

ART. VII.—*On the Recent Statistics of Insanity, Cancer, and Phthisis in New Zealand.*

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Plates II.—IV.

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I HAVE previously pointed out the rapid way in which the age-distribution of the population of New Zealand is changing.* Because of this rapidity of change in the population, numbers giving the proportion which those subject to any disease or infirmity bear to the whole population at different times are of little or no service for purposes of comparison unless the people of all ages are about equally subject to the complaint. If people of certain ages have more than the average liability to the disease, an increase in the proportion which the number of people of those ages bears to the whole population must tend to increase the proportion of the population subject to that particular affliction.

It follows that, for the proper investigation of the progress of any affection during any period, we must consider the extent to which each section of the people of about the same age has been affected by it during the period. This work I have carried out for insanity, cancer, and phthisis, three affections which, as they afflict severally a greater number of the human race than almost any other single disease, are likewise more the objects of popular interest than any others. With respect to each of them I have taken, for each sex and for various age-periods, the statistics for each year from 1879 to 1898, and have grouped them in five-year periods, each having a census year as the central year. I have then taken the averages for each period of five years and compared them with the populations of the same sex included in the various age-periods at the corresponding censuses. The results are, I think, of considerable interest, and will be described in the following sections.

There is no attempt made to institute comparisons with other countries. Such comparisons are of little value unless the statistics of each country are treated in some such way as that I have used in treating New Zealand; for the same reason that makes this method of treatment necessary in

* "The Population of New Zealand" (Trans. N.Z. Inst., vol. xxxiii., p. 453).

properly comparing the statistics of the same country for different years—that is, the difference in the age-distribution of the population—makes it necessary also in comparing the statistics of one country with those of another. Unfortunately, the necessary data for dealing in this manner with the statistics of any other country are not available in Auckland, and the work, therefore, cannot be attempted, though the results to which it would lead would be, I believe, of supreme interest.

INSANITY.

The New Zealand Official Year-book tells us that the proportion which the inmates of the lunatic asylums of the colony, and those out on trial, bear to the whole population changed from 1 in every 383 of population in the year 1884 to 1 in every 288 in 1900, this being equivalent to an increase, relative to the whole population, of about 33 per cent. in sixteen years. The change was regular and continuous from year to year, and was not confined merely to the period just referred to.

On the strength of these and similar figures alarmist articles on the great increase of insanity frequently appear in our newspapers and magazines, and the greater strain of modern competition and the unhealthy conditions of city life are generally assigned as the chief causes. But others doubt the reality of so great an increase in insanity, and these suggest that the large number of good asylums, with the greater use made of those institutions, consequent upon the increased consideration shown for those suspected of insanity, may be responsible for much or all of the apparent increase, whilst the inclusion of a greater number of mental maladies under the head of "insanity" may still further tend to swell the numbers which so affright us. In any case, it appears generally accepted that, without these or similar explanations, the statistics of insanity indicate a continued increase in the modern man of liability to that mental disorder.

Now, I propose to show that the statistics of New Zealand do not indicate any real increase in liability to insanity, even if the numbers returned be taken as the proper measure of the amount of insanity in the colony. For this purpose I shall take the yearly admissions into the various lunatic asylums of the colony. As these will be classified according to age, it is necessary to leave out of consideration the small number of patients of age unknown, but this will not appreciably vitiate the results. The statistics must also be taken as given in the annual volumes of statistics issued by the Government—that is, with the idiotic included amongst the insane. The number

of the former class, however, bears but a comparatively small ratio to that of the latter.

Table I. represents the results obtained in the manner described in the introduction.

TABLE I.—AVERAGE YEARLY NUMBER OF PATIENTS RECEIVED INTO THE VARIOUS LUNATIC ASYLUMS IN THE COLONY PER 10,000 OF POPULATION OF EACH SEX OF VARIOUS AGE PERIODS.

