Occupation and Mortality*

Filial Mortality

In an altogether too close and prolonged professional acquaintance with the Registrar General's Classification of Occupations one has often pondered the risk of being the son (or daughter) of men in different walks of life. It has, for instance, always seemed that there must be something chancy about the home background provided by a drowner (Code No. 029), ripper (044), bruiser (352), lynchman, scalper, gunman, first time mangler, or acid bath worker. What is the ultimate fate of the children of doublers, twisters, slickers, forgers, lurers-off, and vice folders? How delightful to be the child of a Christmas pudding worker, turkish delight maker, toffee dipper, or jelly boiler. And what happens when your father is a bogeyman or wizard?

These, and other similar questions provoked by this "Arabian Nights" collection of occupational descriptions might, one felt, have been answered by that part of the Registrar General's Decennial Supplement which deals with occupational mortality, and in particular with infant mortality. Any such hope was doomed to disappointment. These particular axes of classification have been unaccountably neglected. There is, nevertheless, a great deal of material in the section on infant mortality and stillbirths which is of interest to doctors in industry. For, though it may not be immediately apparent why the infant mortality of the children of men in different occupations should be a suitable subject for review in this *Journal*, a short examination of the data is enough to show how close is the relationship between the death rates of men in different occupations and the mortality of their babies. The mortality of their infants, moreover, together with the mortality of their wives (used for this purpose for the first time in the 1931 report), is a useful indicator of the healthiness of the men's home environment. It may thus help to determine whether a particular high mortality, which might appear to be a direct result of the men's calling, is or is not more likely to be attributable to the general factors which affect also their wives and children.

Social Class.—In this analysis of the mortality in the five years 1949-53 the well-known trend of infant mortality with social class appears, as it has in every previous analysis that has been made in the series of decennial supplements. This is in contrast to adult mortality where, for the first time, the analysis based on the data of the 1951 census shows an irregular trend with class. Nor is there any material decrease in the slope of the trend of infant mortality with social class compared

FIG. 1.—Decline in infant mortality in five social classes in England and Wales in 1921-51 for legitimate births.

with previous years. The differentials are much the same as they have always been in spite of the enormous reduction in the rate since say, 1921 (Fig. 1, c.f. Morris and Heady, 1955). Details of the social class trends are shown in Table I, where it will be seen that (again as usual) the class trend is much more pronounced in post-neonatal mortality (infant mortality after four weeks) than in neonatal mortality. The class trend in the stillbirth rate is also shown for the first time in this series of reports, and it will be seen that the gradient is similar to that of the neonatal mortality rate. Social class trends for some specific causes are also shown. The general picture is familiar to students of the subject, a striking gradient for pneumonia, gastro-enteritis, and deaths ascribed to "immaturity"—not so striking for congenital malformations. This is the first time in this series of supplements, however, that a class gradient in this direction for death due to birth injury has appeared.

Variations in infant mortality in different parts of the country are reported annually in the Registrar General's Statistical Review. The present volume shows that, broadly speaking, the social class variations in neonatal mortality, post-neonatal mortality, and the stillbirth rate described above were reproduced in each of the major regions of the country, and in rural as well as in urban areas. Conversely the regional pattern of high mortality in the north and west and low mortality in the south-east was broadly similar in each class.

Occupational Groups.—So far the results have been discussed in terms of social class, but of course each class is the aggregate of many different occupations, and the second volume of this report on occupational mortality gives the infant mortality and stillbirth rates of children of men in the 600 odd occupations which have a separate

*General Register Office (1957). *The Registrar General's Decennial Supplement, England and Wales (1951) Occupational Mortality*, Part II, vol. 1 and 2.

TABLE I
SOCIAL CLASS TRENDS IN INFANT MORTALITY
ENGLAND AND WALES, 1949-53. LEGITIMATE INFANTS

Social Class	Infant* Mortality	Neonatal* Mortality	Post-neonatal* Mortality	Stillbirth Rate†	Infant Mortality* from Five Selected Causes				
					Pneu- monia	Gastro- enteritis	"Imma- turity"	Congenital Malfor- mations	Birth Injury
I—Professional, etc.	18.7	14.0	4.7	16.3	1.9	0.5	3.9	3.6	2.1
II—Intermediate	21.6	15.6	6.0	19.9	2.7	0.7	4.6	3.6	2.4
III—Skilled workers	28.6	18.3	10.4	22.5	4.6	1.4	5.7	4.5	2.7
IV—Partly skilled workers	33.8	20.0	13.7	24.5	6.2	1.9	6.4	4.8	3.0
V—Unskilled workers	40.8	22.8	18.0	27.4	8.2	2.9	7.6	5.1	3.0
All classes	29.5	18.6	11.0	22.8	4.9	1.5	5.8	4.5	2.7

*Rate per 1,000 live births.

