STATISTICAL ANALYSIS OF SUICIDE AND OTHER MORTALITY RATES OF STUDENTS

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There has been a good deal of interest in cases of suicide among students since Parnell (1951), Parnell and Skottowe (1957), and Rook (1959) have published papers describing high suicide rates among Oxford and Cambridge undergraduates. *The Times* (1959) drew attention to the fact that, as these studies are based on few cases, the suicide rates given may vary a good deal by chance. The following study, based on the figures given in Rook's paper, is an attempt to evaluate the statistical significance of the incidence rates found at the different Universities. The study also considers briefly other forms of mortality among students. No attempt is made to discuss the implication of the findings.

MATERIAL

DEATHS OF CAMBRIDGE UNDERGRADUATES.—Unless the General Register Office publishes figures, it is not easy to find out what mortality is occurring in a particular group of people. Since the University Health Service started in October, 1948, note has been taken of the deaths of undergraduates, and a careful watch has also been maintained on the three or four newspapers in which such deaths would most probably be reported.

Further, in 1958, a search was made by the Cambridge Medical Officer of Health of the records of deaths registered in the city, and the details of all deaths of university students were abstracted. The search started from the present and went back, with the exception of 2 years, as far as the beginning of the academic year 1923-24. Newspapers were scanned to cover the two years in the 1930s for which records were not available.

Finally the records held by the University Registry of all students who had failed to complete their course of study were searched. Occasionally these records showed that the student's studies had been

terminated by death. Such cases were noted when they occurred after October, 1923. In this way a few deaths that had happened in the vacations before October, 1948, were found, but the records in this respect were not complete.

If there was any uncertainty about the certified cause of death, the death certificate was consulted. It was also possible, through University Health Service records, from attendance at, and reports of inquests, and from other sources, to obtain the circumstances of death and other information.

Deficiencies due to the Methods of Collecting the Data.—The data on suicides among Cambridge undergraduates which were collected during the last 10 years are probably complete. Searching the records of deaths certified in the city did not bring any cases to light that had not already been noted, nor did the search of the University Registry records. The type of case that might have been missed would be a student who was admitted to a mental hospital other than in Cambridge, and who committed suicide while undergoing treatment. Such a case might not attract the attention of the press, and the death would probably be registered at the student's home address and not in Cambridge.

Before 1948 we can be certain of knowing only about deaths that occurred in Cambridge. This will cover most cases of suicide occurring in term time but not necessarily all. For example, cases are known to us of students who left Cambridge suddenly and committed suicide a few days later. In such cases the death certificate would show the temporary place of residence at the time of death.

The University Health Service can also be fairly sure of knowing about most climbing and motor accidents that have befallen students in the last 10 years, but a death due to an accident at home or while in temporary employment might have escaped notice.

Information about the number of deaths due to disease is less certain. Few are known, but students are a favoured class and few are to be expected. Some of the deaths which occurred outside Cambridge are unlikely to have attracted press attention, and so might easily have been missed.

Our knowledge of deaths from causes other than suicide is so limited in the period before 1948 that, apart from the study described in the next section, they have not been included in this analysis.

It will be clear from the above description of the way the data have been collected that, while some deaths may have been missed, there is no possibility that deaths otherwise certified have been accidentally included as suicides.

CONSISTENCY OF THE VERDICTS.—The circumstances in which the death occurred were scrutinized to see if the verdicts had been consistent over the years. The data were found to be entirely satisfactory in this respect with the exception of one verdict on an unusual case in the 1930s. Consistency requires that, although the cause of death in this case was brought in by the coroner as accident, it should be counted as a suicide for the present purpose. This has been done, but any effect is negligible.

THE POPULATION AT RISK.—This comprises the total undergraduate population of the University. These data based on the lists of Resident Members of the University have been recorded annually for many years in the *Cambridge Review* (1923 to 1958). A check of the 1951 list showed it to be correct to within 2 per cent.

DATA FOR COMPARISON.—The Registrar General's Statistical Reviews of England and Wales from 1921 to 1956 (Pubd 1923–1957) give suicide rates for England and Wales by age and sex for the population as a whole. In addition, the Registrar General's Decennial Supplements for 1921, 1931, and 1951 dealing with Occupational Mortality (1927a, 1938, and 1957) give details of mortality due to various causes, including suicide, by social class, age, and sex. In these Supplements the deaths of students are unfortunately grouped with those of other persons not gainfully occupied. However, the Registrar General kindly provided a table comparable to those in the 1951 Supplement showing the mortality rates for students due to accidents, suicide, and all other causes of death, by age for males and for all ages for females. It is a pleasure to acknowledge the very ready co-operation of the General Register Office. National statistics given in this paper come from, or have been calculated from,

figures from these sources and from the reports on the 1921, 1931, and 1951 Censuses (Registrar General, 1927b, 1950; General Register Office, 1958). These statistics are given without further reference as to the source.

Finally, it should be noted that a student is defined by the General Register Office as anyone receiving whole-time education. Persons receiving part-time education, apprentices, and those training to be nurses are excluded.

