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Stillbirths: The Case for their Compulsory Registration and their Definition.

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IF any confidence can be placed on present indications, changes may be anticipated at no very distant date in the laws dealing with the registration of births and deaths. The present occasion is not one for a general discussion of the amendments which are necessary or desirable, and only one—viz., the registration of stillbirths—will be dealt with. The discussion on the mortality of infants during the first month of life which took place at the recent International Medical Congress, and the Royal Commission on Venereal Diseases now sitting, furnish additional justification for a careful consideration of the relationship between the causes of stillbirths and those of infantile mortality.

As the main object of this paper is to demonstrate the urgent necessity of official cognizance being taken of prænatal mortality, it appears to be desirable to begin with the evidence in support of the contention that the study of the causes of stillbirths is essential for the reduction of infantile mortality below its present level.

I.

This country, in common with many others, is faced with the problem of a much reduced output of new lives, associated with an exodus of population on a vast scale to new countries. It is generally recognized that national growth and national prosperity are intimately associated the one with the other, so that the reduction in reproductivity

[1] Joint Meeting with the Obstetrical and Gynæcological Section.

is a question of the highest importance. The changes in the birth-rate which have taken place in this country during the half century 1861-1910 are shown in Table I. The crude annual birth-rates have been

TABLE I.—ENGLAND AND WALES.

Quinquennia	AVERAGE ANNUAL RATES			INDEX-NUMBERS		
	Births	Deaths	Natural increment	Births	Deaths	Natural increment
1861-65	35·14	22·58	12·56	100	100	100
1866-70	35·28	22·42	12·86	100	99	102
1871-75	35·48	21·96	13·52	101	97	108
1876-80	35·36	20·80	14·56	101	92	116
1881-85	33·54	19·40	14·14	95	86	112
1886-90	31·44	18·88	12·56	89	84	100
1891-95	30·48	18·74	11·74	87	83	93
1896-1900	29·26	17·68	11·58	83	78	92
1901-05	28·16	16·06	12·10	80	71	96
1906-10	26·26	14·70	11·56	75	65	92

used because the question for consideration is the total annual harvest of new lives, and not one of fertility measured by the proportions of fecund individuals in the population. The birth-index-number for the quinquennium 1906-10 (75) shows a fall of 25 points below that for the quinquennium 1861-65, a change which means that the yield in the last quinquennium was only three-quarters of that of the first. The reduction in the annual rate of natural increment does not show a decrease commensurate with the reduction in the harvest of new lives, the increment-index-number for 1906-10 being only 8 points below that for 1861-65. The maintenance of the rate of increment has been due to the great reduction in the total mortality at all ages, the death-index-number showing a fall of 35 points in 1906-10. Owing to the drain of emigration the actual increment of the population as determined at the census has been nothing like so great as that indicated in the table.

While the total mortality during the fifty years under review has

steadily decreased, the infantile mortality has fluctuated in an irregular manner, first decreasing, then increasing, and in the last two quinquennia notably decreasing. Table II shows how that rate—in quinquennial averages—has moved. In the last quinquennium the index-number was 23 points down as compared with 35 in the case of the total (all age) mortality. Moreover, as will now be shown, the nearer to birth the less the actual reduction in mortality. To illustrate this the data for the twenty years 1891-1910 will be used. It is a coincidence that the total infantile mortality in 1891 was the same as in 1861—viz., 151 per 1,000 births.

TABLE II.—ENGLAND AND WALES.

Quinquennia	INFANTILE MORTALITY	
	Average annual rates	Index-numbers
1861-65	151	100
1866-70	157	103
1871-75	153	101
1876-80	144	95
1881-85	134	91
1886-90	145	96
1891-95	151	100
1896-1900	156	103
1901-05	138	91
1906-10	117	77

Table III gives the average mortality-rates from all causes per 1,000 births recorded in the four quinquennia 1891-1910, for the first year of life and for the three subdivisions of that year for which data are given in the Annual Reports of the Registrar-General. Attention will be more profitably given to the index-numbers. The general trend of the figures is the same for persons, males and females, but some occasional irregularities can be observed. For the whole year there is to be seen a fall of 22 points in the persons-index-number. At ages under 3 months the fall is 14 points only, increasing to 29 at ages 3 to 6 months, and 30 at ages 6 to 12 months. It may be objected that

mortality-rates in the second and third age-periods ought to be calculated on the survivors at those ages rather than the number of children born. To meet such objection Table IV has been prepared, but the results do not differ materially from those given in Table III. The extent to which the present methods of checking mortality become less effective as the data are drawn from the opening months of life is illustrated by the following comparison:—

		Mortality at ages	Reduction in index-number (1906-10)
For fifty years, 1861-1910	...	All ages	35 points
		Under 1 year	23 ,,
For twenty years, 1891-1910	...	All ages	22 ,,
		(Under 1 year	·22) ,,
		6 to 12 months	30 ,,
		3 to 6 ,, ...	29 ,,
		0 to 3 ,, ...	14 ,,

TABLE III.—ENGLAND AND WALES.

Quinquennia	MORTALITY-RATES (PER 1,000 BIRTHS)				INDEX-NUMBERS			
	At ages (months)			Under one year	At ages (months)			Under one year
	0—	3—	6-12		0—	3—	6—	
				Persons.				
1891-95	73·53	31·08	45·89	150·51	100	100	100	100
1896-1900	74·41	33·54	48·13	156·09	101	108	105	104
1901-05	69·63	27·77	40·41	137·82	95	89	88	91
1906-10	62·97	22·01	32·08	117·07	86	71	70	78
				Males.				
1891-95	82·18	33·85	49·09	165·13	100	100	100	100
1896-1900	83·18	36·17	51·00	170·37	101	107	104	103
1901-05	78·29	30·17	42·89	151·36	95	89	87	92
1906-10	70·95	23·89	34·15	129·01	86	70	69	78
				Females.				
1891-95	64·57	28·22	42·56	135·36	100	100	100	100
1896-1900	65·33	30·81	45·15	141·30	101	109	106	104
1901-05	60·64	25·28	37·83	123·77	94	89	89	91
1906-10	54·69	20·05	29·92	104·67	85	71	70	77

Unfortunately, the data published in the Annual Reports of the Registrar-General do not permit any inquiry as to the changes in the rates of mortality at ages less than 0-3 months. The requisite data for the twenty years 1891-1910 are, however, available for one London Borough—viz., Paddington. The Paddington data are based on deaths occurring among (on an average) 3,000 children born each year. To

TABLE IV.—ENGLAND AND WALES.

