that in many boroughs large houses which were formerly occupied by one family are now converted into flats and one-roomed tenements accommodating a number of separate families, generally very poor. Woolwich has a relatively low percentage (4.6), and this is probably explained by the fact that the majority of the householders, although poor, are skilled artisans in comparatively continuous employment, whereas at Stepney (6.6), Poplar (6.2), and St. George's (6.4), the casual labourer predominates.

It would probably be found that those parishes which had a high lunacy rate would have also relatively a high pauper rate, a high infant mortality, and a proportionally higher death-rate from tuberculosis. This would be an interesting and important correlation to establish.

This Royal Sanitary Institute preaches and teaches that the first duty of the State is the prevention of disease; failing that the cure, and failing that the prolonging of life and relief of suffering. At present, as regards insanity, the authorities spend vast sums of money in prolonging life and relieving suffering, which is commendable altruistic utilitarianism up to a certain point. Eastern nations, following the precepts of the ancients, regard lunatics as holy men, and leave them to shift for themselves; some authorities in Great Britain, judging from the lavish expenditure on estates and buildings for the maintenance of lunatics, sometimes regard them as priceless possessions. Some years ago, in an editorial in the *Lancet*, it was remarked that brains, as well as bricks, were required in dealing with this increase of insanity by way of prevention. If it can be shown that there is a correlation between insanity, tuberculosis, alcoholism, syphilis, and overcrowding in one-roomed tenements and insanitary dwellings of our large cities, it might be asked whether public money would not be better expended in attempting to solve the housing question than in expending vast sums on sanatoriums and lunatic asylums in the hope of dealing with physical and mental degeneracy. We hear much at present of the necessity of the adoption of social surgery, but before such a proceeding can come within the range of practical politics many vital questions will have to be answered. We require a much more thorough and extensive knowledge of human genetics and of the social problems underlying the production of the unfit in all classes. The establishment of a social service, as is contemplated at the mental hospital of the State of Massachusetts in Boston, is on the right lines, as it is recognized that the whole matter demands most careful consideration, and not hasty rhetoric and generalization; for if the feeble-minded were sterilized it is probable they would be in many instances made more fitting subjects for segregation; for it would not improve their energy or their sagacity and ability to earn an honest livelihood, and the moral sense would be deteriorated in many cases. Our first duty, in the hope of prevention, is the scientific study of the causes of insanity. This has not been altogether so barren as some people suppose, for one of the greatest advances medicine has ever made was the discovery of the organism of syphilis by the biologist Schaudinn; this led to experiments of the greatest value, and one outcome was a biochemical test whereby the syphilitic virus can be detected in the body even when there are no obvious symptoms. This test enables us not only to detect the active virus, but those late manifestations of syphilis, locomotor ataxy, and general paralysis of the insane. Moreover, it confirms the view I have always maintained of the syphilitic origin of general paralysis.

A sufficient time has not yet elapsed to show whether the widespread use of the new drug, "606," introduced by Ehrlich after a long series of carefully contrived experiments, may not diminish the number of cases of this terrible fatal disease—general paralysis of the insane—and of locomotor ataxy, which is the same pathological change, affecting a different part of the nervous system.

If there were time I could give logical arguments in favour of this hypothesis, but I must be content with saying that since we now know the cause of 20 per cent. of the

deaths in the London County Asylums is due to general paralysis, therefore one very important preventable cause has been discovered. Not only is it important as regards numbers afflicted by this terrible malady, but it is important because the sufferers from this disease are drawn from all grades of society, and as a rule are of civic worth; the same cannot be said of the feeble-minded.

We might add another 5 to 10 per cent. of cases of brain disease dying in asylums with softening of the brain due directly or indirectly to syphilis. In congenital syphilis it is appalling to think what a number of feeble-minded adults there would be from this cause did it not happen that when the syphilitic organism invades the brain it is fatal in the great majority of cases. The congenital syphilitic offspring of diseased parents as a rule die before birth or in early infancy. Still, the biochemical test that I have referred to shows that a considerable percentage of the feeble-minded may owe their defect to this preventable cause.

NEUROPATHIC INHERITANCE.

