ESSENTIALS OF FAMILY STATISTICS.

BY

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INTRODUCTORY.

The social statistician and actuary who professes to practice in the subject matters outlined in our Society's Constitution will sometime in the course of his career have occasion to compile or to use the social statistics which are, or at least should be, the firm support for every programme of social legislation. Facts on human aggregation, association and economic status precede, in our branch of insurance science, all matters of theory and practice in administration, rate making and experience analysis. What would it avail the present actuarial and administrative structure of employers' liability and workmen's compensation if no facts on its social urgency were at hand? In what way shall we justify the institution of workmen's compensation in the first place, and its continuation along present lines, in the second place, if not through a demonstration of its social utility? Have we really determined by an appeal to facts that health insurance, for instance, should not be administered through a nation-wide, non-political, mutual carrier or organization of carriers in harmony with the principles underlying the co-operative and friendly society movement established by the great British Liberals of the nineteenth century?

The cultivation of social statistics is an obligation laid upon us by the requirement that all of our actuarial work shall have a basis of unimpeachable social fact. Social statistics endeavors to provide comparative and historical description of those social facts which comprehend problems of (1) aggregation and of (2) association of human-kind. From this observational base, we derive the crude data which, in any science, are termed empirical, or first-sort, knowledge. By the process of induction, we may discover from these data the facts of social "law" and causation—reasoned or generalized knowledge. Without these statements on the concrete, particular aspects of human aggregation and association,

social insurance science, and deductive analysis from hypotheses in that science, have but slight meaning.

STATISTICS OF (1) AGGREGATIONS OF INDIVIDUALS AND OF (2) ASSOCIATION OF INDIVIDUALS IN SOCIAL UNITS.

Census and vital statistical practice is in a fair way toward providing us with the facts of human aggregation—the arrangement of *individuals* in classes or groups according to race, sex, age, occupation, and other characteristics of such individuals. But these tabular displays of mere aggregation tell us nothing of the important fact of human association; there is no account rendered of the number and characteristics of even primary social units, of those groups of individuals which seek association for purposes of growth, advancement, reproduction, defence and social force. Our present inquiry into social units begins with family statistics.

The family is the primary social unit. No other social units— the Church, secular societies, benevolent organizations, insurance institutions and the like—would be possible without the basic social unit of the family. Through it the individual is brought from a disintegrated state into elementary ethical relations, into the race stream. Insurance institutions themselves are largely an outgrowth of the higher instinct of family preservation.

RELATED LINES OF INQUIRY IN FAMILY STATISTICS.

There are two general categories of family facts: (I) on the biological and social aspects and (II) on the economic phases of family life. The present discussion will be confined to the first and more important of these main classes (with the major emphasis on social considerations). A treatment of the second subject will be taken up in a later paper.

The strictly social statistics of the family of significance for the casualty and social insurance statistician and actuary may be considered in an orderly manner as follows:

1. The formation, or re-formation of family units.
2. The disintegration of family units through dissolution of the man-and-wife relation by reason of death, divorce or separation, and through departure of grown children into marriages of their own.
3. Functioning of the family. Reproduction and nurture of the human species.

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4. Structure and composition of society in social units of the family
   at points in time. History of the family.

The results of research under the first three sections of our
classification of family statistics could be termed studies in social
kinetics (or the progress of society) and under the fourth category,
studies in social statics (or the equilibrium of social forces at
various points in time). It would be well, however, not to insist
upon too strict classification along these lines at present. It will
suffice to say that the sources of data for the first three groups
arise in the practice of dynamic demology,* or statistics of the
movement of population, whereas the fourth group derives its data
from static demology,* or statistics of the *structure and status* of
population at certain points in time—on days of census enumera-
tion. A detailed discussion under each of these points follows:

1. FORMATION, OR RE-FORMATION, OF FAMILY UNITS.

In international census usage, a family is defined as a group of
persons associated in sharing a common table and a common shelter.
This definition is too broad for our purposes, because it embraces
groups of persons sustaining the man-and-wife, parent-and-child or
other relation by blood, marriage and adoption, in addition to per-
sons living alone, and groups of persons unrelated by blood, mar-
riage or adoption, but living in hotels, boarding-places or schools.
Servants and lodgers are also included. These groups are termed
economic families. In our branch of insurance science, we consider
only groups of persons associated by relationship to the head of
the family by blood, marriage or adoption. These latter groups
may be called *natural families.*

STATISTICS OF NATURAL FAMILIES.