Quinquennia	Mortality per 1,000 born and surviving at ages (months)			Index-numbers		
	0—	3—	6-12	0—	3—	6-12
			Persons.			
1891-95	73·53	33·55	51·25	100	100	100
1896-1900	74·41	36·24	53·95	101	108	105
1901-05	69·63	29·85	44·77	95	89	87
1906-10	62·97	23·49	35·06	86	70	68
			Males.			
1891-95	82·18	36·88	55·53	100	100	100
1896-1900	83·18	39·45	57·92	101	107	104
1901-05	78·29	32·73	48·11	93	89	87
1906-10	70·95	25·72	37·74	86	70	68
			Females.			
1891-95	64·57	30·17	46·92	100	100	100
1896-1900	65·33	32·97	49·95	101	109	106
1901-05	60·64	26·92	41·39	94	89	88
1906-10	54·69	21·21	32·34	85	70	69

afford a standard of comparison with the whole country the average quinquennial rates calculated as before are set out in Table V, together with the index-numbers. The figures given in this table should be compared with those in Table III. On the whole there is a general agreement between the two tables, but the figures in Table V show greater irregularities than those observed in Table III. Such differences are to be expected having regard to the smaller population from which the data are drawn.

The index-numbers in Table V for persons show the same diminution in the decrease in mortality at the lower ages. At ages 6 to 12 months the mortality in the fourth quinquennium was 39 points below that recorded in the first; at ages 3 to 6 months 30 points, and at ages 0 to 3 months only 17. Passing to Table VI, a similar phenomenon

TABLE V.—PADDINGTON.

Quinquennia	MORTALITY-RATES				INDEX-NUMBERS			
	At ages (months)			Under one year	At ages (months)			Under one year
	0—	3—	6-12		0—	3—	6-12	
				Persons.				
1891-95	73·75	29·50	44·39	147·65	100	100	100	100
1896-1900	75·84	33·08	47·13	156·05	103	112	106	106
1901-05	65·36	26·33	36·97	128·67	89	89	83	87
1906-10	61·54	20·71	27·24	109·49	83	70	61	74
				Males.				
1891-95	79·61	30·53	49·87	160·02	100	100	100	100
1896-1900	85·30	35·47	52·17	172·94	107	116	105	108
1901-05	73·50	28·44	39·56	141·50	92	93	79	88
1906-10	68·86	22·65	29·86	121·38	86	74	60	76
				Females.				
1891-95	67·67	28·42	38·69	134·79	100	100	100	100
1896-1900	65·77	30·53	41·77	135·30	97	107	108	100
1901-05	56·94	24·13	34·29	115·37	84	85	89	85
1906-10	53·84	18·67	24·48	97·00	79	66	63	72

can be observed in the three age-periods therein given, the reduction in the fourth quinquennium amounting to 12 points at ages under 1 month, to 14 under 1 week, and to 4 only at ages under 1 day. So that it may be accepted as demonstrated that the present methods employed for combatting infantile mortality are of comparatively little effect upon those causes of mortality which are operative during the earliest days of extra-uterine life.

The commonest causes of death in the first month of extra-uterine life are (1) premature birth, and (2) congenital defects and malformations. The mortality from those causes during the past twenty years has increased, a fact which is clearly shown by the figures in Table VII. In the whole country the index-number for premature birth shows an

TABLE VI.—PADDINGTON.

Quinquennia	MORTALITY-RATES			INDEX-NUMBERS		
	Under one month	Under one week	Under one day	Under one month	Under one week	Under one day
			Persons.			
1891-95	42·69	26·17	12·57	100	100	100
1896-1900	46·46	26·35	13·64	109	101	108
1901-05	39·34	21·83	10·51	92	83	84
1906-10	37·53	22·55	11·87	88	86	96

TABLE VII.—ENGLAND AND WALES.

Quinquennia	MORTALITY-RATES				INDEX-NUMBERS			
	Premature birth	Congenital malformations	Totals	All other causes	Premature birth	Congenital malformations	Totals	All other causes
				Persons.				
1891-95	18·42	4·03	22·45	128·05	100	100	100	100
1896-1900	19·61	4·33	23·95	132·13	106	107	107	103
1901-05	20·25	6·19	26·47	111·35	110	154	118	87
1906-10	19·92	7·02	26·95	90·12	108	174	120	70

increase of 8 points, that of congenital defects of 74 points. While the index-number for the total mortality from these two causes shows an increase of 20 points, that for the mortality from all other causes shows a decline of 30 points. From the Paddington data (Table VIII) it appears that the index-number for premature birth has fallen by 3 points, and that for congenital defects risen by 41 points.

It will be observed that in both tables there are sudden changes in the figures in passing from the second to the third quinquennium. New tables of classification were introduced in 1901, and doubtless the changes observed in the tables should be attributed to that fact. There remains, however, the further fact that in each case there has

TABLE VIII.—PADDINGTON.