ANALYSIS

The national suicide rates show important sex differences. Also, the material relating to suicide for women students is very much more limited than that for men. The following analysis is therefore confined to males in the first instance, and such findings as there are for females are then briefly presented.

SUICIDE RATES AMONG CAMBRIDGE UNDERGRADUATES, AND THE FREQUENCY DISTRIBUTION OF SUICIDES.—Table I shows the population at risk, the number of suicides, and the suicide rates for male Cambridge undergraduates for four periods going back to October, 1923. These rates are all based on small numbers of cases and to draw any conclusions about them it is necessary to know what fluctuations are likely to be due to chance.

TABLE I
SUICIDE RATES FOR MALE CAMBRIDGE
UNDERGRADUATES, 1923–58
95 PER CENT. CONFIDENCE INTERVALS FOR THESE RATES
ARE ALSO SHOWN

Period	Average Undergraduate Population	No. of Suicides	Suicide Rate (per 100,000 per year)	95 per cent. Confidence Interval
Oct., 1923,– Sept., 1928	4,455	1	4.5	0.1 to 25.0
Oct., 1928,– Sept., 1938	4,814	10	20.7	10.0 to 38.2
Oct., 1938,– Sept., 1948	3,693	12	32.5	16.8 to 56.8
Oct., 1948,– Sept., 1958	5,950	13	21.8	11.6 to 37.4
Oct., 1923,– Sept., 1958	4,767	36	21.6	15.1 to 29.9

To be able to predict this, the pattern of the variations in the rates needs to be studied. This can be done by considering the variations in the numbers of suicides per year. If cases of suicide were independent events, we should expect a binomial distribution, or, since the probability of a student committing suicide is very small, a Poisson distribution. The assumption of independence implies that

the occurrence of a suicide does not greatly encourage, or discourage, suicide in similarly depressed students. This does not seem an unreasonable assumption, as any effect of this kind is likely to be very temporary. Further, the assumption of independence has been found to work well when considering mortality of all forms, in spite of the fact that some of it may be due to infectious epidemics (Carpenter and Cochrane, 1956).

Table II therefore compares the observed and expected distributions of the number of suicides per year.

TABLE II

OBSERVED DISTRIBUTION OF THE NUMBER OF SUICIDES PER YEAR AMONG MALE CAMBRIDGE UNDERGRADUATES, 1923-58, AND EXPECTED DISTRIBUTION IF SUICIDES WERE INDEPENDENT EVENTS

No. of Suicides per Year	No. of Years	Expected Frequency
0	15	13.51
1	9	11.65
2	8	6.39
3	2	2.48
4	—	0.74
5	1	0.18
6+	—	0.05
Total	35	35.00

The expected distribution was calculated as follows:

In each of four periods (October, 1923, to September, 1928; October, 1928, to September, 1938; October, 1938, to September, 1948; October, 1948, to September, 1958) the number of suicides per year were assumed to follow a Poisson distribution, the mean being given by the mean suicide rate for the period. The four means are shown in Table I. The expected frequency shown in Table II is derived from the sum of the four Poisson distributions.

It can be seen that the observed distribution follows the expected distribution very closely. The number of years are too few to apply any but a very crude test of agreement, but the departure from expectation could scarcely be less. It is therefore concluded that, at least within these periods, suicides may be regarded as independent events.

Hence, from Tables of the Poisson distribution (Pearson and Hartley, 1956), it is immediately possible to set confidence intervals to the suicide rates given in Table I, and these are shown in the last two columns of Table I.

A confidence interval may be briefly described as follows:

Suppose conditions relative to suicide in the University remained unchanged, it would then be possible to observe a very large number of students with the same risk of committing suicide as that run by any particular group under consideration. The rate that would be observed in the very large group can be regarded as the "true suicide rate". The confidence interval given for any observed suicide rate is an interval in which the corresponding true rate will almost certainly lie.

When dealing with very small numbers of cases, as in the present study, more attention should be paid to the confidence intervals and tests of statistical significance than to the particular rates that happen to be observed.

From the assumption of suicides being independent events, we may proceed to apply a χ^2 test to the data in Table I to determine whether there is any evidence that the suicide rate has changed during the last 35 years. χ^2 on three degrees of freedom is 5.07, giving $0.2 > P > 0.1$. There is, therefore, little evidence to suggest any real change in the rates, in spite of the fact that we only know of one suicide in the period October, 1923, to September, 1928.

Since there is little evidence of any change in the rates during the 35-year period, we may set a confidence interval to the mean rate for the whole period. If the incidence of suicide in the University remains unchanged, the suicide rate will, over a very long period, almost certainly lie between 15.1 and 29.9 per 100,000 students at risk per year. The chance of a repetition of the year in which five suicides occurred may also be calculated. If the suicide rate stays at its present level and the University at its present size (*i.e.* 7,300 undergraduates), five or more suicides in one year will, in the long run, probably not occur more often than once in 14 years and not less often than once in 180 years, and most likely about once in 40 years.