In civilized society, natural families† are constituted when
marital relations are formed, or when marital relations broken by
death or divorce are re-formed, with the knowledge and consent of
the State, and in most cases, with the knowledge and consent also
of religious institutions. The variety of impulses, reactions and

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* A broad term used as early as 1896 by the Hungarian statistician,
Joseph Körösi, as the equivalent of "vital statistics" or "demography."

† In the discussion to follow the word "families" is understood to mean
"natural families."

considerations which lead to family formation may be called *centri-petal* forces.

The source of information on the formation and re-formation of family units is the return to offices of registration made by persons authorized to perform marriages. The central repository of these facts in a State such as Massachusetts is the office of the Registrar of Vital Statistics. In some States, this official is attached to the Department of the Secretary of State and in others to the Department of Health.

The tendency toward the formation and re-formation of family units is measured by the "marriage-rate," i. e., the number of marriages, or of persons married, in a specified class of population per 1,000 of mid-year estimated population in that class. When all marriages are related to the total population, the resulting rates are known as "crude" rates; when the facts are shown for marriages of persons within particular sex and age classes per 1,000 persons of those classes, the rates are called "specific" marriage rates. The ratio "persons married per unit of population" is in more general use than the ratio "number of marriages per unit of population" in reports on marriage statistics.

Development of the observational* data on the formation of family units proceeds first by the classing of marriages according to the civil status of the contracting parties: the marriages of bachelors and spinsters, bachelors and widowed or divorced women, widowers or divorced men with spinsters, widowed or divorced women. Classification is to be shown also for the first, second, etc., remarriages of widowers or divorced men, respectively. Each of the classes may be divided according to age of the one party in relation to age of the other. The tabulations provide a reasonable spread of the data for use in compiling additional analytical tables of specific rates. In Massachusetts, an attempt has been made to tabulate marriage statistics in detail. The facts are available for each calendar year by age and sex for marriages of persons in each of the chief civil or marital condition classes.

* Further reference to family statistics in the present paper will relate to the display of empirical data, that is, crude *descriptive* facts in the first category of knowledge, and to the terminology of elementary statistical processes which lead by induction to the statement of social laws. *Analytic* processes, the graduation and testing of data, and the deductive derivation of social knowledge from valid hypotheses, must be left for an additional and later paper.

STATISTICS OF MARRIAGE AND RE-MARRIAGE FUNDAMENTAL IN
WORKMEN'S COMPENSATION PRACTICE.

Compensation statisticians could compute from these and from
the Federal and State Census data, remarriage tables for widows,
for instance, which would probably be more suitable for valuation
of death benefits than the Dutch Survivorship Annuitants' Fund
tables now in use. Comparison of these latter tables with some
data from the Massachusetts statistics for 1910, and the actual ex-
perience of at least one State under its workmen's compensation
act, seem to indicate the need for a table drawn from American
registration sources. Tables of the probability of marriage, accord-
ing to marital condition and age, should be made available for
American Commonwealths which support satisfactory systems of
registration. Auxiliary statistical facts on marriage as influenced
by race or color, religious confession and blood relationship are at
present anticipations, but should be provided for in plans of analy-
sis. Important phases of the marriage question, especially in rela-
tion to insurance aspects of the probability of issue (in health and
maternity insurance), are still in the stage of forensics because of
the lack of these data. In fact, we may expect important symposia
to follow the publication of such statistics in much the same way
that the excellent collection of papers in the *American Journal of
Sociology,* March, 1909, was precipitated by the Census Bureau's
issue of marriage and divorce statistics in that year. This sym-
posium, contributed by Drs. Rubinow, Zueblin, Talbot and Chapin,
should be read by every student of matters relating to the Amer-
ican workman's family and its status and destiny.