| Ages. | Males. | | | | Females. | | | |
|-------------|----------|----------|----------|----------|----------|----------|----------|----------|
| | 1879-83. | 1884-88. | 1889-93. | 1894-98. | 1879-83 | 1884-88. | 1889-93. | 1894-98. |
| 0-5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 |
| 5-10 | 0.5 | 0.5 | 0.2 | 0.3 | 0.4 | 0.2 | 0.4 | 0.3 |
| 10-15 | 1.3 | 0.9 | 0.9 | 0.7 | 0.9 | 0.4 | 0.7 | 0.6 |
| 15-25 | 7.1 | 5.5 | 4.9 | 6.3 | 6.9 | 5.7 | 4.1 | 5.1 |
| 25-35 | 16.8 | 13.2 | 13.3 | 12.9 | 13.9 | 13.2 | 10.4 | 10.0 |
| 35-45 | 18.9 | 17.7 | 15.2 | 16.7 | 18.6 | 12.6 | 13.7 | 15.7 |
| 45-55 | 17.5 | 15.0 | 14.3 | 15.2 | 14.4 | 13.3 | 15.9 | 18.2 |
| 55-65 | 17.7 | 14.8 | 13.1 | 16.2 | 11.7 | 10.8 | 9.6 | 13.6 |
| 65 and over | 15.7 | 15.7 | 18.5 | 19.5 | 10.2 | 10.8 | 12.0 | 12.8 |

The results given in this table for the first and last of the four periods considered are illustrated graphically in Plate II.

Comparing generally the figures given in this table for the two sexes, it appears that there is little difference for the sexes for ages up to 55 years, but after that the tendency to insanity is markedly greater in males than in females.

With respect to the males, it may further be noted that there was actually, during the whole period, a diminution in the number of patients supplied for each 10,000 of population for all ages up to 65; only for ages 65 and over is there an increase, and this is from 15.7 to 19.5. Further, during the years 1879-83 there were 1,207 male patients of known age received into the various asylums, and during the years 1894-98 the number was 1,508; but, if the populations of the various age-periods had supplied patients in the latter period in the same proportion to their numbers as in the former, the number of admissions from 1894 to 1898 would have been as many as 1,771. Thus the statistics, if they fairly correctly represent the amount of insanity, indicate an undoubted substantial diminution in the chance of insanity for the average male.

In the case of females there was, during the period considered, a diminution in the number of fresh cases of insanity relative to the population for all ages up to 45; in the three

age-periods above this age, however, there was an increase. But the earlier age-periods supply so few patients that it is not apparent from these facts alone whether on the whole there was a true increase or decrease of insanity amongst females. We find, however, that during the years 1879-83 there were 739 female patients of known age received into the various asylums, and during the years 1894-98 the number was 1,095; but, if the populations of the various age-periods had supplied patients in the latter period in the same proportion to their numbers as in the former period, the number of admissions from 1894 to 1898 would have been as many as 1,230. Thus we get with respect to females a result, as far as the figures are concerned, like to that we formerly obtained for males—namely, an undoubted falling-off in liability to insanity. The same result thus follows for the population as a whole.

To what degree of correctness the statistics represent the actual state of things is another question, into which I do not propose to enter; but the concern about the increase of insanity, which inspires so many articles, is founded on the figures as roughly put in statistical works, and I have shown that these figures, properly interpreted, afford no justification whatever for the inference usually deduced from them, but rather indicate a strong tendency in the direction of growing sanity.

If the reasons usually assigned to explain the commonly supposed increase in the tendency to insanity have really any force, if many are now classed as insane that would not have been so classed some years ago, and if many are now placed in institutions for the care of the insane that some time since would not have been so provided for, then there must indeed have been in recent years a very real and very marked diminution in the liability of the New-Zealander to insanity, in spite of modern competition and the disadvantages of city life. In fact, explanations are now wanted to account for statistics indicating a falling-off, and not a growth, in the tendency of the race to insanity.

Thus far we have considered only the yearly contribution of the colony to the total insane population, and it may not be yet quite clear how it is that the total insane population is increasing so much more rapidly than the population as a whole. The explanation lies in the great changes taking place in the age-distribution of the people, which has been fully explained in the paper already referred to.