Quinquennia	MORTALITY-RATES				INDEX-NUMBERS			
	Premature birth	Congenital malformations	Totals	All other causes	Premature birth	Congenital malformations	Totals	All other causes
				Persons.				
1891-95	19·57	5·30	24·88	122·77	100	100	100	100
1896-1900	20·43	7·53	27·97	128·08	104	142	112	104
1901-05	18·54	6·20	24·75	103·92	95	117	99	85
1906-10	18·93	7·45	26·38	83·11	97	141	106	68

been recorded in each decennium an increased mortality from these causes. This is shown by the following figures:—

Increase in index-number		England and Wales	Paddington
Premature birth and congenital defects	Second quinquennium (First ,, = 100)	... + 7	... + 12
	Fourth quinquennium (Third ,, = 100)	... + 1	... + 6

The conclusion which appears to be the natural outcome of the foregoing statistics is that the present methods adopted to limit infantile mortality are insufficient, inasmuch as they have little or no influence on the antenatal causes of such mortality. Doubtless more success in reducing post-natal infantile mortality may be anticipated from the present methods in the near future, but there will still remain the necessity for taking action against antenatal conditions prejudicial to infant life and health. It will be admitted that at present the available knowledge of such conditions is but scanty. It is with a view to extending such knowledge that the registration of stillbirths is advocated. A study of the causes of stillbirths will furnish not only information as

to the measures necessary to prevent that form of mortality, but will also greatly assist the study of the causes of post-natal mortality and ill-health.

II.

Passing on to a consideration of the practice of registration of still-births, it appears from the Report issued by the Royal Statistical Society in 1912, that in countries[1] where the registration of births is required, the registration of stillbirths is compulsory except in

> England and Wales, Ireland, Scotland, Gibraltar, Cyprus, Hong Kong, Gambia, Orange Free States, Sierra Leone, Jamaica, New Brunswick, New South Wales, New Zealand, Queensland, South Australia, Tasmania, Victoria, and Denmark.

As regards the last-named country, registration is practically universal, although not required by law. In fact, it appears that it is only in such registration countries as may be assumed to have framed their registration laws on the English model that the registration of still-births is not required.

The present position of the General Register Office towards still-birth can best be illustrated by the following extract from the Official Instructions to the Registrars:—

"No record of stillborn children may be made in a register of births or deaths. Even when an inquest has been held and when, according to the finding of the jury, the child was stillborn or there was not sufficient evidence to prove that the child was born alive, no record may be made."

In effect, stillbirths are *qua* registration non-existent. This attitude is attributable to the inclusion — an unfortunate one — of the word "alive,"[2] in Section 1 of the Births and Deaths Registration Act, 1874 (37 and 38 Vic. c. 88).

It may be urged, that inasmuch as the Notification of Births Act, 1907, requires stillbirths to be notified, registration is unnecessary.

[1] The Report collated information furnished by 100 registration offices scattered throughout the world. On page 3 of the Report there will be found a list of the countries and states from which no information was received.

[2] The Section opens, "In the case of every child born alive after the commencement of this Act. . . ." The repeal of the word "alive" would enable the registration of stillbirths to be enforced.

That Act is, however, an adoptive one, and at the present time is in force in 407 out of 1,809 sanitary districts, with a population (Census, 1911) of 21,196,901 persons, the total population of the country being 36,070,492.[1] Such defect could be remedied by an Order of the Local Government Board putting the Act into operation throughout the country. There would still remain other and more serious defects. The notification of stillbirths is far from complete even in those districts where the Act has been in operation for some time and efforts have been made to secure due compliance with the law. On this point the following paragraphs from the Registrar-General's Annual Summary for 1912 afford fairly convincing evidence.

Writing on the notifications recorded in London (p. xii) he observes:—

> In addition to the notification of 103,708 live-born children (92·0 per cent. of the births registered) 2,593 stillbirths were notified, the latter being equal to 2·4 per cent. of the total, against 2·3 per cent. in 1911, 2·2 per cent. in 1910, and 2·3 per cent. in 1909, when the Act was only partially in force.

He goes on to compare (in a footnote) the foregoing proportions with those recorded in certain Continental cities where the registration of stillbirths is in force:—

> It may be interesting to note that this percentage of stillbirths is generally exceeded in European towns. Thus, in the years 1909 or 1910, the proportion was 2·8 per cent. in Prague; 3·3 per cent. in Breslau, Stockholm, and Milan; 3·7 per cent. in Vienna and Munich; 3·9 per cent. in Dresden; 4·4 per cent. in Antwerp; 5·3 per cent. in Brussels; and in Paris, during the years 1896-1906, it averaged 8·6 per cent.

It should be noted that he calls attention to the fact that the definition of stillbirth varies in the countries mentioned; but, as will appear later, that observation applies to the last three only of the cities mentioned above. In the others the accepted meaning of the word is practically identical.

[1] At the end of last year the Act had been formally adopted by the Councils of 275 sanitary areas, comprising 22 Metropolitan cities and boroughs, 65 county and 79 non-county boroughs, and 88 urban and 21 rural districts. In 7 Metropolitan areas the Act was in force in virtue of an Order made by the Local Government Board under Sec. 3 of the Act, and in 10 non-county boroughs, 59 urban and 56 rural districts as the result of adoption by the County Councils of Worcester, Herts, Leicester and Durham. At that date the Act was not in force in 13 county and 159 non-county boroughs and in 656 urban and 574 rural districts.

Anticipating somewhat, it may be noted here that the Notification of Births Act does not provide for information of the causes producing the stillbirths, and that the information obtainable by inquiries from the Public Health Departments cannot satisfactorily make good that defect. This defect appears to make it impossible to rely on the Act for the information, the need of which is one of the principal arguments in support of the demand for registration.

III.

It is of no use to advocate the registration of stillbirths without a definite understanding as to the meaning to be attached to the term. It is therefore somewhat remarkable that in only one of the countries where such registration is required is any sort of definition included in the law establishing registration, and that is to be found in Ordinance No. 1, 1885, Section 3, in force in Ceylon. It is there enacted that "the term 'stillbirth' means a child born after the twenty-eighth week of gestation as dead, or apparently dead and not called back to life." It can scarcely be held that the foregoing phrase fulfils the requirements of a "definition." In most countries the need of a definition—for the guidance of the public—is obviated by enacting that all births, without distinguishing "live" from "dead" births, shall be registered, but such procedure does not get rid of the need of definitions for the guidance of the registration officers. Official requirements have been met by drafting Regulations.[1]

Before passing to a consideration of the Regulations in force it will be convenient to advert to a misuse of the term "stillborn" which prevails in certain countries where children born alive but dying before registration (*déclaration de naissance*) are deemed to have been born dead. The countries where that practice prevails are Belgium, France, Holland, Italy, and Spain. In the first three countries the official returns of "stillbirths" include (*a*) children born prematurely and dead; (*b*) full-term children born without life; and (*c*) children born alive but dying before declaration of birth. In those countries three days are allowed in which to "declare" a birth. In Spain a child failing to survive the first twenty-four hours of extra-uterine life is counted as stillborn. In Italy, where five days are allowed for the declaration of a birth, a child born alive but dying before

[1] The Regulations are given *in extenso* in the Report of the Royal Statistical Society.

the declaration of birth is at law stillborn, but statistically the event is treated as a birth and a death. Evidently the mortality-rates at ages under one year published in Belgium, France, Holland, and Spain are not comparable with those of this country, and, judged by our standard, the former are understatements of the truth, as they exclude a considerable proportion of the deaths in the earliest days of extra-uterine life when the mortalty is highest.