2. DISINTEGRATION OF FAMILY UNITS.

The effect of centrifugal forces acting upon the family may now
be discussed. Death is the chief proximate cause of family disin-
tegration. Notwithstanding more than forty years of workmen's
life insurance in England, no really worthwhile data have ever been
published on the social values destroyed by death of the married
wage earner. Industrial life insurance, fraternal insurance, work-
men's compensation, establishment funds—all are based largely
upon the need for meeting the economic emergency created by the
death or disability of the wage earner.

Death as a Factor in Family Disintegration.

The American sources of information on the severance of the family by death are meagre, likewise the facts on the family damage produced by acute or chronic illness and by accident. Requirements under the latter head are being shaped up at present by a group of American social workers. They have at least progressed to the point of trying to develop a nomenclature of social disabilities of the family, and in this nomenclature they have recognized the place of sickness, accident and injury, and death. In the lack of the facts, however, it is not surprising to find a wide variety of vague legislative remedies offered each year, so many of which hold about the same relation to the real nature of the problem of family disintegration and impairment, as the quack patent medicine does to the diagnostic and therapeutic skill of the well-grounded physician. The gathering of the facts on this phase of family welfare should be the immediate concern of every member of our Society interested in founding an American programme of workmen's insurance on the basis of knowledge, and not presumption, of American family facts.

The requirements for a study in the next Census year of family disintegration are elementary and have been met in foreign countries most admirably, notably in Switzerland and in Australasia. These are:

(*a*) Tabulation of deaths in selected areas (if cost restrictions are imperative) by marital condition, sex and age in addition to the classifications of the population in similar groups. "Registration Area" figures for the United States are at present not shown for sex and age by conjugal classes with respect to chief causes of death. Without this latter item, how shall we determine the damage to family life set up by tuberculosis, that "captain of the hosts of death" among workmen? Or by other diseases and conditions such as heart affections, preventable infectious diseases, and accidents? The only available studies of recent American data on the severance of family ties by death is to be found in the New York State Department of Health report for 1912—a paper by Professor Walter F. Willcox.[*]

(*b*) Tabulation of (1) the number of live-born issue and (2) the number of such issue living at the time of death of married, widowed and divorced persons of each sex, according to (3) dura-

* Willcox, Walter F., Special Report on Vital Statistics, p. 237.

tion of marriage. This second requirement cannot be met until official death certificates at present in use are revised to include these three simple questions under the head of "personal and statistical particulars." A proposal has been made to the group of registrars represented in the American Public Health Association, Section on Vital Statistics, to have this change effected. Our interest in this matter of having supplied the necessary data for our social studies rests entirely with the registrars of our Departments of Health. It is hoped that they will meet the social statisticians fraternally by giving the proposal the most serious consideration, thus to show their appreciation of one of our vital needs. The lack of social data of this type is really conspicuous.*

Divorce as a Minor Factor in Family Disintegration.

Divorce and separation is the second and less important cause of family disintegration. A large amount of discussion of the divorce problem is available for study, especially the productions which followed the first Department of Labor report and the second Census Bureau report on marriage and divorce in the United States. In fact, students who have in mind the full significance of the whole problem of broken families, whether by death or by divorce or separation, are inclined to think that there has been too much moralizing, too much emphasis upon the divorce phase of family disintegration and a positive neglect of inquiry into the larger breach in family relations caused by preventable mortality. In Massachusetts, during the year 1910 for every divorced woman there were 24 widows, and for every divorced man, 13 widowers.