Three years ago I initiated a card system of relatives who are at present, or have been discharged from, or have died in, the London County Asylums. The ball once set rolling has grown to enormous dimensions, and I have at present considerably over 3,000 cards, most of them belonging to persons closely related in the direct line. There are at the present time about 1,000 closely-related persons inmates of the London County Asylums—namely, 5 per cent. of the total population. *A priori* this is a strong argument in favour of the importance of heredity as a cause of insanity, for it cannot be supposed that if we took 20,000 people from the 4,522,961 inhabitants of London for some random cause we should find 5 per cent. of them closely related.

TABLE III.—Statistics of 3,042 Related Cases in the London County Asylums.

	Dis- charged.	Trans- ferred.	Died.	Resident.	Total.
Males ...	256 19.2 %	60 4.5 %	392 29.4 %	626 46.9 %	1,334
Females ...	353 20.6 %	59 3.4 %	389 22.8 %	907 53.1 %	1,708
Total males and females	609 20.0 %	119 3.9 %	781 25.6 %	1,533 50.4 %	3,042

The above table shows the proportion of males to females; the latter are much more numerous; it will be observed that owing to a lower death-rate of the females, they tend to accumulate. This is no doubt due to the fact that general paralytic males are three times as numerous as females, whereas other non-fatal forms of insanity are much commoner in females. It will be observed that of the 3,042 relatives who are at present or have been in the London asylums 1,533 still remain resident, a little more than half. I shall have occasion later to refer at length to some important deductions made from the age incidence of the first attack of insanity in these insane relatives.

NATURE AND NURTURE.

No child is born insane, though it may be born feeble-minded either from actual organic disease or inborn germinal cerebral deficiency. The former being an acquired character is not heritable, a fact of very considerable importance in diagnosis and segregation with the view of prevention of transmission of feeble-mindedness.

We should endeavour to study every case of nervous or mental disease as a biological problem, ascertaining as far as possible what the individual was born with, ancestral inheritance (Nature); what happened during development after conception (congenital); finally, what happened at or after birth (nurture). The collection of statistics and pedigrees merely relating to the question of certifiable insanity or epileptic fits is quite inadequate for scientific purposes, as the *neuropathic predisposition* manifests itself in many ways; and it is necessary to seek the first stages and less obvious conditions of degeneration in a stock. Morel, who studied this question more than fifty years ago, pointed out that nervous irritable weakness, the

neurotic temperament, neurasthenic predisposition, may be the first evidence of degeneration of a stock. The inborn morbid neurotic temperament may be manifested in a variety of ways by the behaviour and conduct observed in various members of the stock. The signs of degeneracy which may be exhibited are self-centred narrow-mindedness in religious beliefs, fanaticism, mysticism, spiritism, an unwholesome contempt for traditional customs, social usages, and morality, a vain spirit of spurious art and culture, a false self-loving vanity in the pursuit of a sentimental altruism, or by eccentricities of all kinds; such signs of degeneracy are often combined with talent and even genius, especially of the constructive imaginative order; but the brilliant intellectual qualities of a degenerate are invariably associated with either a lack of moral sense or of sound judgement and highest control. Time, chance, circumstances, and opportunities play an especially important part in moulding and determining the career of the members of a neurotic stock; circumstances and environment may favour one member and he rises on the tide of fortune to an eminent position, whereas another, unfortunate or less fortunate, but with a similar inborn temperament, dies in an asylum or commits suicide in despair. How often may it be observed that an apparently sound stock may in reality be unsound. Successful men in the eyes of the world may be really degenerates; not infrequently so-called self-made men form the first step in the process of degeneration. The selfishness and meanness or the cunning, avarice, and moral guile by which they have succeeded in selfishly amassing a huge fortune for their children to spend selfishly is the first evidence of degeneracy; but whereas the parents to gratify their selfish desires succeeded by work and abstemiousness, the children, possessing the same selfish instinct with no need to work, and supplied with abundant wealth, acquire vicious habits and criminal propensities and not infrequently terminate their careers in the madhouse or prison.

I have often found in the collecting of pedigrees the association of insanity and suicide in a stock preceded by, or associated with, the existence of individuals possessing the melancholic, suspicious, brooding, self-centred, hypochondriacal temperament; and it is not uncommon for suicide of one or more members of the stock in successive generations to occur. Associated with these temperamental evidences of degeneracy of a stock may be chronic alcoholism, dipsomania, hysteria, hypochondriasis, exophthalmic goitre, neurasthenia, psychasthenia, migraine, *petit mal*, or neuroses of an epileptic character, often unrecognized because not manifesting fits of the major form of the disease. In searching for the neuropathic tendency there are, therefore, many possibilities of missing the inborn factor of a neurosis or psychosis though a careful inquiry be made, even when aided by intelligent co-operation on the part of the friends.