COMPARISON OF THE SUICIDE RATES AT VARIOUS UNIVERSITIES.—Table III shows the suicide rates that are being experienced by male students at Cambridge, Oxford, University College (London), and seven other British universities. The Table also shows confidence intervals for these rates. A χ^2 test shows that there are real differences between the experience recorded at the different universities, the rate at the seven British universities taken together being significantly lower than the rates at Cambridge

TABLE III
POST-WAR SUICIDE RATES FOR MALE STUDENTS AT VARIOUS UNIVERSITIES
95 per cent. Confidence Intervals are shown for these Rates and also which Rates are Significantly Different

Students	Duration of Observation (yrs)	Average Population	No. of Suicides	Suicide Rate (per 100,000 per year)	95 per cent. Confidence Interval	Significance of Differences*
Cambridge Undergraduates	10	5,950	13	21.8	11.6 to 37.4	}
Oxford Undergraduates	10	5,250	16	30.5	17.4 to 49.5	
Students of University College, London	7	2,500	4	22.9	6.2 to 58.5	
Students at Seven Other British Universities	8.5	15,000	10	7.8	3.8 to 14.4	

* Differences between rates which are bracketed together have a chance greater than 0.05 of occurring, *i.e.* these differences are not statistically significant.

or Oxford. The data for University College, London, are too small to indicate whether the true rate is higher than the rate at the seven other British universities or not, though the data so far suggest an experience comparable with that at Oxford and Cambridge.

COMPARISON WITH THE NATIONAL RATES: AGE.—Table IV shows the suicide rates for males in England and Wales in three age groups for the periods 1921–23, 1930–32, and 1949–53. At each period there is a definite rise in the suicide rate with age, a feature which is regularly observed.

TABLE IV
MALE SUICIDE RATES PER 100,000 PER YEAR IN ENGLAND AND WALES FOR THREE AGE GROUPS AND FOR THREE PERIODS

Period	Age Group (yrs)		
	16–	20–	25–34
1921–23	3.4	7.2	9.9
1930–32	3.8	9.8	13.3
1949–53	3.5	6.0	8.0

In the academic year 1951–52, 77 per cent. of the undergraduates came for medical examination during their first year. Over 90 per cent. of the men examined were in the age group 18 to 22, which implies that the majority of the university were in the age group 18 to 24, as most academic courses last for 3 years. The age range of the women examined was much narrower, 90 per cent. of them being aged 18 or 19. Most of the women undergraduates in the university therefore probably belong to the age group 18 to 21.

Before the war when there was no national service, the age distribution of the men was probably similar to that of the women in 1951. It remained much the same during the war, the majority of students

having come from school, but after the war the age range widened considerably owing to the large intake of men who had been in the forces during the war. The age distribution of the women students has probably altered little.

The national death rates are given for groups under 20, 20 to 24, 25 to 34, etc. The age group most comparable to that of university students is obviously the group 20 to 24. On account of the rise of the suicide rate with age, the national rate for this group will generally be a little too high. This will apply particularly to comparisons of pre-war figures for men and to rates for women. For the immediate post-war period rates slightly higher than those experienced by men aged 20 to 24 might be expected in the university, but the excess would be small.

It is concluded that the age group 20 to 24 is the appropriate group when comparing university suicide rates with national experience. To use the age group 15 to 24 for comparison, as Parnell (1951) has done, will probably tend to give an unfavourable picture of the mortality experienced at university.

CHANGES IN NATIONAL SUICIDE RATES SINCE 1921 AND THE EFFECTS OF SOCIAL CLASS.—The trends in national suicide rates for men aged 20–24 are shown in Table V (opposite), which gives the average rates in 5-year periods since 1921. The suicide rate rises to a peak in the period 1931–35 and then falls again, so that it is now just below what it was in 1921–25.

Social class also has an important effect on suicide rates, but national rates by age, sex, and social class can only be calculated for the periods 1921–23, 1930–31, and 1949–53. Table V shows clearly that these three periods will adequately represent the changes there have been in the suicide rates for the age group 20–24 since 1921.

TABLE V

SUICIDE RATES FOR MALES AND FEMALES AGED 20-24, BETWEEN 1921 AND 1955 IN FIVE-YEAR PERIODS, IN ENGLAND AND WALES (Civilians only)

5-year Periods	Rate per 100,000 per Year	
	Male	Female
1921-25	7.1	4.0
1926-30	8.4	4.5
1931-35	9.6	4.9
1936-40	8.9	3.8
1941-45	7.2	2.2
1946-50	6.1	2.5
1950-55	5.8	1.9

Table VI accordingly shows the population, the suicide rates, and confidence intervals for the rates, by social class in the three periods 1921-23, 1930-32, and 1949-53 for males aged 20-24. In these classifications students are included with all other persons not gainfully occupied. This group does not, however, contain those who are temporarily out of work, who are classified either by their last occupation or under a special code.

