NOTE ON CLASS INCIDENCE OF CANCER.

By DAVID HERON, M.A.,

GALTON RESEARCH FELLOW IN NATIONAL EUGENICS.

[From the Galton Laboratory for National Eugenics, University of London, University College, W.C.]

In a memoir¹ on the relationship of fertility in man to social status, recently noticed in the *BRITISH MEDICAL JOURNAL* (December 15th, 1906), I have dealt briefly with the relation of cancer incidence to social status. I have shown that cancer is the one exception out of the qualities dealt with by me which is associated with a higher social status. The correlations obtained indicate that the cancer-rate is highest amongst both men and women where (1) the birth-rate is lowest, (2) where the proportion of professional men in the population is highest, and (3) where most domestic servants are kept. In other words, cancer appears to be correlated with higher social status. It is perfectly true that these results are only found for the London districts, but it must be remembered that it is in London alone that we are able to trace the cancer deaths to their district of origin, owing to the "corrections for institutions" provided by the Medical Officer for the county of London.

The possibility that cancer may be to some extent a class disease seems of such importance that it is well worth considering further. My investigation of the matter was, of course, preliminary, but possibly it may result in the collection of data bearing more directly on this point. As a matter of fact, the census, combined with the Registrar-General's unpublished returns, should enable much light to be thrown on the question. The census provides the occupational frequency and the age frequency in each occupation. The death certificate gives the age and occupation of each individual dying of cancer, although these particulars are not published. A combination of these data would enable us to determine whether there is any, and, if so, how much, contingency of cancer incidence and social status.

Failing these data, I have endeavoured on the existing material to make some improvement on my preliminary investigation from the material already available. In the first place, I find that the cancer death-rate varies somewhat erratically in the same district from year to year. To give it greater steadiness, I have taken for each district a four year's average (1901-4).

It has also been pointed out to me that a correction is further required for the age distributions in the several districts. It is not an easy matter, however, to make such a correction accurately, for we have not the age distribution of the cancer deaths in each district; but the correction may be made in a rough manner in the following way. Cancer is essentially a disease of middle life, and if an examination be made of the age-frequency curves for cancer² it will be found that the bulk of the cases for both sexes fall between 30 and 70. I have accordingly worked out for each district the cancer death-rate on the basis of the population between 30 and 70, obtaining the following results:

A.—Relation of Birth-rate (calculated throughout on the Number of Possibly Reproductive Wives) to the Cancer Death-rate.

	Correlation between Cancer Death-rate and Birth-rate.		
	Males.	Females.	Mean.
Cancer-rate on total population ...	-0.52 ± 0.09	-0.80 ± 0.05	-0.66
Cancer-rate on population aged 30 to 70 ...	-0.29 ± 0.12	-0.27 ± 0.12	-0.28

Thus somewhat more than half the high correction is due to the fact that districts with a high birth-rate have a larger proportion of the population outside the cancer-incidence ages. But enough remains to show that my former conclusion is still valid; there is for both males and females an association between low birth-rate and high cancer death-rate. The fact that it is equally true for males and females serves to indicate that it is a question of social status and method of life rather than that of

direct relationship of multiparity to cancer. My previous results were for 1901 alone, and the rates were based on the whole population. I found the correlation between the birth-rate and the cancer death-rate to be:

Males.	Females.	Mean.
-0.16 ± 0.13	-0.54 ± 0.09	-0.35

From this it seemed that the relationship was due to multiparity. The result of averaging the rate over four years indicates that this arose from want of steadiness in the rate.

The direct relation between the cancer death-rate and social status may now be investigated. This has already been done for two measures of social status—the proportion of professional men and the number of female domestic servants—but the rate was for 1901 only, and on the total population. The coefficients have been recalculated with the rate taken over four years and on the population between 30 and 70. The results are as follows:

B. 1.—Correlation between Cancer Death-rate for 1901 on Total Population and

	Males.	Females.
Proportion of professional men ...	+0.45 ± 0.10	+0.55 ± 0.09
Number of female domestic servants per 100 families ...	+0.42 ± 0.11	+0.40 ± 0.11