Table I. shows that there is no great liability to insanity till about the age of 25, whilst after that age there is no very great change in this liability; indeed, the number of insane

persons under the age of 15 might, for most purposes, be entirely neglected. Now, whereas the total population of the colony increased between 1881 and 1896 by 43·8 per cent., the population in some of the later age-periods considered as much as trebled. Further, the number of people that become insane in any age-period during any year, as represented in Table I., does not represent the number actually insane in that age-period, for that number includes the survivors of all those belonging to that age-period who became insane in previous years and failed to recover. Thus the number of insane in any section of the people is cumulative relatively to the population, and the number of insane per 10,000 of the population must increase rapidly in the age-periods of maturity as we rise from one age-period to a higher one. This is quite distinct from the liability of sane persons at those ages to develop insanity, and, with the rapidly increasing proportion of the whole population included in the later age-periods, completely explains the continually growing proportion of the population that are afflicted with insanity. Considerations brought forward in the paper already referred to, leading us to expect a continued rapid increase for many years to come in the proportion that the old bear to the whole population, also lead us to expect a similar increase with respect to the insane, and this without the aid of any increased liability of the race to insanity, and possibly even in spite of a falling-off in such liability.

CANCER.

The statistics of cancer as commonly presented make it appear that that relentless disease is increasing its ravages at a rate that is somewhat horrifying. In the year 1879 there were 118 deaths from cancer, forming 2·11 of the whole number of deaths, and being at the rate of 2·63 deaths per 10,000 of population, whilst in 1898 the number of deaths from cancer was 471, forming 6·50 of the whole number of deaths, and being at the rate of 6·40 deaths per 10,000 of population. The number of deaths from cancer thus increased some two and a half times relatively to the population during the period of twenty years under consideration. We shall apply, however, the same kind of analysis as that just used for the case of insanity; and the results, though not yielding a conclusion just the reverse of the popular notion, as in the case of insanity, will still be found to considerably modify the estimate generally formed of the progress of this disease.

Table II. presents the results obtained in the manner already described.

TABLE II.—AVERAGE YEARLY NUMBER OF DEATHS FROM CANCER PER 10,000 OF POPULATION OF EACH SEX OF VARIOUS AGE-PERIODS.

| Ages. | Males. | | | | Females. | | | |
|-------------|----------|----------|----------|----------|----------|----------|----------|----------|
| | 1879-83. | 1884-88. | 1889-93. | 1894-98. | 1879-83. | 1884-88. | 1889-93. | 1894-98. |
| 0-5 | 0.2 | 0.2 | 0.4 | 0.2 | 0.3 | 0.0 | 0.2 | 0.1 |
| 5-10 | 0.0 | 0.2 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.2 |
| 10-15 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| 15-20 | 0.1 | 0.3 | 0.3 | 0.2 | 0.0 | 0.1 | 0.0 | 0.1 |
| 20-25 | 0.6 | 0.3 | 0.6 | 0.4 | 0.1 | 0.1 | 0.3 | 0.3 |
| 25-30 | 0.4 | 0.9 | 0.6 | 0.3 | 0.9 | 0.6 | 0.5 | 0.8 |
| 30-35 | 1.1 | 0.9 | 0.7 | 1.0 | 2.1 | 2.6 | 2.2 | 2.4 |
| 35-40 | 1.5 | 1.5 | 2.5 | 2.3 | 4.2 | 4.3 | 5.3 | 4.5 |
| 40-45 | 4.2 | 4.9 | 4.3 | 5.5 | 8.9 | 9.7 | 10.1 | 10.2 |
| 45-50 | 7.2 | 9.2 | 8.6 | 9.9 | 14.9 | 15.3 | 12.5 | 20.3 |
| 50-55 | 11.9 | 13.7 | 16.3 | 17.4 | 20.8 | 24.3 | 22.6 | 22.0 |
| 55-60 | 17.5 | 22.3 | 24.1 | 29.0 | 29.7 | 33.6 | 34.1 | 35.4 |
| 60-65 | 20.1 | 31.7 | 39.5 | 43.4 | 27.7 | 34.0 | 36.7 | 40.1 |
| 65-70 | 34.2 | 42.8 | 52.8 | 47.7 | 45.8 | 36.7 | 60.1 | 47.1 |
| 70-75 | 23.8 | 44.5 | 58.4 | 64.0 | 37.3 | 51.7 | 39.4 | 53.5 |
| 75-80 | 48.2 | 46.8 | 58.8 | 77.0 | 58.4 | 47.4 | 55.6 | 64.8 |
| 80 and over | 31.1 | 38.1 | 44.6 | 42.8 | 38.2 | 51.3 | 31.8 | 36.4 |

The results given in this table for ages 30 and over, and for the first and last of the four periods considered, are illustrated graphically in Plate III. For ages under 30 the numbers of cases are too small to give fair averages.