In the United States, divorces are recorded mostly in county offices. These records are by no means uniform between states. The basic facts usually available are as follows:

1. The degree of suspension of the marriage relationship through judicial decree, i. e., whether absolute divorce, "divorce *a vinculo matrimonii*"—from the bond of matrimony; or separation, limited divorce, "*a mensa et thoro*"—from bed and board, the parties retaining the legal status of married persons. Description of modes of granting divorces (1) by legislative enactment, (2) by judicial decree or (3) by automatic operation of law, would be superfluous in the present paper. Nor would it be desirable to bring into dis-

* See "Family Statistics from Registration Sources." *Amer. Journal of Public Health*, December, 1918.

cussion the social ethics of marriage and divorce. The descriptive data of divorced persons necessary for statistical study are: marital status of divorced parties before marriage, duration of marriage, number of live-born issue and number of such issue living at time of divorce, color or race, age, occupation, religious confession of both parties, alleged "cause" for divorce and whether divorce is granted upon demand of either huband or wife.

Empirical probabilities of the fracture of family relations enter into all well-considered actuarial plans for computing the probable costs of benefits which vary as between unmarried wage earners, married men without issue, and married men with issue. Tabulation procedure for divorces may follow the same plans outlined for marriages. The statistics of marriage and divorce as briefly outlined above, merit thorough study by the casualty and social insurance statistician and actuary, because they illuminate some basic issues in insurance science.

3. FUNCTIONING OF THE FAMILY.

Veritable storms of discussion have arisen over questions of the functioning of the family. Of the one type, dignified scholarly essays planned with sincerity and purpose, there are the utterances of the French, American and British students and ethicists. Farther down the scale in point of scholarship, there are the publications of ardent birth-controllers. The prime function of the family is the reproduction and nurture of the human species; in a secondary way, the sacrifices and hardships entailed by marriage and the obligations of family are a powerful cultural and selective force. They insure the persistence of ethical characters in rugged individuals who take upon themselves this primary form of human association, and virtually guarantee the elimination from the race stream of some of the ethically unfit, by means of the "defense reaction" of individual selfishness engendered in the latter individuals by the prospect of sacrifice. The social statistician in quest of the facts which affect insurance questions must detach himself from attractive controversy, however, and patiently continue to assemble data, using the methods of both static and dynamic demology. In order to thread our way through the mazes of the statistical side of the problem, and primarily to serve insurance science, let us take up the two sources of data, considering first, the contributions of static demology.

3a. Static Demology in the Study of Family Function.

Census enumerations are the sources of these facts.*

A few preliminary definitions are in order. The capacity to bear offspring is termed "fertility"; incapacity to reproduce is called "sterility." Fecundity is the degree of fertility; a childless marriage is said to be "non-fecund," whether or not the capacity to bear exists. Non-fecund unions are not necessarily sterile. Statistics of non-fecundity include the physiologically sterile as well as what may be designated, for present purposes, artificially or voluntarily sterile unions.

The tabulation of census, or static demologic, data on fecundity is a complex operation, because of the number of variables involved and the wide limits of such variations. There are four principal elements, three of which are independent variables and one a dependent variable. The independent variables are:

(1) Age of the wife at marriage.
(2) Age of the husband at marriage.
(3) Duration of marriage.

The dependent variable is (4) the number of children live-born to the marriage, considered according to (a) number of children live-born to the marriage and (b) number of such children living on the censal day. Other complicating factors of some importance are the differential mortality of parents of small, moderate and large families, the prevailing ratio of true physiological sterility,† the probability of issue at ages under 15 and over 45 years (the age division 15 to 44 years is usually chosen as the period of childbearing in fertility and fecundity studies), and various census enumeration difficulties. Mortality among parents of small families is said to be higher than among parents of large families,‡ the ratio of physiological sterility is unknown, and the probability of issue at ages outside the usual "childbearing period," 15 to 44 years, nearly so.

* Discussion of this section will conflict slightly with the treatment of section 4 of our classes of family statistics, but this is immaterial.

† Brownlee, John, "Germinal Vitality," *Proceedings of Royal Phil. Society*, Glasgow, April, 1908.

‡ Snow, E. C., "Note on a Possible Source of Fallacy in the Interpretation of the Census Figures Relating to the Fertility of Marriages," *Journal of the Royal Statistical Society*, February, 1914, p. 313.