I have not yet mentioned alcoholic intemperance and the habit of drug-taking so common in degenerates of all kinds; the habit may be the cause or the result of the degeneracy. I am of opinion that such causes as alcoholism, infective diseases, autointoxications, physical injury, especially head injuries and shocks, emotional shocks, sexual excesses and perversions, are too often wrongly assigned as the *sole* cause of nervous and mental disease to the neglect of the *inborn* factor. That they are powerful exciting causes there can be no question. In diseases of the mind there are two factors—namely, the soil and the seed, the inborn and the acquired environmental. There are individuals born of sound stocks that no acquired conditions—for example, drink, poisons engendered within the body or taken from without, head injuries, emotional shock, distress, and even profound misery and destitution, separately or even all combined—can render insane. There are others, and these are generally from a neuropathic stock, whose mental equilibrium may be upset by any one of these exciting causes, or very frequently, as my further observations will show, without any apparent cause, except it be by a disturbance of the normal physiological conditions of the sexual functions in adolescence, pregnancy, and the involutional or climacteric period. The profound psychical influence of the sexual glands by reason of their internal secretions during the period of ripening of the germ cells is beyond

all dispute, and the repression of the instinct of propagation, attendant mental dejection, or excitation is a powerful exciting cause of mental or nervous disorders. The preservation of the individual and the preservation of the species form the basis of the desires in which our actions are rooted, or as Schiller poetically expresses it:

Durch Hunger und durch Liebe
Erhält sich die Welt-
getriebe.

At the involutional or climacteric period, when the sexual functions wane and cease and the *joie de vivre* is no more, the stimulus ceases, and with it a general biochemical change in the body which has a profound psychical influence especially noticeable in females. As I shall show you later, the great numerical incidence of the true insanities is during adolescence, 15 to 25, and the involutional period 45 to 55.

Bateson, in his interesting Herbert Spencer Lecture, "Biological Fact and the Structure of Society," thus quotes from Spencer's *Study of Sociology*, written in 1873: "If any one denies that children bear likenesses to their progenitors in character and capacity, if he holds that men whose parents and grandparents were habitual criminals have tendencies as good as those whose parents and grandparents were industrious and upright, he may consistently hold that it matters not from what families in a society the successive generations descend. He may think it just as well if the most active and capable, and prudent and conscientious people die without issue; while many children are left by the reckless and dishonest. But whoever does not express so insane a proposition must admit that social arrangements which retard the multiplication of the mentally best and facilitate the multiplication of the mentally worst must be extremely injurious."

Bateson remarks: "In the period when these words were written practically nothing was known of heredity." But there are signs, as Bateson says, that the civilized world is at length awakening to the fact that the knowledge needed for the right direction of social progress must be gained by biological observations and experiments.

I have been able to make some deductions which I regard

as important from a sociological point of view from a study of data concerning 3,000 odd relatives, who are or who have been in the London County Asylums, to some of which I will now briefly direct your attention.

It is acknowledged that the value of statistical inquiries depends fundamentally upon the reliability of the data, and a sufficient number of instances to enable conclusions to be drawn. In respect to certain facts there can be little doubt concerning the reliability of the data as to the insane relatives in the London County Asylums — namely, sex, age, date of admission, date of discharge, date of death, and in the vast majority of cases the age of the patient at the first attack. Hence, taking into consideration the large number of cases dealt with, it is legitimate to draw certain conclusions from these data.

Maudsley, in his philosophical work

on the *Pathology of Mind*, says:

There appears to be at work a silent tendency in Nature to restore an insane stock to a sound type if regeneration be possible, or to end it if its degeneration be such that it is too bad to mend.

This conclusion, which he arrived at from a wide experience and knowledge combined with philosophical deduction, seems to be proved by the facts which I shall now briefly bring to your notice.