The figures of this table show that from 30 to 60 years of age females are more subject to the disease than males; indeed, between the ages of 30 and 50 the chance of dying of cancer is about double in the case of the female of what it is in the male, but after the age of 60 there is an opposite tendency, though one not so marked.

In this table, it may be further noted, the results for ages up to 30 years indicate how small is the chance of death from cancer at those ages compared with subsequent ages, but are otherwise of little service, the number of deaths being too small to give a fair average.

From the age of 40 in males and 35 in females the number of deaths from cancer is considerable for each age-period, and is generally the greater the greater the age, with the exception that, after the age 80 years, there appears to be a falling-off in liability to death from this complaint.

Thus cancer is eminently a disease associated with degeneration, and most commonly afflicts the aged. Consequently much of what has been said with respect to insanity will apply to cancer, and we are thus prepared to find that much of the apparent increase in cancer is due really to a relative

increase in that portion of the population most liable to suffer from its inroads—namely, the aged. But we are not so fortunate in this case as to find the whole increase thus explained, with a credit balance on the other side. There is undeniably an increase in cancer, as represented by statistics. This is generally, however, not nearly so great as would appear at first from the simple statements with the quotation of which this section opened. The increase in cancer, as properly represented by statistics, is thus more capable of being explained away by the reasons that have been given from time to time for its apparent increase in New Zealand and elsewhere. The Registrar-General of England, for instance, expressed the opinion that part of the increase was due to improved diagnosis and more careful statement of cause, in support of which opinion he pointed out the greater proportionate apparent increase in the deaths of males from cancer, a fact plainly apparent for the case of New Zealand in Table II. This disproportionate increase for the two sexes he explained as being due to the fact that "the cancerous affections of males are in much larger proportion internal or inaccessible than those of females, and consequently are more difficult of recognition, so that any improvement in medical diagnosis would add more to the male than to the female figures." Whether all or how much of the apparent increase in liability to deaths from cancer can be explained by these suggestions of the Registrar-General of England is a matter, however, on which I cannot venture to express an opinion.

PHTHISIS.

Phthisis, commonly known simply as consumption, has of late excited none of that alarmed interest that has centred round insanity and cancer; it has supplied no startling figures appearing to indicate irresistible conquest. At the beginning of the period we are considering, in the year 1879, the number of deaths from phthisis was 399, or 8.90 per 10,000 of population, while in 1898 the number of deaths was 597, but only 8.11 per 10,000 of population. These figures in themselves should not, however, be taken to indicate a real decrease in liability to death from phthisis. As far as these figures go, the relatively smaller number of deaths from phthisis might be due to the section of the population of those ages most liable to death from phthisis forming more recently a smaller proportion of the whole population. To draw proper conclusions we must proceed to a more detailed analysis.

Table III. exhibits the result of applying the same method as that already applied to the other two diseases.

TABLE III.—AVERAGE YEARLY NUMBER OF DEATHS FROM PHTHISIS PER 10,000 OF POPULATION OF EACH SEX OF VARIOUS AGE-PERIODS.