The "Infantile Mortality" Report issued by the Royal Statistical Society contains the Regulations in force for the guidance of registration officers in a large number of countries. Generally speaking, the Regulations are very vague and, from the standpoint of a "definition," most of them beg the question by referring to a stillbirth as the birth of a "dead child," without specifying any test of life or death. Only two sets of Regulations need be quoted here—viz., those in force in the Dominion of South Africa, and those drawn up by the American Public Health Association, which have been adopted by the Census Bureau, U.S.A.

South Africa.[1]

"Stillbirth"—the delivery of a formed child which has not shown any sign of life after complete birth.

"Formed"—any fœtus at any stage of development as to be readily recognized by any uninstructed person as a human child.

"Complete birth"—the body of the child is entirely outside the mother, but does not include either the division of the umbilical cord or the delivery of the afterbirth.

"Sign of life"—the child after complete birth has not been seen or heard to perform any physiological sign of life, such as breathing, crying, movement, pulsation, or the like.

American Public Health Association.

For registration purposes, stillbirths should include all children born who do not live any time whatever, no matter how brief, after birth.

Birth (completion of birth) is the instant of complete separation of the entire body (not in the restricted sense of trunk, but the entire organism, including head, trunk and limbs) of the child from the body of the mother. The umbilical cord need not be cut nor the placenta

[1] Strictly interpreted, these Regulations include births of non-viable children, and the scope of the Regulations therefore exceeds the provisions of the Registration Act, which requires the births of viable children only to be registered.

> detached in order to constitute complete birth for registration purposes. A child dead or dying a moment before the instant of birth is a stillbirth, and one dying a moment, no matter how brief, after birth was a living child and should not be registered as a stillbirth.

The above quoted Regulations are good, but are capable of improvement. Before considering what improvements are desirable it will be well to consider very briefly—from a physiological standpoint—what it is that has to be defined.[1]

In popular parlance, a "stillbirth" means the birth of a dead child, and it will be at once apparent that definite meanings are wanted for the words "birth," "dead," and "child." It will be convenient to take the last word first.

From an examination of the information contained in the Report already referred to, it appears that the term "child" may include any fœtus born after a gestation, varying from four months (in Japan) to full term. It seems useless to take cognizance (for registration purposes) of any child born before it has reached a development which will enable it to maintain an independent existence, which would exclude (in ordinary practice) all children born earlier than the twenty-ninth week of gestation. Such limit is also in agreement with the provisions of the Notification of Births Act.

The determination of the duration of pregnancy from an examination of a child's body is by no means an easy matter. It is a task beyond the capacity of a midwife, on whom, in the majority of cases, the responsibility of deciding between life and death in a new-born child at present rests. The difficulty can be obviated without material loss of accuracy by the adoption of a standard of length of body of the child. The length agreeing with the proposed inferior limit of gestation (twenty-eight weeks) is one of 13 in., or 32 cm. Such standard has the advantage of only requiring a tape measure for its determination, which anyone can apply. The measurement would, of course, be from the crown of the head to the sole of the heel, the tape being applied to the back of the child.

As the definition now sought is to be applicable to children at the time of birth—not for the purpose of determining at an interval after birth whether the child was born alive or dead—the term "birth" should be taken to mean the time when the birth is complete *qua* the

[1] The Report of the Royal Statistical Society contains a more extended discussion of the drafting of definitions of stillbirth and stillborn.

child, which will be on the completion of the second stage of labour when the child's body (the head, trunk and limbs) is outside the maternal body. At that moment of time the child is "born," inasmuch as the separation of the cord and the expulsion of the afterbirth are neither of them essential to the existence of the child.

The word "dead" being an adjective, it is necessary to find a definition of the corresponding noun "death," to complete the inquiry. "Death," however, is a negation, and hence appears to be incapable of definition in the strict sense of the term. The question, therefore, resolves itself into a task of finding some paraphrase of the word, or of prescribing some test of life, the absence of which in a given case shall be accepted as evidence of "death." The classic signs of life in a newborn child are movement and respiration (including crying). It is common knowledge that both of those signs may be absent at birth, and yet the child may be "alive." White asphyxia is a familiar instance of such an occurrence. Whether a child born in that condition can be "resuscitated" will depend on the vigour of the heart's action. Similarly, in cases of apparent drowning the success or failure of artificial respiration will depend on the vigour or feebleness of the circulatory system. With a few rare exceptions, when once the heart has ceased to beat the individual cannot be restored to "life"—that is to say, the other physiological functions cannot be renewed. It appears necessary that the presence or absence of the functions of the heart should be made the test of life or death at the time of birth. This conclusion is strengthened by the consideration that movement and respiration are impossible in the absence of the action of the heart. In other words, the classic signs of life are not primary but secondary indications. Their presence constitutes clear evidence of life, their absence is not complete evidence of death.

The foregoing considerations lead to the following definitions of "stillborn" and "stillbirth":—

> A "stillborn" child means a child whose body at birth measures not less than thirteen (13) inches, or thirty-two (32) centimetres, in length, from the crown of the head to the sole of the heel, and who, when completely born (the head, body and limbs of the child, but not necessarily the afterbirth, being extruded from the body of the mother), exhibits no sign of life—that is to say, whose heart has ceased to function, as demonstrated by the absence of pulsation in the cord at its attachment to the body of the child, and the absence of any heart sounds or impulses.