If we ask ourselves how Nature could best accomplish the mending of a degenerate stock, the obvious answer would be to cause a coalescence* or aggregation of the unsound germinal determinants into a few of the offspring leaving the germ plasm of the others more or less free. This would not only purify the stock by concentration in one or two offspring, but would lead to intensification of the disease tendency and the occurrence of the disease at an earlier

age. The occurrence of the disease at an earlier age was termed by Darwin "anticipation" or "antedating"; hitherto it has only been shown to occur in

* A discussion of the application of the chromosome theory and a number of illustrative pedigrees showing anticipation will be found in my Presidential Address of the Neurological Section of the Royal Society of Medicine; also in an original article, "The Inborn Factors of Neuroses and Mental Disease," *Brain*, Parts II and III, vol. 34.

Fig. 3. CURVES SHOWING ANTE-DATING.

Fig. 3 represents diagrammatically the age incidence of first attack in father and offspring. The first peak in the curve of the parent is due to the incidence of a larger number of cases of general paralysis in the male as compared with the female at this age period. It would be much more marked were it not for the fact that the cases of general paralysis among relatives are not numerous comparatively with other forms of insanity. This is as we should expect, for it is an acquired disease, and heredity plays a far less important part in its etiology than in the true insanities. It will be observed that the parent curves, male and female, attain their maximum in the involutional period. There is an obvious difference in the male and female parent curves. There is a greater incidence of insane mothers under 30 than fathers; this is due to puerperal cases, of which there were a fair number. These figures (3 and 4) are constructed upon the data contained in Table IV. The abscissae represent the age periods and the ordinates the percentages of cases whose ages at the time of first attack is given.

Fig. 4.

Fig. 5.

Fig. 5 shows the curves of uncles and aunts and nephews and nieces constructed from the percentages in Table VII. Fig. 6 shows the curves of uncles and aunts and nephews and nieces, including those cases where one of the parents was also insane, so that there is direct and collateral heredity. It will be observed that there is a considerable difference in the offspring curves. When there is only collateral heredity there are a far larger number of offspring in which the first attack occurred in the later periods of life. There is antedating, but it is not nearly so marked as is shown in Fig. 6; nor is it nearly so marked as in parents and offspring, Figs. 3 and 4. These figures are constructed from the data contained in Table VII.

Fig. 6.

diabetes, tuberculosis, and certain eye diseases. My observations show that there is a signal tendency for the insane offspring of insane parents to be born imbeciles or become insane at a much earlier age than the parent, and to suffer with a more intense form of mental disorder. I have not yet any precise data, but I should think 1 in 4 or 5 of the offspring of an insane parent on an average become insane. The effect of this intensification and antedating of the insanity upon the offspring affected would be to unfit them for the struggle for existence and propagation, therefore of begetting their like. Moreover, I have found that the form of insanity of the insane offspring of insane parents is especially a primary incurable and progressive dementia occurring in adolescence (dementia praecox), and the most frequent cause of death in these cases is tuberculosis. In putting forward this coalescence theory of unsound germinal determinants, I may mention, in support thereof, a statement made by Galton in his great work, *Natural Inheritance*:

In the process of transmission by inheritance elements derived from the same ancestor are apt to appear in large groups just as if they had *clung together in the pre-embryonic stage*, as perhaps they did.

Before referring to the statistical results I would like to call your attention to the fact that I began this study of relatives in the asylums rather more than three years ago with a view of ascertaining if the convoluted pattern of the brain formed by the fissures showed a resemblance in relatives, as everybody knows the physiognomy does. No two brains are alike, any more than two faces, but there is close family resemblance. I will show on the screen a photograph of the brains of a mother and daughter. The mother became insane at the age of 45, just after the birth of the daughter, who became insane at the age of 16, and a brother at the age of 23 shot himself. Dr. Edgar Schuster has undertaken for me the investigation of the pattern of the brains in relatives; he has made a careful examination of the fissures of the brains of this couple and shown that there are many and marked similarities. He has also examined the brains of two brothers, and they again show marked resemblances in the convoluted pattern; still there are many differences, which, of course, we should expect, as these two brothers were not twins. But if there is a close morphological resemblance of the organ of mind, it is reasonable to suppose there is a corresponding close functional relationship, for there is from an evolutionary point of view a certain relationship between the fissures and cerebral localization of function.

STATISTICAL DATA RELATING TO INHERITANCE AND INSANITY. ESPECIALLY IN RELATION TO ANTICIPATION.