The numbers of students are given or may be determined from the Census Reports, but the numbers of student suicides are not generally available. The Registrar General, in a private communication, provided this information for the period 1949-53 and the rates for students are accordingly shown. The suicide rates for all other persons not gainfully occupied, and for all persons not gainfully occupied for 1949-53 are also shown in Table VI. It can be seen that students form so large a percentage of all persons not gainfully occupied in this age group that the suicide rate for the group as a whole

is only a little higher than for students alone. As students comprise more than 56 per cent. of all persons not gainfully occupied in the two previous periods it is thought that the suicide rates for all persons not gainfully occupied provide some guide as to the student suicide rates in these periods.

COMPARISON OF SUICIDE RATES IN VARIOUS GROUPS.

—The rates and confidence intervals set out in Table VI are illustrated in the Figure (overleaf). Some guide to the statistical significance of differences between groups may be obtained as follows:

If the rate for one group lies within the confidence interval for another the rates are not significantly different. If the confidence intervals for two rates do not overlap the difference is highly significant. Intermediate cases may or may not be significantly different.

Table VI and the Figure show that the rates for all males aged 20-24 in the three periods reflect the changes in the rates since 1921. The rise of the suicide rate in the 1930s and the subsequent fall to about the same rate as in 1921 is clearly shown in Social Classes II, III, and IV, and to a lesser extent in Social Classes I and V. The rates for all students do not however show this pattern. Presumably persons not gainfully occupied were not much affected by the social conditions which caused the rise in the suicide rates in the 1930s.

In consequence, the estimated rates for all students are significantly above the rates for all males in 1921-23. In 1930-32 the difference is not significant, and the observed suicide rate in Social Class II is higher than among all persons not gainfully occupied. In 1949-53 the suicide rates for all

TABLE VI

MALE SUICIDE RATES PER 100,000 PER YEAR IN ENGLAND AND WALES FOR THE AGE GROUP 20 to 24, BY SOCIAL CLASS, IN 1921, 1931, AND 1951

95 per cent. Confidence Intervals are also shown

Year		1921			1931			1951		
		Population (1921)*	Suicide Rate (1921-1923)	95 per cent. Confidence Interval	Population (1931)	Suicide Rate (1930-1932)	95 per cent. Confidence Interval	Population (1951)	Suicide Rate (1949-1953)	95 per cent. Confidence Interval
Social Class	I	23,186	4.3	0.9 to 12.6	21,778	7.7	2.5 to 17.9	35,618	6.7	3.5 to 11.8
	II	200,794	10.1	7.7 to 13.0	104,201	14.7	10.8 to 19.6	107,320	6.1	4.2 to 8.6
	III	614,342	6.3	5.2 to 7.6	933,168	8.4	7.3 to 9.5	836,118	4.8	4.2 to 5.5
	IV	327,927	6.1	4.7 to 7.9	335,223	11.2	9.3 to 13.5	218,348	5.5	4.2 to 7.1
	V	174,442	6.1	4.2 to 8.6	257,046	10.2	8.1 to 12.8	163,824	7.7	5.9 to 9.8
	Not gainfully Occupied	19,415	14.4	8.1 to 23.8	27,010†	14.0	8.5 to 21.6	53,659	15.7→	11.3 to 21.2
Students		15,211*			20,715			12,341	←17.0 22.7→	12.4 to 38.1
Others										
All Males		1,375,317	7.0	6.2 to 7.8	1,699,141	9.8	8.9 to 10.6	1,427,228	6.0	5.4 to 6.5

* Excludes active and retired members of the armed forces. ("Retired" means those who had retired from service who had not subsequently taken up civilian employment.)

† Estimated.

students aged 20-24 were again significantly above the rates for all males, and were also significantly higher than the rates in any social class.

Thus, in 1949-53, students aged 20-24 formed a group at special risk of committing suicide. The observed suicide rate for this group was 261 per cent. of that of all males of the same age. Estimates suggest there has been little change in the suicide rates among students since 1920.

The Figure also shows the suicide rates for various universities. The average rate for Cambridge students during the last 35 years is above the rates for all students, but the difference is not statistically significant. Nor is the difference significant if the experience in Cambridge in the last 10 years is compared to that among all students aged 20-24 in 1949-1953. The suicide rates among Oxford students in the period 1948-1957 is significantly above that of all students ($0.05 > P > 0.01$). The rates for University College, London, are very uncertain. The rate for the seven other British universities is below the rates for all students in England and Wales aged 20-24, but the difference is not statistically significant.

The suicide rate at Yale University over 35 years has been 13 per 100,000 per year (Parrish, 1957). The confidence interval for this rate is 7.3 to 21.5.

These figures are shown for comparison in the Figure. The rate at Yale is similar to that of all students aged 20-24 in England and Wales. It is not significantly below that observed at Cambridge, but is statistically significantly less than that reported at Oxford ($0.05 > P > 0.01$).

FACTORS AFFECTING SUICIDE RATES

Colour.—Three of the suicides that occurred in the last 10 years among Cambridge students were those of coloured students from overseas. Owing to the small population at risk this suggests a very high suicide rate among overseas students at Cambridge, but the number of cases is so small that the difference in suicide rates between them and the rest of the students is not significant. We do not know of any such overseas undergraduates at Cambridge committing suicide before 1948. If these three cases at Cambridge had been omitted from the 1948-58 data for Cambridge in the foregoing analysis, the conclusions would not have been altered in any way.