> *Note*—Crying and/or breathing being secondary signs of life, manifested only when the heart is acting, can be relied upon as signs of life, but the absence of either or both is not to be held to be proof of absence of life in the child.

A "stillbirth" is the birth of a stillborn child.

Comparing the suggested definition with the Regulations quoted above, it will be seen that those in force in the Dominion of South Africa require to be amended: (1) As regards the meaning of the word "child," which in its present form would include children born before they are viable; and (2), as regards the "sign of life." In this latter, although the heart's action is included in the words, "any physiological sign of life . . . . pulsation or the like," the whole phraseology of the sentence places undue emphasis upon breathing, crying and movement, which are secondary, not primary, signs of life. The Regulations drawn up by the American Public Health Association contain no definition of the word "child" at all. The question as to what constitutes a sign of life is not dealt with in the Regulations quoted above, nor until quite recently was there any rule on the point. The matter was considered by the Association as late as September last, and the following resolution was then adopted:—

> *Resolved.*—That the present Rules of Statistical Practice relating to stillbirths and premature births as adopted by the American Public Health Association in 1908 should be strictly followed by American registration offices, it being understood, in Rule 19, "No child that shows any evidence of life after birth should be registered as a stillbirth," that the words, "any evidence of life" shall include action of heart, breathing, movement of voluntary muscle.

The resolution, unfortunately, places all three manifestations of life on the same level, whereas a slight modification in the wording—i.e., "shall mean action of the heart with or without breathing and movements of voluntary muscles"—would have brought the amendment into line with the definition here suggested.

IV.

The last point for consideration is the form of registration which may be expected to give the most useful information. Incidentally it may be observed that the registration of stillbirths would afford a better measure of human fertility, indeed, the best measure available when taken with the data of registration of births in the absence of the notification of pregnancy which was advocated in the course of a discussion held during the recent International Medical Congress. The present proposal for registration is, however, put forward with another object—viz., the study of the causes of stillbirth and of early infantile mortality and ill-health. The "Infantile Mortality" Report of the Royal Statistical Society shows that the practice in those countries where such registration is in force is very diverse, some counting stillbirths as births only, others as deaths, and others, again, as births and deaths. Duplication of registration appears to be undesirable, and for the purpose now advocated registration as deaths is the only method which can be recommended. Stillbirths should be recorded in a special register which should provide for the entry of the cause of death. Such procedure would involve the production of a certificate signed by a registered medical practitioner. As many stillbirths are not attended by medical men, and as it would not be desirable to require inquests to be held with reference to such cases —they would probably be very numerous at first, at least—the appointment of public certifiers, or verifiers, of death, recommended as long ago as 1895 by the Select Committee on Death Certification, would become specially necessary. To prevent the illicit disposal of stillborn children the present law with reference to burial would require to be amended so as to prohibit the burial of bodies in any place other than recognized cemeteries. Further, the co-operation of undertakers would be required. It is a question whether they should not be licensed or registered, as they are in certain of the States of North America. The renewal of the licence or registration should be made dependent on the licencees conforming to the law.

V.

The discussion which is to take place really involves two questions, the one national (the need of making registration of stillbirths compulsory in this country), the other international (the desirability of arriving at an international agreement as to the meaning of the term "stillbirth").

The arguments in favour of enacting registration may be summarized in the following terms:—

(1) The desirability of falling into line with other countries;

(2) The fact that additional information is required to discover how the present methods of checking infantile mortality, which have been shown to be ineffective at the earliest ages of extra-uterine life, can be supplemented; and

(3) The necessity of studying, with a view to finding means of remedying, the causes of infantile ill-health which result in enfeebled adults.

It has been urged that the definition of stillbirth is a condition precedent to registration and it is believed that the time is now ripe for an international agreement on that point. Until such agreement has been reached the international comparison of mortality statistics for the first year of life must necessarily be incomplete, and to a certain degree illusive. The question was submitted for discussion at the recent meeting in Vienna of the International Institute of Statistics, but it was thought that the subject was one for consideration by medical experts. The Institute formulated a resolution asking the international medical organizations to take the subject into consideration at an early date. The subject was also brought before the last International Medical Congress, but as the communication was a private paper, there was no discussion and no action was taken. The American Public Health Association had the matter before them in September last and adopted the following resolutions:—

> That pending the possibility of international action, it is inexpedient to attempt more exact definitions than those contained in the present Rules (*quoted above*).
>
> That the present Committee on this subject be continued by the Section on Vital Statistics, with request to keep the Section advised as to the progress made abroad and in this country and the possibility of co-operation in the adoption of additional Rules or the revision of the present Rules relating to stillbirths.

The time has come for action to take the place of discussion. In any efforts to secure the reforms here advocated the Royal Society of Medicine ought surely to take a prominent part. To that end it appears to be eminently desirable that this Joint Meeting should forward to the Council of the Society an expression of their opinion as to the desirableness, in the interests of preventive medicine, ante-natal hygiene, obstetrical practice, and medical jurisprudence—

(*a*) of securing the registration of stillbirths in this country;
(*b*) of formulating an official definition of the term "stillbirth"; and
(*c*) of endeavouring to secure an international agreement as to such definition.

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DISCUSSION.

The PRESIDENT (Dr. Hamer) said he would like to ask Dr. Dudfield one question. When he said that the mortality from premature birth and congenital defects and malformations had increased during the last twenty years, it might be presumed that he meant us to understand that this was only a paper increase. Dr. J. F. J. Sykes some years ago laid stress upon the failure to demonstrate reduced death-rates in very young infants and upon the large part played by increase of mortality from premature birth and congenital defects in determining the maintenance of a high death-rate in babies less than a week old. It was possible that improved death registration in the case of very young children had come largely into question here. A century or two ago a death was often ignored if it occurred in an unchristened child, and Dr. McVail had shown that the small-pox statistics of Aynho were vitiated by the non-inclusion of deaths of children not only under 1 but even under 2 years. As in course of time registration became more and more perfected, younger and younger children were presumably swept into the registration net, and this fact might partly explain the phenomenon referred to by Dr. Sykes. Whether this was true or not the importance, from a statistical standpoint, of registration of stillbirths must be insisted upon.