†Rate per 1,000 live and stillbirths.

Neonatal mortality, *i.e.*, deaths at ages under 4 weeks.

Post-neonatal mortality, *i.e.*, deaths at ages 4 weeks to 1 year.

For full details see Tables ES, EX, and FK of the commentary volume.

TABLE II
OCCUPATIONAL GROUPS WITH HIGHEST AND LOWEST INFANT MORTALITY RATES
ENGLAND AND WALES, 1949-53. LEGITIMATE INFANTS

Occupational Group No.	Description	Social Class	Infant Mortality	Stillbirth Rate
A. Ten Groups with Highest Rates				
4	Coal-miners (coalface coal getters, loaders)	III	46.9	29.4
5	Coal-miners (workers below ground, not coalface)	IV	43.1	26.7
19	Iron foundry labourers	IV	42.4	25.0
10	Coal-miners ("other" workers, above ground)	IV	40.7	31.0
40	Openers, sorters, blenders, carders, etc. (textile)	III and IV	40.7	24.4
82	Costermongers, newspaper sellers, and other hawkers	V	39.9	27.6
69	Locomotive engine drivers and motormen	III	39.4	26.3
61	Platelayers	IV	38.9	32.0
58	Builders', bricklayers', plasterers', masons' labourers	V	38.3	25.8
18	Iron or steel foundry furnacemen	IV	38.1	23.0
	All occupations		29.5	22.8
B. Ten Groups with Lowest Rates				
85	Clergymen (Church of England)	I	16.2	17.0
89	Registered medical practitioners, radiologists	I	16.7	13.2
66	Civil service and local authority administrative and executive officers	I and II	17.4	18.0
91	Teachers (not music)	II	17.7	17.0
92	Professional engineers, surveyors	I	17.7	16.5
87	Ministers of other religious bodies, <i>i.e.</i> , not C. of E. or R.C.	I	17.8	19.0
31	Radio and radar mechanics	III	17.8	17.0
88	Judges, barristers, etc., solicitors	I	19.3	12.9
76	Owners, etc., of wholesale businesses	II	19.7	18.0
93 and 94*	Armed forces, commissioned officers, (active and retired)	I	20.0	14.9

*These two occupational groups have been combined to form the tenth in this table since their infant mortality and stillbirth rates are not given separately.

Rates calculated on less than 50 deaths are shown in italics. None of the rates is calculated on less than 30 deaths.

codenumber in the Classification of Occupations (Registrar General, 1951). The first volume, which is the commentary on the tables in the second volume, does not deal with this information in any detail, presumably for reasons of space, and of course there is no room for extensive treatment here. Since, however, analysis of the social class variation in infant mortality in terms of the constituent occupations and groups of occupations can be revealing, it seemed worth while at least to compute the infant mortality and stillbirth rates of the 110 "occupational groups" which the Registrar General uses for detailed analysis of the adult mortality by age and cause of death. The 10 occupational groups with the highest infant mortality rates and the 10 with the lowest rates are shown in Table II, together with the corresponding stillbirth rates and the social classes to which the

individual occupations which make up the groups are assigned. This table is interesting for the additional information it gives over and above the usual picture of infant mortality as being closely determined by "social class". The occupations in each of these extreme groups do not by any means come only from the social classes at either end of the class scale. Miners in Social Class III have the highest rates, while one occupation from Social Class III figures in the 10 groups with the lowest rates. High income is no essential qualification for inclusion amongst the group with the lowest rates. Clergymen, teachers, and civil servants are not the richest of the rich. Nor is very low income the hall-mark of the man in the high risk group. It is true, of course, that no occupations from social classes I and II appear amongst the 10 with the highest rates, nor do any from classes IV and V

TABLE III
INFANT MORTALITY, STILLBIRTHS, AND ADULT MALE MORTALITY IN OCCUPATIONAL GROUPS WITH HIGH AND LOW MORTALITY RATES. ENGLAND AND WALES, 1949-53