Six months ago data referring to 508 pairs of parent and offspring had been collected from the records of 464 insane parents whose 500 insane offspring have been also resident in the London County Asylums, and in these the age of the first attack has been ascertained.

Direct Heredity.

The following table is compiled from 217 pairs of father

TABLE IV.

Age Periods.	Father.	Offspring.	Mother.	Offspring.
Under 20 years	1.4	26.2	0.6	27.8
20-24	0.4	18.0	3.4	15.7
25-29	1.4	18.0	4.4	18.2
30-34	9.6	13.0	7.8	13.4
35-39	11.5	7.3	9.2	10.0
40-44	9.2	6.4	10.3	5.8
45-49	14.3	6.0	12.0	3.7
50-54	17.5	0.9	12.3	2.4
55-59	13.8	3.7	14.0	1.7
60-64	10.1	—	11.6	1.3
65-69	5.0	—	8.8	—
70-74	4.6	0.4	3.1	—
75-79	0.4	—	1.3	—
80	0.4	—	0.6	—

and offspring and 291 pairs of mother and offspring. The figures denote the percentage of cases whose first attack occurred within the given age periods.

The above Table IV is shown graphically in the two figures 3 and 4 (p. 1058); the abscissae represent the age periods, and the ordinates the percentage of cases whose age at the time of first attack is given.

Investigating the ages at the time of the first attack in the insane offspring of insane parents, I find in the following pairs that 239, or 47.8 per cent., out of 500 offspring had their first attack at or before the age of 25 years:

TABLE V.

Mother—son	...	51 out of 118 offspring,
Mother—daughter	...	81 " 170 "
Father—son	...	45 " 90 "
Father—daughter	...	62 " 122 "
Total	...	239 out of 500 offspring. = 47.8 per cent.

If a table is constructed to show the average age at the time of first attack in the parent and offspring it will be found, as the subjoined table shows, that a difference of practically twenty years exists between the average age of first attack in parent and offspring.

TABLE VI.

	Average Age.	
	Parent.	Offspring.
120 pairs, mother—daughter	49.7	29.3
67 " mother—son	50.2	30.7
76 " father—daughter	50.1	30.4
51 " father—son	51.9	33.1
79 parents, 133 offspring in families with more than 2 insane	47.7	28.7
Total: 393 parents, 427 offspring	49.7	30.0

I have not, however, included in this Table VI seventy-one parents (whose average age was 49 years at the time of first attack) who were associated with imbecile offspring mentally defective at birth.

Lastly, I find that in 299, or 58.8 per cent., of the 508 pairs of insane parent and offspring, the first attack in the offspring occurred at an age twenty or more years earlier than in the parent; of these 299 instances seventy-three of the offspring were imbeciles.

Collateral Heredity.

The subjoined Table VII is compiled from 193 pairs of uncles and aunts, with nieces and nephews in which only collateral heredity is manifested, and 231 pairs of uncles

TABLE VII.

Age Periods.	Collateral Only.		Collateral and Direct.	
	Uncle or Aunt.	Niece or Nephew.	Uncle or Aunt.	Niece or Nephew.
Under 20 years	5.2	20.7	5.2	25.5
20-24	3.1	19.2	3.4	17.7
25-29	6.2	18.6	7.8	19.0
30-34	12.9	17.1	14.3	15.1
35-39	11.9	12.4	12.1	11.2
40-44	11.3	5.7	10.4	4.3
45-49	12.4	2.1	12.1	2.6
50-54	14.5	2.1	12.1	1.7
55-59	7.7	1.5	8.6	2.1
60-64	8.8	—	8.2	—
65-69	1.5	0.5	1.7	0.4
70-74	1.0	—	1.3	—
75-79	3.1	—	2.6	—
80	—	—	—	—

and aunts with nieces or nephews, in which are included those instances where one or both parents of the nieces and nephews are also insane. The figures denote the percentage of cases whose first attack occurred within the given age periods.

The results of the above Table VII are shown graphically in Figs. 5 and 6 (p. 1058); the abscissae represent the age periods, and the ordinates the percentage of cases whose age at the time of first attack falls within the given periods.

Of the insane nieces and nephews of insane uncles and aunts, 103 out of 208, or 49.5 per cent., had their first attack at or before the age of 25 years.

Uncle—nephew or niece	...	51 out of 93
Aunt—nephew or niece ...	...	52 „ 115
Total ...	...	103 out of 208
		= 49.5 per cent.