Dr. W. S. A. GRIFFITH (President of the Obstetrical Section) stated that the necessity for the registration of stillbirths was fully established. It appeared to him that the system in force in the Dominion of South Africa was, on the whole, the best—namely, the registration of all recognizable fœtuses at any stage of their development. These might be divided into two classes: (1) Those presumably viable, measuring 13 in. or over; (2) those less than 13 in. Fœtuses under 13 in., born alive, as many are, would need to be specially recorded; and the duration of life as well as the length of the fœtus should be added. It might simplify some difficulties if the term "still-birth" were discarded in favour of "dead birth." The term "stillbirth," although in common use, was not generally understood, and the term "dead birth" could not be misunderstood. Whichever term was used must be clearly defined, and a definition must be scientifically accurate and at the same time sufficiently simple, so that it might be used by any person, without special instruction, whose duty it was to register. The difficulties of definition arose in attempting to combine the two. Dr. Dudfield's suggestion that the action of the heart should be the essential indication of life or death was scientifically accurate, but was often too difficult for the unskilled observer to determine; and it was not very rare for a baby born, apparently without heart action, to be put aside by a doctor or skilled nurse as dead and to surprise them eventually by beginning to cry, if its body had been kept warm, though without artificial respiration. Dr. Dudfield was quite correct in saying that crying, respiration, voluntary movements, were all evidence of life, and their absence

was not valid evidence of death. The next most important point was the estimation of the duration of the development of the fœtus; that is, of the duration of pregnancy. Every medical man knew that this was often a very difficult and uncertain problem. It was common custom to describe this as of so many weeks' duration, as if it were possible, with any accuracy, to do so. It was quite easy to determine the number of weeks since the last menstrual period when the patient was able to give that date, but pregnancy might have commenced any day between that and the date of the following period, and while careful observation generally enabled us to determine the month of pregnancy, the number of weeks must often be very uncertain. Many women also became pregnant during periods of amenorrhœa due to various causes. Falsification of the duration of pregnancy as well as mistakes of calculation would be easily made and difficult to discover, while gross falsification of measurement would be liable to detection. An arbitary measurement of the fœtus had clear advantages—it was easily ascertained by anyone—and no one should be allowed to bury a fœtus without verifying the measurement and seeing that it was registered if it was of the required length.

Dr. T. H. C. STEVENSON congratulated the author of the paper on his useful and luminous summary of the position of the question of stillbirth registration in this country. He agreed with what the Chairman had said as to the probability that the increase in mortality from premature birth and congenital malformations was at least to a large extent factitious, but differed somewhat in the explanation he would suggest. While it was probable that there was some decrease in the practice of registering early deaths of premature infants as stillbirths, which would account for a portion of the increase in mortality from prematurity, he thought the chief explanation must be sought elsewhere. There was reason to believe that throughout the whole of the period reviewed in the paper registration of births had been practically complete. Mortality attributed to the indefinite heading "atrophy, debility and marasmus" had, however, been decreasing, as precision in certification increased, throughout this period, and it was by transfer of mortality from this heading to prematurity and malformation that he thought the increase in the latter was largely to be explained. Little need be said as to the case for registration of stillbirths, as there seemed to be something very like unanimity of opinion in its favour. He assumed that when Parliament passed the Notification of Births Act, including stillbirths in its scope, it committed itself to the principle of official cognizance of stillbirths, so it might probably be taken for granted that any comprehensive revision of the law of registration, such as was even now overdue, would include this proposal. With regard to the question of registration of stillbirths of less than twenty-eight weeks' gestation, as suggested by the last speaker, he had considerable sympathy with the proposal but thought that this country in entering upon a policy of registration long pursued by most others would probably be well advised not to attempt to carry it further at first than it was carried elsewhere. The question of exten-

sion might be considered at a later date when the less ambitious scheme proposed in the paper had been for some time in successful operation. If twenty-eight weeks were to be accepted as the early limit for registrable still-births, the question arose as to how the birth of a living child at a less advanced stage of pregnancy should be dealt with. Presumably, in such cases, the child did not long survive, and he understood that in Germany such live births were excluded from the registers. This course seemed to him but logical, as it would be most undesirable, when live and stillbirths were both being registered, not to make the conditions similar for both. If, however, it were possible, as he thought it should be, to ascertain the period of gestation at which birth had occurred, or the length of the child, in the case of all deaths occurring during, say, the first week of life, this information would afford a means of surmounting the difficulty, for in the comparison of still and live births the number of the latter occurring before the twenty-ninth week would be known, and could be excluded from the comparison. One question which would have to be decided at the General Register Office if stillbirths were made registrable, was the extent to which it would be desirable to carry the attempt to ascertain and tabulate the cause of death in these cases. No doubt in a large proportion of cases this would not be ascertainable, but that fact did not seem sufficient reason for refraining from tabulation of such information as it might be possible to get. He presumed that in all cases it should be possible to get a statement whether the fœtus died before or during labour, and whether it was macerated. He would greatly welcome an expression of opinion from any of the obstetricians present as to the usefulness of this information and whether there were any other points on which information might be expected in all cases, as apart from the class of information which could only be looked for in a proportion of certificates returned by medical men.

Dr. FRED. J. SMITH remarked that in his opinion there was no possible sign of a "stillbirth" which could be completely observed in a moment. He said that circulation and respiration might both be in abeyance for a period of time to be reckoned certainly by seconds, and possibly by minutes in the newly born, and that therefore (except of course in case of putrefaction *in utero*) to determine the fact of actual death the child *must* be watched for some minutes while attempts at resuscitation were being made. Considering, then, the definitions of "stillbirth," or "sign of life," he preferred that adopted in South Africa: "The child after complete birth has not been seen or heard to perform any physiological sign of life," and the "delivery of a formed child," formed being defined as "any fœtus at any stage of development as to be readily recognized by any uninstructed person as a human child." He ridiculed the idea of an undertaker trying to estimate either the uterine age of a fœtus, or indeed measuring its length, when 'crime' or 'no crime' might depend upon $\frac{1}{32}$ in. in measurement. He went on to say that to be logical, therefore, and indeed to get facts which might be of use from a preventative point of view, every miscarriage of whatever stage of development ought to be

registered and recorded, though this would involve a good deal of very delicate consideration by the profession and possibly would have, so far as the first three months' development were concerned, to be made voluntary and not compulsory. He was glad to hear Dr. Griffith ridicule the possibility of the rigid determination of the age of a fœtus and the duration of pregnancy.