10 Occupational Groups with Highest Infant Mortality Rates							
Occupational Group No.	Description	Infant* Mortality	Stillbirth* Rate	Male S.M.R., at Ages 20 to 64, for			
				Respiratory Tuberculosis	Chronic Rheumatic Heart Disease	Pneumonia	Bronchitis
4	Coalface getters and loaders	159	129	119	110	112	135
5	Coal-miners below ground	146	117				
10	Coal-miners above ground	138	136				
19	Iron foundry labourers	144	110	130	104	212	177
40	Openers, sorters, blenders, carders, etc.	138	107				
82	Costermongers, hawkers, etc.	135	121				
69	Locomotive engine drivers and motormen	134	115	65	68	65	86
61	Platelayers	132	140				
58	Building trade labourers	130	113				
18	Iron and steel foundry furnacemen	129	101	(82)	(25)	(120)	100
10 Occupational Groups with Lowest Infant Mortality Rates							
85	Clergymen (C. of E.)	55	75	40	87	(40)	(10)
89	Registered medical practitioners	57	58	49	48	59	24
66	Civil Service and local authority administrative and executive officers	59	79	45	58	43	30
91	Teachers (not music)	60	75	29	57	33	21
92	Professional engineers, surveyors	60	72	42	44	49	28
87	Ministers of other religious bodies (not C. of E. or R.C.)	60	83	40	(33)	(27)	(7)
31	Radio and radar mechanics	60	75	82	108	(30)	(38)
88	Judges, barristers, etc., solicitors	65	57	58	59	63	26
76	Owners, etc., of wholesale businesses	67	79	47	65	63	49
93	Armed forces, officers—active	68	65	32	(17)	(22)	(74)
94	Armed forces, officers—retired			237	91	80	77

*Infant mortality and stillbirth rates are expressed as a percentage of the rate for all occupations for ease of comparison with the S.M.R.s. The rates are shown in Table II.

S.M.R.s calculated upon less than 50 deaths are shown in italics, those calculated on less than 10 deaths are also enclosed within brackets. The S.M.R.s for the separate occupational groups in the coal-mining industry are not shown because of the doubt cast in the report itself on the validity of such distinctions.

appear amongst the 10 with the lowest rates. Apart, however, from this general agreement these occupational groups cut across most of the accepted social classifications, except perhaps the ancient social stratification of those who do the rough work and those who don't. For the 10 with the highest rates include several from really "black" industry—coal-miners, foundry labourers, furnacemen, plate-layers—almost brute labour so far as it now exists. At the other extreme are "white collar" jobs where no-one is likely to get his hands dirty. On the whole it will be seen that the stillbirth rates correspond with the infant mortality rates.

Comparison with Mortality of Adult Males.—Further interest is added to the infant mortality rates of the children of men in these occupations when the mortality of the men themselves is considered. Table III takes the same occupational groups and gives their standardized mortality ratios for four causes of death—respiratory tuberculosis, chronic rheumatic heart disease, pneumonia, and bronchitis—which, like infant mortality, show, and have shown since "social class" was invented, a striking class gradient, with high mortality in social class V. For each of these causes this class gradient is present also for the wives of men in these classes. They are therefore four thoroughly class-conscious killers. For ease of comparison the infant mortality and stillbirth rates have been dressed up to resemble standardized mortality ratios, *i.e.*, the rate has been expressed as a percentage of

the rate for all classes or occupations. It will be seen that, with some exceptions which are themselves interesting, where the infant mortality rate is low the mortality from these four causes is also low, and where the infant mortality is high the mortality from these causes is high. This is, of course, partly a consequence of the fact that, in each case, the class trend is similar to the class trend for infant mortality. But this is not the whole story, for, as has been stressed above, the occupations do not follow the class pattern at all rigidly, though conforming to it in a general way. It is interesting that these four conditions, in three of which the mortality has declined, though for different reasons, while mortality in the fourth remains obstinately high, should show this degree of similarity in their occupational distribution, both amongst themselves and with infant mortality. It can be seen from this table also how useful, in a question-raising way, it can be to put side by side the occupational mortality for adult males, adult females, and their children. The high rates for pneumonia and bronchitis in foundry workers, for instance, is not so obviously and wholly occupational in origin when it is known that their infants also have a high mortality, especially since respiratory infections comprise nowadays the most important single group of causes of infant death. Conversely, the relatively low adult mortality from these four causes of engine drivers, motormen, and plate-layers contrasts strangely with the high infant mortality of their children.