Age.—Table VII shows the age distribution of cases of suicide among male undergraduates for four periods. The cases form a fair sample of the undergraduate population, and the tendency for

undergraduates to be older since the war can be seen. Three cases however, seem somewhat older than the rest. These were all reading ordinary undergraduate courses leading to a B.A. degree, and it cannot be regarded as surprising that some cases of suicide should occur among the older undergraduates. What Table VII does show clearly is that the few older men at the University do not explain the high rates of suicide at Cambridge.

TABLE VII
AGE DISTRIBUTION OF SUICIDES AMONG MALE
CAMBRIDGE UNDERGRADUATES FOR FOUR PERIODS

Period	Age (yrs)									Total
	18	19	20	21	22	23	24	25	26	
Oct., 1923, to Sept., 1928	—	—	1	—	—	—	—	—	—	1
Oct., 1928, to Sept., 1938	—	5	2	1	1	—	—	—	1	10
Oct., 1938, to Sept., 1948	3	4	1	2	1	—	—	1	—	12
Oct., 1948, to Sept., 1958	1	2	6	3	—	—	1	—	—	13
Total ..	4	11	10	6	2	—	1	1	1	36

Time of Year.—Term-time* at Cambridge only lasts for 24 weeks of the year. The percentages of suicides occurring in term-time and at other times in the year are shown in Table VIII. The contrast between term-time and vacation is striking. The incidence of suicide is, however, known to fluctuate with the time of year. The fluctuations to be expected were estimated as follows:

The best control material is provided by the Registrar General's Weekly Returns (1923 to 1958),

* *Term-time* in this paper describes the period when the undergraduates are in residence, and corresponds to what in Cambridge is known as 'full term'.

Vacation in this paper describes any time other than term-time.

which show the number of suicides that have occurred in London each week by age and sex. The number occurring among males aged 20–24 were abstracted and tabulated by terms and vacations. The 8 weeks most closely corresponding to each term between October, 1923, and October, 1958, had previously been determined from the Ordinances of the University (1923 to 1958).

The results for London shown in Table VIII do not suggest that there has been any real difference between the suicide rate in term-time and vacation when the three terms and the three vacations are taken together. This applies to the periods both before and after October, 1948.

We, therefore, conclude from Table VIII that in the last 10 years the suicide rate in term-time among male Cambridge undergraduates has been rather more than double that shown in Table I, *i.e.* a rate of 47·3 per 100,000 per year. The confidence interval for this rate is 25·1 to 81·0 per 100,000 per year. For the whole period the term-time suicide rate has been 39·0 per 100,000 per year, and the confidence interval for the rate is 26·3 to 55·6 per 100,000 per year.

The association shown in Table VIII of the cases of suicide among the Cambridge undergraduates with term-time is highly significant ($0·01 > P$). This applies both to the whole period and to the last 10 years. There are two possible explanations: the first is that the suicide rate is higher in term-time because of the stress of life at the University; the other is that the association is caused by the oversight of cases that have occurred in the vacation.

The association of suicide with term-time over the last 10 years would not have been significant had six cases occurred in the vacations without coming to the notice of the University Health Service. This, in turn, would imply that the suicide rate among Cambridge undergraduates has been at least 31·9

TABLE VIII
PROPORTION OF SUICIDES EXPECTED TO OCCUR AND OCCURRING IN TERM-TIME AND AT OTHER TIMES AMONG MALE CAMBRIDGE UNDERGRADUATES AND AMONG MALES AGED 20–24 IN LONDON FOR THE PERIOD OCTOBER, 1923, TO SEPTEMBER, 1958

Group		Percentage Suicides Occurring			No. of Cases
		Term-time†	Vacation†	Total	
Cambridge Undergraduates	Oct., 1923, to Sept., 1948 ..	73·9	26·1	100	23
	Oct., 1948, to Sept., 1958 ..	100	—	100	13
	Whole Period	83·3	16·7	100	36
London Males aged 20–24 yrs	Oct., 1923, to Sept., 1948 ..	48·1	51·9	100	673
	Oct., 1948, to Sept., 1958 ..	45·1	54·9	100	206
	Whole Period	47·4	52·6	100	879
Expected Suicides*		46·2	53·8	100	—

* The expected percentage assumes equal suicide rates in term-time and at other times.

† See footnote on this page, col. 1.

per 100,000 per year over the last 10 years. Applying a similar argument to the whole period of 35 years, rejection of the hypothesis of suicide being associated with term-time implies that the suicide rate for the whole period must have been at least 30.0 per 100,000 per year. These rates are similar to the rate for Oxford University shown in Table III.

Probably both hypotheses are true, namely, that the occurrence of suicide is to some extent associated with term-time, and also that some unknown cases of suicide have occurred during the vacations so that the suicide rate has been higher than reported.

It was also thought that there might be a tendency for suicides to occur in the Easter Term when most of the examinations are held. The observed percentage of cases occurring in each term is compared with the percentage that occurred in London in Table IX.