Dr. G. S. BUCHANAN considered that a good case had been made out for Dr. Dudfield's propositions. If carried into effect, they should enable statistics to be obtained which would be more or less comparable as between the United Kingdom and other countries and between special localities, and in course of a sufficient number of years such statistics might yield very valuable information. Besides this, general notification of stillbirths might help to some extent in obtaining exact knowledge of the causes of stillbirth. If, however, it was desired that these should be studied minutely, and classified according to causation—faulty midwifery, syphilis, lead, and so on—it would be better not to rely upon massed information obtained by different observers using different standards. At present in most parts of the country, including nearly all large towns, information as to stillbirths can be obtained by the public health authorities through the operation, or enforcement, of the Notification of Births Act and the Midwives Act, and the way to investigate the cause of stillbirth in a locality would seem to lie in taking the information which is already available and getting a satisfactory research undertaken on a consecutive local series, which could be examined from all points of view and in a comparable manner by those who undertook the investigation. Apart from its being a means of obtaining knowledge, notification of stillbirths had been suggested as an important means by which direct administrative action could be undertaken to diminish the occurrence of stillbirths and to prevent the conditions which led to the death of infants within a few weeks of birth. Its importance from this point of view was, perhaps, open to doubt, as it would seem more logical, from the preventive point of view, not to wait till the fœtus or the infant was dead, but to deal with the pregnant mother. This course, if strictly pursued, would seem to lead, if not to the notification of pregnancy which had been suggested in some quarters, at least to the provision of municipal aid, by clinics and otherwise, to the pregnant woman.

Dr. AMAND ROUTH would value registration of stillbirths for several reasons: First, because of the statistics which such registration would afford. This would be still more complete and reliable if all abortions were notifiable also, for the exact number of potential lives lost during antenatal existence would then be known. Dr. Newsholme, Medical Officer for the Local Government Board, had shown him a statement of the stillbirths notified under the Notification of Births Act, 1907, and though in London it was only 2·46 per cent. of live births for 1912, it was 2·98 per cent. in the seventy-four large County Boroughs and towns now under the Act, and 3·34 per cent. in the sixty-seven smaller towns. It might, therefore, be held that the stillbirth percentage was

about 3 per cent. in England and Wales. In a recent lecture on the subject[1] he had shown that the most moderate estimate of the proportion of abortions to stillbirths was four to one. This would make the total of antenatal deaths in one year about 100,000, rather more than the average infantile deaths of the survivors in their first year of life, and represented a loss of 200,000 deaths during the nine months of intra-uterine existence and the first year of life. Inasmuch as the survivors of this double mortality in 1911 were only 782,362 (not four times as many as the previous deaths) the annual loss to England and Wales was enormous. The second reason why registration of stillbirths would be valuable was that by its introduction means could be found by which every stillborn child and placenta would be retained for scientific examination, and the cause of death ascertained. The third reason for registration was that indirectly treatment to prevent this antenatal disease and death could be instituted, not only as regards the subsequent pregnancies of the mother concerned, but of similar diseases in other pregnant women. If the State could use some of the money now in their hands, and earmarked for research, in the formation of centres for research in antenatal pathology, a vast amount of good would be done, both in increasing the birth-rate and adding to the health of mothers and children. Efficiently to carry out such subsequent treatment medical supervision of pregnant women was essential. Possibly all these results could be obtained by *notification* to the Medical Officer of Health of the births of every "formed" fœtus, and by *registration* of stillbirths when 13 in. long, or after twenty-eight weeks of gestation. If stillbirths became registrable, the practitioner's certificate giving the cause of the stillbirth should be a secret one, otherwise such causes as "congenital syphilis" might be entered as "debility, marasmus, premature birth, constitutional disease, &c.,' for fear of the disastrous effect of such a statement upon the parents' happiness and mutual respect.

Dr. W. A. BREND said that although Dr. Dudfield appeared to be urging only registration of stillbirths, his proposals really went a great deal further. The object aimed at was to acquire more knowledge of the causes of stillbirth and the circumstances under which they occurred. It was clear that the mere act of formal registration would not give that. When a medical man had been in attendance at the birth, information might be forthcoming; but a large proportion of births were attended by midwives only, and in these cases additional examination by an expert would be necessary. Dr. Dudfield had realized this, and proposed to appoint public certifiers or verifiers of death, but he had given no details of the duties these persons were to perform, or of the way they were to discharge them. Nor had subsequent speakers examined this far-reaching suggestion. The late Mr. Troutbeck urged that death verifiers should be appointed to examine the body, and make inquiries in the case of every death, whether the practitioner who had been in attendance was willing

[1] *Brit. Med. Journ.*, 1914, i, pp. 355-63.

to certify or not. If Dr. Dudfield's proposals went as far as that, and there was no indication in his paper that they did not, then they demanded more consideration than had been given to them that evening. The public would probably resent the intrusion of a stranger into the death-chamber, and the interrogation of relatives and others, purely for the sake of getting scientific information; medical practitioners would also object to having their treatment and diagnosis revised by a State official. In the special case, even if death verifiers were appointed, it was not easy to see how they would obtain useful information. The procedure would be, presumably, that the stillbirth was reported by the midwife in the first instance to the registrar or medical officer of health, and by him to the death verifier, who probably would not arrive on the scene until the following day. What investigation could he make? He would find simply the dead body of the infant, and, in many cases at all events, he would not even be able to verify that it had been stillborn. The only possibly useful proceeding would be to make a post-mortem examination, and that was undesirable without the authority of the coroner. Dr. Brend agreed that the present method of disposing of the body of a stillborn child was unsatisfactory, and that there should be a special register of such births. But, to start with at least, he was disposed to accept the statement of the midwife. If in any case there was reason to doubt the fact that the child was stillborn, the matter should be one for inquiry by the coroner.