B. 2.—Correlation between Cancer Death-rate for 1901-4 on Population aged 30 to 70 and

	Males.	Females.
Proportion of professional men ...	+0.42 ± 0.11	+0.20 ± 0.12
Number of female domestic servants per 100 families ...	+0.52 ± 0.09	+0.07 ± 0.13

The very small correlation with the number of female domestic servants and the female cancer death-rate requires some explanation. It arises from the large negative spurious correlation introduced by the fact that the female population between 30 and 70 contains a large number of female domestic servants (in Hampstead they form 41 per cent. of the adult females). When the rate was calculated on all adult females except domestic servants the correlation was found to be +0.72 ± 0.06. Unfortunately it was not found possible to deduct the cancer deaths among female domestic servants, so that this coefficient is now probably too large, though certainly positive.

The correlations between the cancer death-rate and various other measures of social status were then found, and are as follows:

C.—Correlation between the Cancer Death-rate for 1901-4 on Population between 30 and 70 and

	Males.	Females.
Proportion of general labourers ...	-0.22 ± 0.12	-0.42 ± 0.11
Proportion of pawnbrokers, etc. ...	-0.06 ± 0.13	-0.31 ± 0.12
Infantile mortality-rate ...	-0.35 ± 0.11	-0.20 ± 0.12

It thus appears from the figures given that there is always a substantial correlation between the cancer death-rate and social status; in other words, the incidence of cancer is most heavy among the well-to-do classes. It is to be hoped that a more extensive investigation on the lines already laid down may be entered on to supplement the present preliminary study.

What is badly needed at the present time is a collection of complete family histories of cancer cases. While such family histories in cases of insanity and pulmonary tuberculosis have been provided for the use of this laboratory in fair numbers, which we hope may go on increasing, we have, and can find, no records of any value bearing on heredity in cancer cases. The statements "a family history" or "no family history" are purely useless for scientific discussion of inheritance, when neither the individual relatives attached nor the sizes of the families are stated. The laboratory is prepared to issue schedules for the family history of special diseases

to any medical man or institute for special disease when a return of 10 to 20 cases can be provided.

REFERENCES.

¹ *Studies in National Deterioration*. I, On the Relation of Fertility in Man to Social Status. Drapers' Company Research Memoirs. (Oulau and Co.) ² Report on certain Cancer Statistics. By Karl Pearson, F.R.S. *Archives of the Middlesex Hospital*, vol. ii, 1904.

The Lumleian Lectures

ON

INSANITY, ITS CAUSES AND INCREASE.

DELIVERED BEFORE THE ROYAL COLLEGE OF PHYSICIANS OF LONDON.

By GEORGE HY. SAVAGE, M.D., F.R.C.P.,

CONSULTING PHYSICIAN AND LATE LECTURER ON MENTAL DISEASES, GUY'S HOSPITAL.

LECTURE I.

THE FORMS OF INSANITY.

I HAVE approached this lectureship with mixed feelings. I began with pride at my selection; this was followed by doubt as to the subject on which I should lecture, and lastly a feeling, which still exists, of dread lest I should fail in my endeavour.

But the nature of my life's work indicated something connected with insanity, and as at present on every side the question is being raised of the increasing numbers of the insane, I felt that though the field has been partly occupied by both medical and lay writers, yet perhaps I might add something from my own special experience, and I shall depend on this rather than on voluminous statistics.

I admit that there is considerable increase in the insane, but I find no reason from this fact to dread the future of the race. I shall hope to demonstrate that much insanity does not depend on material brain disease, but has reference to the complexity of society and the numerous social misfits which occur. Many people are treated as insane because they are out of harmony with their surroundings.

I purpose dividing the lectures as follows: First, I wish to consider what is really included in the term "insanity"; next, what are the chief conditions leading to this disorder; and lastly the statistics as to its increase. I shall refer largely to the reports of the Commissioners in Lunacy of England, Scotland, and Ireland, and I am fortunate this year in having the Irish appendix to the report which is chiefly concerned with the increase of the insane in Ireland.

I shall therefore first consider the forms of insanity. I do not intend giving any fresh classification, for I still feel, with Hughlings Jackson, that we alienists have to be like market gardeners rather than botanists—we have no natural orders, only grouping for convenience.

