by the Committee were not referred to an expert familiar with the handling of figures, as the value of the statistical tables compiled by the Committee is very seriously damaged by the erroneous methods adopted by them. This applies particularly to the summaries and averages that have been calculated. Without such summaries the figures are too complicated to carry much meaning. It is therefore very unfortunate that, as pointed out by Mr. Stuart below, the average length of residence in, for instance, all English asylums is calculated by adding together the averages for each individual asylum, thus improperly giving equal weight to the experience of large and small asylums. If the medical officer of health of a borough of 100,000 divided into three districts, one with a population of 10,000 and a death-rate of 10 per 1,000, a second with a population of 20,000 and a death-rate of 15 per 1,000, and a third with a population of 70,000 and a death-rate of 20 per 1,000, were to conclude that the average death-rate of the entire borough was $\frac{20 + 10 + 15}{3} = 15$ per 1,000, he would be

laughed at. And yet this is the method adopted in the statistical report of the committee. If, as appears to be the case, this method has been adopted throughout the report, it is impossible seriously to criticize the figures contained in it, or to accept any conclusions based on it. We must fall back on Dr. Crookshank's figures which form a sufficient basis of facts to justify the main conclusions of the Committee's report quoted above. It is very unfortunate, however, that the statistics collected by the Committee with such an expenditure of labour should be left in their present condition. Were they properly analysed and arranged, they would probably serve to hasten reform in the present condition of our asylums which is desired by all.

A CRITICISM ON THE RECENT REPORT OF THE TUBERCULOSIS COMMITTEE OF THE MEDICO-PSYCHOLOGICAL ASSOCIATION.

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In May, 1900, the Medico-Psychological Association of Great Britain and Ireland appointed a "Tuberculosis Committee for the investigation and collection of evidence and for practical suggestions as to the isolation of phthisical patients in asylums." This Committee have just issued their report.

We all recognize and deplore the prevalence of tuberculosis in asylums, and eagerly welcome any suggestions for bringing about a better state of things. No one will dispute the value of the suggestions of the Committee. They have, as it were, crystallized in a report the views of most thinking members of the Association. There is, however, no greater enemy to a good cause than an advocate who, by his incapacity to handle statistics, gives the ungodly occasion to blasphemy. While this Committee deserve full credit for their good intentions, I would point out and illustrate how they have done their work.

The Committee report that "A very large number of cases of phthisis have acquired that disease after admission to the asylum" (page 11). The correctness or otherwise of this opinion is not questioned; their method of calculating statistics on which they base this opinion is, however, incorrect. On page 22 it is stated that the "average length of residence in asylums of those cases dying with tubercle during 1899 was as follows:

England	...	6 years 2 months
Scotland	...	4 years
Ireland	...	5 years 1 month

These figures calculated from their statistics as available should read:

England and Wales	...	6 years
Scotland	...	4 years 9 months
Ireland	...	4 years

The method adopted in calculating "average length of residence" is peculiar, but "was accepted and approved" by the Committee, taking Scotland as an example, and studying the average length of residence of the males only. The Committee's method is given in the first table in the next column. (Table A, Group 3, Column 6).

The incorrectness of their method is at once apparent when it is considered that the Committee's calculations show that if 9 men in the Montrose Asylum live on an average 13 years

in that institution, and 1 man lives in Murray's Asylum for 1 year, the average asylum life for these 10 men is only $(13+1) \div 2 = 7$ years.

Name of Asylum.				Average Length of Residence in these Asylums of Male Deaths with Active Tubercle, 1899.	
				Years.	Months.
Aberdeen	...	...	...	5	11
Edinburgh	...	...	...	2	11
Montrose	...	...	...	13	0
Perth (Murray's)	...	...	...	1	0
Govan	...	...	...	1	7
Inverness	...	...	...	6	6
Lanark	...	...	...	2	3
Midlothian	...	...	...	0	4
Perth District	...	...	...	1	8
Roxburgh	...	...	...	8	11
Total				44	1
Average for 10 Asylums				4	5

The proper way to calculate is as follows:

Name of Asylum.	Average Length of Residence in these Asylums of Male Deaths with Active Tubercle, 1899 (Column 6).		Number of Such Male Deaths from Active Tubercle, 1899 (calculated from Column 7).	Total Residence in these Asylums of Male Patients dying with Active Tubercle, 1899.	
	Yrs.	Mths.		Yrs.	Mths.
Aberdeen	5	11	9	53	3
Edinburgh	2	11	8	23	4
Montrose	13	0	9	117	0
Perth (Murray's)	1	0	1	1	0
Govan	1	7	4	6	4
Inverness	6	6	7	45	6
Lanark	2	3	3	6	9
Midlothian	0	4	1	0	4
Perth District	1	8	6	10	0
Roxburgh	8	11	5	44	7
Total	...	...	53	308	1
Average for 10 asylums		...	...	5	9½

This may be taken as a fair example of the way in which the statistics have been handled, and it must be remembered that these figures were "duly and carefully considered and amended" by the Committee "where necessary."

On page 22 it is stated that the average number of patients dying with active tubercle under each form of insanity in each asylum works out as follows: (I contrast the averages as given in the report with the averages as correctly calculated from their own data.)

	Averages as Given (Tuberculosis Committee.)	Averages as Correctly Calculated.
In England and Wales:		
Dement and imbecile...	17	8½
Mania	6	4
Melancholia	4½	3½
General paralysis	3½	1½
Epileptic	2½	2½
In Scotland:		
Mania and melancholia	2½	4½

Again, taking Scotland as an example, and studying the table with reference to mania and melancholia, the facts as in the first table on page 1352 are found (see Table A, Group 3, Column 7).

So that in Scotland, of patients suffering from mania and melancholia, there were 44 deaths in 10 asylums, an average of about 4½ in each asylum, and not 2½ as given by the Tuberculosis Committee. These are the figures that the Committee have made up their calculation from, as is evident by the fact of the averages they give for Ireland being correct according to such calculations.

On page 29 the relation of cubic air space to tuberculosis is considered, and the conclusion is arrived at that the asylums "with the lower tuberculous death-rate provide on an average

Name of Asylum.	Form of Insanity at Death of Patients Dying with Active Tubercle, 1899.	
	Mania.	Melancholia.
Aberdeen	1	3
Edinburgh	4	7
Montrose	6	3
Perth (Murray's)	2	0
Govan	4	0
Inverness	0	4
Lanark	1	0
Midlothian	0	2
Perth	0	0
Roxburgh	4	3
	22	22

34 cubic feet per patient more by day, and 108 cubic feet per patient more by night, than do those with the higher death-rate." Now this is quite correct, if for the figures 34 and 108 are read 37 and 31. The Committee have again come to grief over the calculation of averages. They appear not to have recognized that because one man has 1,000 cubic feet air space and 1,000 men have 500 cubic feet air space each, the average for 1,001 men is not 750 cubic feet.

These are but examples, and can be multiplied. If such grave errors be found in the evidence on which they base their conclusions, what might not an opponent say as to their methods.

The Committee in their report state: "We find that the death-rate bears a ratio to the number of hours spent in the open air by the patients, which proves conclusively the benefit arising from giving the inmates of our large asylums as much time in the open air as possible." Here, again, the Committee are unfortunate, for the death-rate must bear a ratio to the number of hours spent in the open air, inasmuch as two figures, whatever they are, bear a ratio to each other; but, even accepting their idea of the meaning of the word ratio, which is not that usually to be found in mathematical works, and even adopting their own novel method of calculation, they do not find that as the average hours spent out of doors increase, the death-rate diminishes, which is obviously what they mean by "ratio." Here are their own figures (Table B):

	Average Death-rate.	Average Hours Outside.
	Per Cent.	
1. England and Wales County Asylums	2.4	6½
2. England and Wales Borough, City, etc., Asylums	1.7	6¼
3. Scotland	1.9	5¾
4. Ireland	2.2	5½

I ask the Committee to show me any "ratio" in the above table. It is, however, not from the above figures that they try to prove their point; they have split each of the above four groups into two divisions, one division with a death-rate below the average, and one division with a death-rate above the average for the whole group; then having calculated the "average hours outside" for each division, and having omitted to calculate the average death-rate for the division, they proceed to "find that the death-rate bears a ratio to the number of hours spent in the open air by the patients," but even so they find no evidence to support them except in the case of Ireland (5 asylums), where they deal with very small figures; and in Scotland (8 asylums), where they divide 23 by 4, and make the answer 5. If they made it 5½, this figure would compel them to disregard Scotland. The figures for England and Wales (57 asylums) being slightly, very slightly against them, are disregarded in this connexion. On the other hand, taking the character of the population as a basis (page 31) England and Wales are considered; Scotland and Ireland are disregarded.