Finally, curves of parents, male and female, and offspring have been constructed by taking as abscissae the numbers of cases (instead of percentages) of parents and offspring and the age-periods as ordinates; the result is shown in Fig. 7. It will be observed that the parents and offspring curves represent a blending of the two curves of Figs 3 and 4.

Fig. 7.—Parents and offspring curves, showing antedating.

Permit me to point out that this signal tendency of insane offspring to suffer with a more intense form of the disease and at an early age, as shown in the above figures and tables, is of great importance for the following reasons: First, it is one of Nature's methods of ending or mending a degenerate stock; secondly, it is of importance to the physician, for he can say that there is a diminishing risk of the child of an insane parent becoming insane after he has passed 25, a matter of great importance in the question of marriage; thirdly, it is of importance in connexion with the subject of social surgery of the insane, for when the first attack of insanity occurs in the parent the children for the most part have all been born, as these tables and curves show. Sterilization would therefore be applicable in relatively few parents admitted to asylums.

In conclusion, I should like to call attention to the fact that the importance of the study of mental diseases in this country has within recent years received an impetus in several directions. First, the universities have just

commenced to grant diplomas in psychological medicine. Impressed by the great value the D.P.H. had proved in the advancement of public health, I advocated five years ago the establishment of a similar diploma for psychological medicine, in the preface of the *Archives of Neurology*, vol. iii, and I interviewed some of the heads of the profession, but, like many other innovations, it received a plentiful douche of cold water. Secondly, Dr. Henry Maudsley four years ago most generously offered £30,000 to the London County Council if they would build a hospital with pathological laboratory attached for the treatment and study of acute curable cases of insanity. This was accepted; the site has now been obtained, and the plans for this hospital have been recently sent to the Commissioners. In connexion with this, I may mention that a hospital for acute cases has recently been built in Baltimore, and the State of Massachusetts has built a hospital for acute mental diseases in Boston. Thirdly, the Royal Society of Medicine has established a Section of Psychiatry, which should do much to stimulate in this country the scientific study of mental diseases.

The Royal Sanitary Institute, I am sure, will recognize the great importance of these movements and approve of them and all others which aim at encouraging the scientific study of the causes, individual and social, of mental defects and disorders and their inheritance, for by this way alone can we hope to promote the relief of the present and the protection of future generations. And if we should feel despondent and listen to the cries of racial degeneracy, we can reflect upon the magnificent heroism displayed in the recent terrible *Titanic* disaster, which shows that the same spirit of calm resolution, devotion to duty, and unselfishness in the hour of supreme danger and death that was shown fifty years ago at the foundering of the *Birkenhead* still remains with us as an inborn character in all classes of our Anglo-Saxon race.

A Post-Graduate Lecture ON COMA AND ITS DIFFERENTIAL DIAGNOSIS.

BY
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CHARING CROSS AND EVELINA HOSPITALS.

I.

GIVEN a comatose patient, perhaps a stranger and, for the time being at any rate, with no friend to tell his history, how is his state to be diagnosed? The situation, though familiar to us all, can never abate its claim on our serious attention. For these patients often die, and yet, at best, our diagnostic insight is not always keen enough to pierce the obscurity of their symptoms; and sometimes, in addition, we discern across their couch the shadow of legal complications. Not, however, that the cases mostly lie near the boundary of our resources. On the contrary, the majority fall well within it, and the difficulty presents itself rather in the fact that now and again we are at a loss to recognize the patient who is dying from him, for example, whose cure can safely be left to nature within the four walls of a police cell.

However, the whole subject is too important to allow any of its clinical forms, even the simplest, to be passed over, though, by putting aside all cases of such merely fleeting insensibility as fainting, I shall restrict myself to those in which, defining them roughly, the unconsciousness is not transitory and is generally profound. The clinical picture I wish to paint is that of a patient rapidly bereft of his senses, except, perhaps, of pain, with no power of voluntary movement, and unable, whatever the provocation, to respond by blinking, swallowing, or coughing. The condition is common enough, and its causes spread over a pretty wide field. Let us begin by arranging them, not in any anatomical or even pathological order, but with the everyday, and therefore to this extent most important, varieties in the front.

In the foreground of our minds we should keep this round half-dozen: Vascular derangements of the brain