TABLE IX

PERCENTAGE OF SUICIDES AMONG MALE UNDERGRADUATES IN EACH FULL TERM AT CAMBRIDGE BETWEEN OCTOBER, 1923, AND SEPTEMBER, 1958, COMPARED WITH THOSE IN COMPARABLE WEEKS AMONG MALES IN LONDON AGED 20-24 YRS

Group	Percentage Suicides				Total Suicides
	Michaelmas	Lent	Easter	Total	
Cambridge Undergraduates	26.7	30.0	43.3	100	30
London Males aged 20-24 yrs	27.3	38.1	34.5	100	417

The percentage that occurred in London varies significantly between the terms, so that the number of suicides would be expected to rise in the Lent and Easter terms, and the incidence would be expected to be maximum in the Lent term. The observed distribution of suicides at Cambridge shows some departure from this pattern. Thirteen of the thirty deaths that occurred in term-time occurred in the summer term, while only 10.4 would be expected from the London data, but the departure is not statistically significant. The departure was more marked in the period October, 1948, to September, 1958. In this period eight of the thirteen suicides occurred in the Easter term, which suggests that there may have been a change in the time of year at which cases tend to occur. The numbers are, however, too small for any definite conclusions to be drawn.

Year of Residence.—Table X shows the year of residence of the cases of suicide occurring in term-time. Suicides occurring in the vacation have been excluded because of the difficulty of defining the

year of the student, and also because the third year does not normally include a long vacation. In the first nine terms of residence, 29 suicides occurred. Equal numbers of these would be expected in each year, for although a few men go down before the third year the number is insufficient to make an appreciable difference to the population at risk. A χ^2 test shows that there are significantly fewer cases of suicide among third year students than expected. Only two of the cases were in their ninth term, and both occurred before October, 1948. The tendency in the period October, 1948, to September, 1958 seems to be for suicide to occur in the summer term of the second year, for six of the thirteen cases in this period occurred then. Thus, while there is some suggestion that in the 10 years since 1948 student suicides may be associated with second year examinations, there is nothing to suggest a general association with final examinations.

TABLE X

YEAR OF RESIDENCE OF SUICIDES AMONG MALE CAMBRIDGE UNDERGRADUATES OCCURRING IN TERM-TIME

Year of Residence	First	Second	Third	Fourth	Total
No. of Suicides	11	15	3	1	30

SUICIDE RATES FOR WOMEN STUDENTS.—During the 10 years October, 1948, to September, 1958, the average number of women undergraduates in Cambridge has been 630, and during this time there has been one suicide. This suggests that the suicide rate is comparable to that of male students, but the data are so small that the confidence interval for the true rate ranges from below 1 to over 80 per 100,000 per year, and clearly no conclusions can be drawn. One other case of suicide occurred among women students at the universities for which data have been published. In all, the population at risk is equivalent to observing 63,800 women students for one year. Two suicides occurred, giving an observed rate of 3.1 per 100,000 per year, and a confidence interval for the true rate of 0.4 to 11.3 per 100,000 per year.

The national suicide rates for women aged 20-24 have, since 1920, followed a pattern almost identical to that of the males as is shown in Table V, except that the rates for women have been about half the male rates. Table XI (opposite) shows the suicide rates for single women by social class for the period 1949-53. The pattern is similar to that of males of comparable age, but the numbers of cases are very small and the rates are therefore somewhat erratic.

The Registrar General, in the private communication already referred to, informed us that there were

TABLE XI

SUICIDE RATES PER 100,000 PER YEAR FOR SINGLE WOMEN AGED 20-24, BY SOCIAL CLASS, ENGLAND AND WALES, 1949-53

Women in England and Wales		Suicide Rate
Social Class ..	I	10.0
	II	2.6
	III	1.4
	IV	5.6
	V	1.1
Not Gainfully Occupied ..		4.2
All Single Women		2.1
All Women Students (aged 20-64)		4.4

seven cases of suicide among whole-time women students in England and Wales in the years 1949-53. The ages were not specified beyond indicating that they were over 20 and under 65. Even in the oldest age groups there are a few women who are whole-time students. At the 1951 census there were 31,999 women students over the age of 20 and under the age of 65, giving a suicide rate for the group of 4.4 per 100,000 per year. The 95 per cent. confidence interval for this rate is 1.8 to 9.1. However, as 81 per cent. of these women students were aged 20-24, and 94 per cent. of them were single, their suicide rate may be compared with the rates for single women aged 20-24 shown in Table XI. The

suicide rate for the women students is above the rate for all women aged 20 to 24, but the difference is not statistically significant. The only statistically significant difference is between the rate for women students aged 20-64 and women aged 20-24 in Social Class III ($0.05 > P > 0.01$). The rate of 1.1 for Social Class V is based on only two suicides.

The effect of including 19 per cent. of students over 25 would be to increase the suicide rate slightly. The suicide rate for all single women aged 24-34 in 1949-53 was 5.6 per 100,000 per year. On the other hand, suicide rates for married women are slightly lower than for single women, the rates in 1949-53 being 1.8 for all married women aged 20-24 and 3.3 for the age group 25-34.