| Ages. | Males | | | | Females. | | | |
|-------------|---------|----------|----------|----------|----------|----------|----------|----------|
| | 1879-83 | 1884-88. | 1889-93. | 1894-98. | 1879-83. | 1884-88. | 1889-93. | 1894-98. |
| 0-5 | 2.0 | 1.3 | 0.6 | 0.8 | 2.2 | 1.6 | 1.5 | 0.8 |
| 5-10 | 0.5 | 0.5 | 0.3 | 0.3 | 1.2 | 1.3 | 0.7 | 0.3 |
| 10-15 | 0.9 | 0.9 | 1.1 | 1.0 | 2.9 | 2.6 | 1.8 | 1.8 |
| 15-20 | 7.2 | 7.0 | 5.8 | 4.6 | 10.5 | 9.7 | 10.7 | 11.4 |
| 20-25 | 15.6 | 17.3 | 14.2 | 15.0 | 16.3 | 17.0 | 16.6 | 14.5 |
| 25-30 | 16.6 | 19.1 | 18.1 | 14.3 | 21.8 | 15.2 | 16.0 | 14.5 |
| 30-35 | 18.5 | 16.9 | 14.0 | 13.4 | 18.2 | 19.1 | 15.3 | 13.5 |
| 35-40 | 17.7 | 15.6 | 15.3 | 14.0 | 15.6 | 15.4 | 15.4 | 14.3 |
| 40-45 | 14.9 | 14.4 | 13.0 | 11.5 | 14.4 | 10.8 | 10.1 | 13.3 |
| 45-50 | 16.2 | 15.6 | 14.2 | 11.6 | 12.5 | 13.1 | 11.0 | 9.4 |
| 50-55 | 13.6 | 17.2 | 14.3 | 13.3 | 9.6 | 9.7 | 12.3 | 7.3 |
| 55-60 | 23.3 | 15.9 | 16.1 | 13.6 | 14.8 | 9.5 | 10.7 | 8.8 |
| 60-65 | 14.3 | 15.3 | 15.3 | 17.7 | 7.1 | 8.2 | 8.1 | 8.3 |
| 65-70 | 16.0 | 13.8 | 15.9 | 17.6 | 5.3 | 9.4 | 6.2 | 6.9 |
| 70-75 | 8.5 | 7.6 | 13.6 | 11.2 | 2.2 | 4.9 | 3.2 | 1.8 |
| 75-80 | 10.3 | 7.0 | 5.0 | 14.1 | 0.0 | 3.0 | 8.5 | 5.8 |
| 80 and over | 0.0 | 7.6 | 5.6 | 8.2 | 7.6 | 0.0 | 0.0 | 4.6 |

The results given in this table for ages up to 65, and for the first and last of the four periods considered, are illustrated graphically in Plate IV. For ages over 65 the numbers of cases are too small to give fair averages.

This table shows that during the ages from 10 to 20 females are much more liable to death from phthisis than males, but from 45 onwards the position is more than reversed.

Phthisis is often regarded as a disease of youth, but this table shows that though this is the case to a considerable extent for females, yet for males from the age of 20 years, when the chance of death from phthisis first becomes considerable, it remains comparatively constant up to the age of 70 years, when a decrease sets in.

Leaving out of further consideration the ages 65 and over, because of the comparatively small number of cases they supply, we see that for other ages the number of deaths per 10,000 of population fell off during the period under consideration for the great majority of age-periods. In fact, in the case of males the only age-period showing an appreciable increase was that of 60-65, and in the case of females the only age-periods showing an increase were those of 15-20 and 60-65, and the increases in both these cases were comparatively slight.

Thus, on the whole, there was during the period a very gratifying falling-off in the ravages made by this insidious disease.

CONCLUSION.

It is somewhat beyond my province to attempt to comment on the figures I have brought forward from a point of view that should be left to the medical expert. My only object has been to present the statistics of the three diseases in the manner in which I think they should be presented, and one that leads to the possibility of sound and not fallacious inference. My only regret is that I have not been able, from lack of material, to extend the investigation to other populations than that of our own colony. If others with the available material to hand will take up the work, I am convinced they will succeed in obtaining results of supreme interest to all who are interested in statistics so closely concerned with the health and welfare of the race.

ART. VIII.—On some *Relics of the Moriori Race*.

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[Read before the *Philosophical Institute of Canterbury*, 2nd October, 1901.]

Plates V. and VI.

THE Moriori race is already on the verge of extinction, and at the time of my visit to Chatham Island, in January, 1901, there were only about a dozen pure-blooded individuals remaining, some of whom were of great age, while the youngest was a lad of about sixteen. Under these circumstances it must be considered as extremely fortunate that any reliable record of this interesting people has been preserved. That such is the case is due chiefly to the energy and enthusiasm of Mr. Alexander Shand, who for more than thirty years has lived amongst the Morioris, and has made a special study not only of that race, but likewise of their Maori conquerors. Mr. Shand, whose acquaintance I first had the pleasure of making at his home on the island, has published a series of very valuable papers on the subject in the *Journal of the Polynesian Society*, from which, as well as from my personal intercourse with the author, much of my information has been derived.