Dr. BLACKER supposed that the main reasons for advocating the registration of stillbirths were the collection of statistics and the furtherance of our knowledge of the various causes leading to the death of the fœtus. Such statistics would of course be very interesting, but he did not think that they would be of much value to the clinical obstetrician, nor indeed did he think that much would be gained from the pathological point of view by the registration of stillbirths. Indeed, it was rather a case of putting the cart before the horse. Even if they were informed that a pregnancy had ended in the birth of a dead child, that information often gave them but little assistance, for the fœtus was in most cases too badly preserved or had been dead for too long a time to enable them to draw any accurate conclusions, either as to the condition producing its death or how best to prevent such an occurrence in future pregnancy. If they were ever to practise effectively preventive medicine in the case of the pregnant woman, and to carry out the treatment of antenatal diseases, then they must demand not the registration of stillbirths, but the compulsory notification of pregnancy. The notification of pregnancy would place them in a position to study the course of the various conditions which might result in the premature termination of the pregnancy, and would enable them to acquire some certain knowledge of antenatal diseases, and to undertake the treatment of both the mother and her unborn child with some hope of success. Their ideal as obstetricians should be not the collection of statistics of the frequency of stillbirths, useful as this might be, but the prevention of such stillbirths, and this could only be accomplished when they were

in a position to supervise every pregnant woman throughout the whole of her pregnancy. No doubt this was an unattainable ideal at the present time, but it was one worth striving for and one which as obstetricians they should lose no opportunity of attempting to bring about. He certainly agreed with Dr. F. J. Smith when he said that it was possible for a fœtus to be born with no signs of cardiac activity to either palpation or inspection, and yet for it to be resuscitated by appropriate means and to survive.

Dr. DUDFIELD, in replying to the discussion, agreed with Dr. Stevenson in thinking that the more complete registration of births had little or no part in causing the increase in mortality from premature birth and congenital defects. He (the speaker) thought that there had been, in all probability, some transference from the very indefinite rubrics—such as "atrophy, debility, and marasmus"—to the slightly more definite rubrics already mentioned. He thought it would be useful to measure such transference. It might be advantageous to find, as Dr. Griffiths had suggested, some term in substitution for "stillbirth," although the latter had the advantage of being good Anglo-Saxon in origin. "Live born" and "dead born" appeared to be somewhat awkward, and were difficult to defend etymologically. The latter term was the literal translation of the French designation *mort-né*. He recognized that breathing and crying were signs recognizable by any onlooker, even the most uninstructed, at a birth, but there would always remain a proportion of births in which those signs were absent. The responsibility of deciding whether the child were alive or dead would then rest on the person (doctor or midwife) conducting the labour. The days of the half-instructed midwife were past, and he failed to see why it should be impossible to instruct midwives so as to make them competent to rely on the "heart test." After all, his suggested definition did no more than provide an ultimate test of life when the classic signs were wanting. Dr. Griffiths had referred to the arbitrary character of the standard of viability. No doubt the standard was arbitrary; but that quality would attach to any standard, as exceptions would almost certainly be forthcoming. The standard proposed had the advantage of agreeing very closely with actual practice in induced labour, and was, moreover, the rule in the majority of foreign countries. The objection from a statistical point of view to the South African regulations describing a "stillbirth" (preferred by Dr. Smith) was that these included non-viable children, who could not be regarded as assets *qua* population. In relation to the study of fertility such extension would undoubtedly be useful, and it would help to the elucidation of the causes of antenatal mortality. He was of opinion that, taking all the pros and cons into consideration, such extension was to be deprecated. Dr. Routh had referred to the difficult position of practitioners who would find themselves called upon to certify stillbirths as due to venereal disease. That difficulty was not limited to stillbirths or to venereal disease. In his (the speaker's) opinion, the only way of obviating such difficulty was to make the certificate of cause of death a confidential document, which should not be handed to the

relatives nor disclosed to the local registrar of deaths. Such practice prevailed in Switzerland, where the cause of death was reported in a specially endorsed letter direct to the Central Statistical Bureau. Dr. Brend had questioned the advisability of appointing verifiers of death partly on the ground that the public would resent their visitations, and partly because their work would infringe the prerogatives of the coroners. In reply, he (the speaker) wished to call to remembrance the fact that such appointments were strongly recommended by the Select Committee on Death Certification in 1895. Since that date a Bill including provisions for appointing death verifiers had been introduced every Session as a private measure. Under that Bill the verifiers would act only when no medical practitioner had been in attendance on the deceased. It was intended that the verifiers should act in concert with the coroners, not independently of them. For the purposes of the Cremation Act a second certificate was required, and his experience of work under the Act had not disclosed any resentment on the part of the relatives against the verification. In the case of stillbirths the verifiers would be able to obtain evidence of the cause of death by inquiries into the medical history of the pregnancies. The notification of pregnancy at the present time appeared to him to be quite outside the range of practical politics. What line public opinion would take in the future on such a suggestion it was impossible to forecast. Having regard to the high degree to which the public had been educated with regard to notification generally, it was conceivable that at some distant date notification of pregnancy might come to be regarded not merely as a duty imposed by law, but as one to be carried out as part of the normal functions of citizenship.

In conclusion, he desired to emphasise two points: The first was that any legislation on the question of stillbirths should not attempt to provide for exceptional cases, but must be framed on lines which would have a quite general application. The second point was that public opinion required to be educated to regard stillbirths as much a waste of human life as infantile mortality was now held to be. He did not intend that observation to be taken to mean that every stillbirth inevitably implied the loss of a potential citizen, but he did wish to press the view that a proportion of stillbirths were absolutely preventable, and that it was incumbent on the public to see that proper measures were taken to obviate that waste. He hoped that the Council of the Society would give the whole question their best consideration.