Thus, although the national figures indicate that women students may have a slightly increased suicide rate, the difference is not statistically significant. Death rates from suicide in women are in any case substantially below the rates for men.

MORTALITY FROM ALL CAUSES.—Table XII shows the England and Wales death rates from all causes for male students in three age groups. The death rates for all other males in these age groups are shown by social class. For completeness, the death rates for students at Oxford and Cambridge are also shown, although the rates for Cambridge are probably too low.

TABLE XII

DEATH RATES PER 100,000 PER YEAR IN THREE AGE GROUPS FOR ALL MALE STUDENTS IN ENGLAND AND WALES AND FOR ALL MALES BY SOCIAL CLASS, WITH THE RATES FOR OXFORD AND CAMBRIDGE STUDENTS AT ALL AGES

England and Wales					Age Group (yrs)								
					16-19			20-24			25-34		
					Total Deaths (1949-53)	Popula- tion (1951)	Mean Death Rate (per 100,000 per yr)	Total Deaths (1949-53)	Popula- tion (1951)	Mean Death Rate (per 100,000 per yr)	Total Deaths (1949-53)	Popula- tion (1951)	Mean Death Rate (per 100,000 per yr)
All Students					243	106,543	46	311	53,659	116	136	22,992	118
All Males	Social Class	I	91	13,673	133	370	35,618	208	885	109,048	162		
		II	200	32,885	122	595	107,320	111	2,174	382,618	114		
		III	2,736	651,843	84	5,118	836,118	122	13,164	1,780,598	148		
		IV	812	156,204	104	1,471	218,348	135	3,731	479,834	156		
		V	537	85,036	126	1,277	163,824	156	3,619	338,975	214		
		Not Gainfully Occupied (excluding students) ..		782	6,768	2,311	725	12,341	1,175	1,309	25,656	1,020	
	Total		5,401	1,052,952	103	9,867	1,427,228	138	25,018	3,139,721	159		

Undergraduates (All Ages)			Total Deaths	Mean Population at Risk	Mean Death Rate
Cambridge (1948-57)*	..	..	37	5,950	62
Oxford (1947-49)	..	..	33	5,048	218

* Academic years

Table XII shows that students in England and Wales are a favoured class so far as mortality is concerned, their rates being lower than the rates for males of comparable age in any of the social classes. The death rates for Cambridge undergraduates are lower than the rates for all students aged 20–24. In contrast, the death rates among Oxford undergraduates in 1947–49 are significantly above the rates for all students aged 20–24 ($0.01 > P > 0.001$), and are comparable to the rates for males in Social Class I.

Table XIII shows the distribution of deaths according to cause for the groups shown in Table XII. Three groups of causes are shown: accident, suicide, and disease. Accidents, mostly motor accidents, cause a very high proportion of all deaths in Social Class I. As social class declines the proportion of deaths due to accident declines and the proportion due to disease increases. The very high death rates among those never gainfully occupied shown in Table XII are to be expected. This group will comprise all persons in institutions and all invalids, and, as shown in Table XIII, the majority of deaths in this group are due to disease.

The distribution of deaths among all students is noticeably different. This group has a favourable mortality experience from accident and disease and an unfavourable experience of suicide. Hence, the substantial increase in the proportion of deaths due to suicide. The proportion due to suicide is still

further increased among Oxford undergraduates, the increase being statistically significant. The distribution of deaths among Cambridge undergraduates again shows a higher percentage of suicides, the difference between the two universities being statistically significant. However, little weight can be put on the figure of 35 per cent. for the proportion of deaths among Cambridge undergraduates due to suicide. It is probably inflated by under-enumeration of deaths due to accident and disease. It serves, if anything, to show that the under-enumeration relates to causes other than suicide.

ALL FORMS OF MORTALITY AMONG WOMEN STUDENTS.—During the last 10 years five deaths have occurred among women undergraduates at Cambridge. Parnell (1951) records two deaths among women at Oxford in the period 1947–49. These seven deaths give a death rate of 73 per 100,000 per year.

Table XIV (opposite) shows the death rates for single women aged 20 to 24 by social class, and also the rate for all women students aged 20–64. It can be seen that the death rates for women at Oxford and Cambridge, and for all women students, are lower than the rates for single women in Social Classes I and III, and higher than those for single women in Social Class II.