I have calculated the figures for them concerning the average hours spent in the open air from the data supplied in their report, and make them a present of the result. The

patients in asylums which have a tuberculous death-rate less than the average for their class, are out in the open air ten minutes on an average more than those in asylums which are classified as having a higher tuberculous death-rate. I rejoice that the well-known fact of the value of fresh air in this connexion stands upon a firmer basis than the comparison of death-rates in institutions where the inhabitants are in the open air 365 minutes daily, as against 355 minutes daily.

There are some figures which the Committee tell us had their close attention, concerning which some information would be useful. How is it managed that in summer and winter weather, the inhabitants of a certain asylum are in the open air on an average 11 hours daily?

There are also some interesting omissions. The air space in two asylums which are not unknown to prominent members of the Committee is not given. Why not? Has it never been calculated or commented upon? I might even go further, and point out a case which was apparently "amended" by the Committee. The Royal Naval Asylum allows 1,000 cubic feet air space by day and the same quantity by night. These figures are excluded. Why? It cannot be because of the size of the institution, as we find a smaller asylum is included. The hours spent out of doors at the Royal Naval are accepted. Why is the air space excluded? The inference is that it would spoil the statistics.

There yet remain two other questions to discuss.

1. Age of Asylum in Relation to Tubercle.

The following table is copied from the report:

TABLE I.—(Tuberculosis Committee.)

Age of asylum in years ...	Under 20	21 to 40	41 to 60	61 to 80	81 to 100
Number of asylums (78) ...	15	23	21	12	7
Tuberculous death-rate (per 1,000) ...	18	21	23	26	28

On page 33 the following comment is made on this table: "It will also be observed that the tuberculous death-rate rises about 10 per cent. for every 20 years added to the age of the asylum." No information is given to enable us to identify these asylums, nor are we told what years are taken for the purpose. I have, however, taken this year's Blue Book of the Commissioners in Lunacy for England and Wales, and calculated their figures for public asylums, and the table works out as follows:

TABLE I.—(Calculated from Blue Book.)

Age of asylum in years ...	Under 20	21 to 40	41 to 60	61 to 80	81 to 100
Number of asylums (80) ...	20	21	25	8	6
Tuberculous death-rate (per 1,000) ...	10.56	18.55	16.13	16.23	16.68

These figures may indeed suggest that after 20 years the tuberculous death-rate is increased, but it does not help the theory put forth in the report.

2. Size of Asylum in Relation to Tubercle.

The following table is copied from the report:

TABLE II.—(Tuberculosis Committee.)

Average daily residents ...	Under 300	300 to 500	500 to 700	700 to 900	900 to 1,100	1,100 to 2,000
Number of asylums (77) ...	13	14	16	15	9	10
Tuberculous death-rate (per 1,000) ...	17	19	22	24	28	29

This is a very pretty table, and is a powerful argument against building large asylums. Curiously enough the Commissioners in Lunacy for England and Wales give in this year's Blue Book a table dealing with the same subject:

TABLE II.—(Commissioners in Lunacy.)

Average daily residents ...	under 500	500 to 1,000	over 1,000
Number of asylums (80) ...	17	38	25
Tuberculous death-rate (per 1,000) ...	16	15.8	15.6

As, however, the basis on which the asylums are divided are not the same in the Blue Book and in the report I have taken the divisions chosen in the report, and the figures work out:

TABLE II.—(Calculated from Blue Book.)

Average daily residents ...	Under 300	300 to 500	500 to 700	700 to 900	900 to 1,100	1,100 to 2,000	over 2,000
Number of asylums (80) ...	5	12	16	17	9	12	9
Tuberculous death-rate (per 1,000) ...	8.73	17.49	15.73	16.69	15.27	15.49	15.46