First, unsoundness of mind often occurs without anything which can be called insanity arising. The medical man looks for material brain change, the lawyer looks for responsibility, while society only considers whether a man is dangerous to himself or to society. There can therefore be no common pathological basis for the various classes. There are many cases of insanity in which I maintain that there is no ground for suspecting any detectable material change in the nervous system.

Several able articles have appeared recently in the *Times* on the increase of insanity, but the writer does not seem to appreciate that insanity is not a definite disease. It is a negation, and certainly no one line of treatment will avail for the various cases. As so much really depends on the conditions, it seems that treatment must, in many instances at least, depend on the change of these rather than on *materia medica*.

Hence, though careful clinical observation in homes or hospitals will advance knowledge of insanity, yet too much must not be expected, and the general physician who has no practical—that is, living—knowledge of the insane will not advance knowledge much. Statistics prove that the recovery-rate has not advanced with the progress in treatment so far.

To make more clear one of my points, I say the medical standpoint has been medical; the legal, responsibility; and the social, social danger. The vernacular recognizes what many seem to overlook. Thus some are spoken of as being "beside themselves," others "out of their senses," while only some are said to be "out of their minds"—that is, unreasonable.

There is no fixed standard of sanity; a man is sane or insane in relation to himself, so that what is insane conduct in one man may not be insane conduct in another. Some persons are out of place and others out of their time. Thus, a fine strong youth was described by his father as being suitable for the middle ages as a knight, or for America as a cowboy, but quite unsuited for the twentieth century in England. Again, the conduct suitable to youth may connote insanity in old age. Some persons, notwithstanding their education, fail to fit into their surroundings, and are treated as aliens.

Insanity, again, is often a question of degree; a man may be parsimonious and be reasonable, but he may develop into a true miser with the hermit's habits, and become a social danger, but even with such it does not follow that they are all to be treated alike. The liberty of the subject depends on the length of the purse, so that while one recluse may have to be sent to an infirmary or asylum, another with wealth need not be so treated.

Normal habits and healthy feelings may grow into morbid. The miserly habit is one example, but the normal family feeling may by overgrowth produce insane jealousy, and such growths vary in degree, but that they are very common I know, and that they add to the chronic insane in asylums I also know.

Probably many will say there must be something wrong in the quality of brains which so readily get out of order. This may be so, but I fail to believe that any ordinary hospital treatment is going to alter them much. I shall as much expect to have a pathology for religious conversion as for social perversion. We have, so far as insanity is concerned, to judge by the conduct, not by any definite nerve signs.

It is therefore necessary to recognize that similar conduct may depend on various and different mental states. We may have exaltation of ideas occurring in general paralysis, in mania, in toxic states, in delusional insanity, and with certain slowly-growing states which I have called "governess disease." The chief interest of these lectures, I presume, however, will centre on what may be called the common forms of insanity. I shall later point out that I believe strongly in a neurotic type or constitution, and that those who have this are the most likely to produce any increase among the insane; and I shall have to consider what evidence there is of the increase of the neurotics, and what causes may give rise to such increase.

Is it possible for any one to become insane? Are there some persons so constituted that no storms will upset their nervous or mental balance? I say that though any one may become delirious, and, given certain conditions, any one may become a general paralytic, yet I believe that there are very many who could never become subject to delusional insanity or suffer from recurring mania or melancholia. I say here that there is increase among the senile insane and general paralytics. As to alcoholic insanity I shall go into details later; but alcoholism produces neurotic states, and also causes insanity in many forms, but I do not think there is at present any evidence that alcohol is causing increase among the numbers of the insane. Insanities of special types, with particular effects on the nervous system, follow toxic influences other than alcohol, and I shall have to study these in my second lecture.

The next part of my subject is more open, I suppose, to debate. I have already said there are many cases in which the insanity depends on the person being out of relationship with his immediate surroundings; I now say there are many who are temporarily out of such relations; they may be said to suffer from functional disorder. Sutton maintained that function is the cause of organization, and to a great extent I maintain that that is true, that morbid habits may lead to distinct morbid results, that bad habits may lead to bad brains. Many social misfits and cases of incompatibility are thus to be classed, and the so-called hysterical cases and cases of sudden cure