Individual Occupations.—The next, more detailed, stage in classification of occupational groups consists of those occupations designated by a single code number in the Classification of Occupations and reveals even higher infant mortality and stillbirth rates. Limiting the discussion to those occupations where there were 50 or more infant deaths (or stillbirths) in the five years one finds the infants of kitchen hands and of other indoor domestic servants with mortality rates of 55.3 and 61.0 per thousand respectively; of “other fitters” with a rate of 60.3; of fishermen with 55.1; of plasterers’ labourers and drivers of horse-drawn vehicles with 50.1; and of non-ferrous foundry furnacemen with 50. Stillbirth rates in the 40s are also returned though the groups concerned are not very closely defined, being largely such categories as “other fitters” (with a rate of 47 per thousand), etc. There were no single occupations with rates appreciably lower than for the occupational groups shown in Table II B.

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Clearly there is scope for much quarrying of this mine of material and much speculation on the reasons for such differences. Current theories about the importance of the quality of maternal care, of the mother’s education, of the different customs of child care handed down from mother to daughter, of the mother’s childhood background, of the differences in availability and of summoning medical help, of the spread of infection, can receive support and discouragement from these figures. There is no space to do more than indicate the extent of the information available.

Reliability of Occupational Data.—One further general point should be mentioned, namely the reliability of the occupational data. In dealing with adult mortality the Registrar General has, very honestly, raised important doubts about the validity of the rates he has published. This is largely because the information about occupations comes from two sources, from census schedules for the “population”, or denominator of the mortality rate, and from the death registration documents for the deaths, or numerator of the rate. These may not tally for various reasons: changes of job which mean that the distribution of jobs at the census does not reflect the distribution over the five-year period, differences between census description and death registration description of the same job (in the one case by the man himself and in the other by his widow, for instance) and so on. Moreover, the man may have changed his job because of the illness which finally kills him. Important as these effects may be in adult mortality they are likely to be less important in the analysis of infant mortality by the father’s occupation. For, though information about the numerator and denominator comes from two sources as in adult mortality (in infant mortality the two sources are birth and death registration), the first volume of the present report on occupational mortality describes the results of a special enquiry which shows clearly that the effect of such differences is unimportant in infant mortality. In stillbirths, of course, they do not arise. It is also clear that the

father will rarely change his job because his child is ill, so that another reason for doubting the validity of adult occupational mortality rates is not present in the statistics of infant mortality. One particular group of occupations, the validity of whose adult mortality rates has been most seriously questioned in the report, is the group concerned with coal-mining; particularly where comparisons are made between different occupations within the industry. In infant mortality, these difficulties are unimportant since the rates for all three groups of miners distinguished in Table IIA are similar and all well above average.

The fact that differences between the descriptions of occupations on two different occasions, and, quite likely, by two different people, do not appear to affect the validity of infant mortality rates to an important extent alleviates, though it by no means disposes of, corresponding doubts about adult occupational mortality rates. It also adds authority to the evidence mentioned above, on the parallelism of decline of infant mortality rates in different classes and occupational groups over the past few decades.

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Mortality in Mining and Quarrying Occupations

Mining is a good example of the caution needed in the interpretation of death rates tabulated by occupation. The report of a standardized mortality ratio above the national average raises two questions: Is it correct, and, if correct, does it necessarily imply a hazard to life specific to the occupation? As the Registrar General points out in this section of his Commentary, studies designed to answer these questions have been sponsored by the National Coal Board and carried out, with the help of the Board and the General Register Office, in the Department of Medical Statistics and Epidemiology at the London School of Hygiene and Tropical Medicine. The first report of the work was recently published (Heasman, Liddell, and Reid, 1958). Briefly, a comparison of occupation as given either by the informant at the time of death registration or as ascertained by local inquiry largely at the pit where the dead man used to work showed quite serious discrepancies. In general, there was a marked tendency for “promotion” from retirement or doing another job back to the mine; and within the mine, men tended to be described by the informant as coal-face workers. Again, where the description was the rather vague one of “coal-miner”, the General Register Office coding conventions assigned the death to the faceworker category. To a lesser extent, the same trends operated even in self-description at the time of census. Although these similar errors in assignment tended to cancel each other out, the net result was still an inflation of the reported death ratio for miners in general and faceworkers in particular, it seemed likely, in fact, that miners do not have a death rate much above the national average and that among men whose