As with males there is a tendency for the proportion of deaths due to accident to decrease as

TABLE XIII

PERCENTAGE OF DEATHS DUE TO VARIOUS CAUSES IN THREE AGE GROUPS FOR ALL MALE STUDENTS IN ENGLAND AND WALES AND FOR ALL MALES BY SOCIAL CLASS, WITH THE RATES FOR OXFORD AND CAMBRIDGE UNDERGRADUATES AT ALL AGES

England and Wales				Age Group											
				16-19				20-24				25-34			
Cause of Death				Accident	Suicide	All Other Causes	Total	Accident	Suicide	All Other Causes	Total	Accident	Suicide	All Other Causes	Total
All Students				31.7	7.4	60.9	100	37.0	13.5	49.5	100	19.9	15.4	64.7	100
All Males	Social Class	I	72.5	5.5	22.0	100	72.7	3.2	24.1	100	44.6	7.8	47.6	100	
		II	42.5	3.0	54.5	100	39.8	5.5	54.6	100	19.5	6.9	73.7	100	
		III	42.3	4.0	53.8	100	41.8	3.9	54.3	100	22.9	4.4	72.7	100	
		IV	45.2	3.2	51.6	100	38.7	4.1	57.2	100	23.2	4.9	71.9	100	
		V	36.0	3.2	60.9	100	27.9	4.9	67.1	100	20.2	6.5	73.3	100	
	Not Gainfully Occupied (excluding students)		9.7	0.5	89.8	100	5.2	1.9	92.8	100	6.0	1.8	92.2	100	
	Total		37.4	3.4	59.2	100	37.7	4.3	58.0	100	22.1	5.0	72.8	100	

Undergraduates (All Ages)		Cause of Death			
		Accident	Suicide	All Other Causes	Total
Cambridge	..	37.8	35.1	27.0	100
Oxford	..	48.5	27.3	24.2	100

TABLE XIV

DEATH RATES PER 100,000 PER YEAR FOR SINGLE WOMEN
AGED 20-24, BY SOCIAL CLASS, AND FOR ALL WOMEN
STUDENTS AGED 20-64, ENGLAND AND WALES, 1949-53

England and Wales			Death Rate (per 100,000 per year)
All Single Women	Social Class	I	85
		II	46
		III	83
		IV	117
		V	124
		Not Gainfully Occupied	329
	Total		112
All Women Students aged 20-64			66

social class decreases, but the change is not nearly so dramatic, the percentages ranging only from 16 to 5. The distribution of the 106 deaths among all women students, when divided into the three main groups (accident, suicide, and disease) is almost identical with that of single women aged 20-24 in Social Class II.

Thus the data relating to women students all suggest that their mortality experience is comparable with that of a group largely selected from the higher social classes.

SUMMARY

The methods of collecting data relating to cases of suicide among Cambridge undergraduates during the last 35 years, and to deaths from all causes during the last 10 years are described. Misclassification is unlikely, but under-enumeration could easily have occurred, especially of deaths due to disease. This is borne out by the distribution of deaths by cause.

A study of the frequency distribution of the numbers of deaths per year shows the assumption, that cases of suicide are independent events, to be reasonable. The use of standard statistical methods for handling Poisson and binomial variables is therefore justified.

There is no evidence that the suicide rates among male Cambridge undergraduates have changed during the last 35 years. If the University remains at its present size and the present suicide rates continue, five or more cases of suicide in one year are, in the long run, to be expected about once in 40 years, and not more than once in 14 years. One such year has already occurred.

Suicide rates for male undergraduates seem slightly lower at Cambridge than at Oxford, but they are significantly higher than the rates for men at seven other British universities.

Age has an important effect on suicide rates and the national rates for the 20-24 age group provide the best standard by which to compare the rates experienced in the universities. In this age group all social classes experienced a rise in the suicide rate in the 1930s, which was followed by a decline to about the 1920 level. National rates for students do not seem to show this pattern, but to have remained constant.

In the period 1949 to 1953, students in England and Wales experienced suicide rates significantly above the rates for males in any of the five social classes. The suicide rate in Cambridge during the last 35 years has been higher, but not significantly higher, than the national rate for students aged 20-24. The rate experienced in Oxford in the last 10 years is significantly higher than the national rate.

Three cases of suicide among coloured students from overseas studying at Cambridge have tended to inflate the suicide rate for the last 10 years, but there are not enough data to show whether coloured students are at any special risk, nor are the foregoing conclusions affected if coloured students are excluded.

The age distribution of students committing suicide corresponds to that of all students in the University. In the last 10 years the suicide rate in term-time has been about eight times the rate among all males. It seems probable that suicide is more likely to occur in term-time than in the vacation. There is little evidence to suggest that the number of suicides occurring during the term when most of the examinations are held is greater than is to be expected, although in the last 10 years 46 per cent. of the suicides have occurred in the Easter term among second-year students, which may represent a real change in the pattern of suicides. The figures for the whole 35 years show that suicide is more likely to occur during the first 2 years of residence than in the third, and there is nothing to suggest an association between the occurrence of suicide and the examinations held in the third year.

Suicide rates among single women aged 20-24 follow very much the same pattern as that described for men, but are lower. There is a slight suggestion that the rates may be higher for women students than for all single women, but the increase is not statistically significant.

Death rates from all causes are reviewed. The death rate among male students as a class is low, and that from all causes for Cambridge students may be lower than that experienced by all students. The death rate reported by Parnell (1951) for Oxford seems remarkably high.

As the suicide rates of male students tend to be above the rates for other groups, and their death rates from other causes are low, suicide accounts for a very much higher proportion of male student deaths than of deaths in other groups of the population.

Women students seem to have death rates typical of the social classes from which they are drawn.

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