A first approach to what promises to be a maze of tabular practice is to establish two groups or classes of enumerated, tabulatable marriages (1) those of *continuing fertility,* i. e., still within the ages of childbearing on the census day and (2) those of *completed fertility,* where the wife has attained age 45 on the censal day. This classification is arbitrary, indeed, but is necessary in the interests of direct contact with the chief facts of family function.

Census schedules give the information on the number of children live-born to the wife, or to a widowed or divorced woman, whether born of the present or of any former marriage, and also the number of such children living on the censal day, whether then residing with the mother or elsewhere. Age of the wife or husband at marriage is computed by subtracting the reported duration of the marriage from age of the parties on the day of census enumeration. Using recent Scottish experience as a basis, perhaps 10 per cent. of the total replies for families may be excluded from the tabulation on account of palpable defects in enumeration.

Statistics of Completed Families.

With due allowance for minor qualifying influences, the facts on the structure and characteristics of completed families, compared from one censal point to another, provide one, and perhaps the best, statement of the trend of fecundity in a national group or in one subordinate thereto. The data may be arranged to show (1) the number and percentage of families having had 0, 1, 2, 3, etc., children; (2) the number of children who were first-born, second-born, third-born, etc., among (a) marriages of completed fertility, compared with (b) all tabulatable marriages on the censal days; (3) the average size of completed family according to (a) age of wife at marriage and (b) age of husband at marriage; (4) for each year of age at marriage of husband show the average size of completed family according to age of wife at marriage; (5) for each year of age of wife at marriage show the number and percentage of completed families which were (a) fecund and (b) non-fecund. These suggestions relate only to the main tables on completed families. Given the primary enumeration of the facts on the census schedules other tables leading to data on the probability of issue, and of non-issue, on the decline in fecundity according to calendar year in which the marriage occurred, on the number and percentage of children surviving out of a given number born (classed according

to occupation of parents, employment or non-employment of the mother, age of the parents at marriage, etc.), the interval between marriage and the first birth, etc., are possible. In the graduation of these data involving so many variables, there are rich opportunities for the application of the theory of skew correlation, especially the development of methods at present imperfectly understood, of computing multiple correlations from non-linear regressions.

Study of family function in statistical sources of census origin are possible to a limited extent when no enumeration is made of the number of children born to and living in families. A ratio is sometimes computed by dividing the number of children less than five years of age on the censal day into the number of (a) women aged 15 to 44 years and (b) married women 15 to 44 years of age. This ratio for several censal points, classed according to subgroups of population, i. e., the native-born, the foreign born, the negro population, etc., has been used* in discussions of family function to show the trend of fecundity for such population groups. Obviously this ratio is very seriously affected by the prevailing birth rates, the death rates of both children and adults, the average ages at marriage, and by the masculinity and marriageability of populations at the adult ages, etc.

3b. DYNAMIC DEMOLOGY IN THE STUDY OF FAMILY FUNCTION.

Sources of information under this heading are the data recorded, or which may possibly be recorded, by American registrars of vital statistics. The potential record sources are the certificates of birth, death, marriage and divorce. Certain facts on family function— the rate of birth, of infant deaths, of still-birth, of child mortality, and of the survival of children to the ages of maturity, self support and marriage—are accessible more or less from published statistics. Other facts on family function—the size of families of women, the births of whose children are registered, and the size of families of men and women whose deaths are registered—are unfortunately not now recorded upon the American registrars' forms.† This defi-

* Willcox, Walter F., ''The Nature and Significance of the Changes in the Birth and Death Rates in Recent Years,'' Quarterly Publications of the American Statistical Association, Vol. XV.

Baines, J. Athelstane, ''The Recent Trend of Population in England and Wales,'' *Journal of the Royal Statistical Society*, July, 1916, p. 399.

† A record of this kind would have been invaluable during the recent

ciency was pointed out in a preceding section of this paper on family disintegration. Let us consider the classes of statistics which are available in dynamic demology.

Birth Statistics.

The record of birth, completed by the attending physician or midwife, is required to be reported within a specified period after birth, to the registrar of vital statistics, who in some Commonwealths is the representative of the health authorities, and in others, the local representative of the Secretary of State. Registration laws of recent enactment have designated the office of the State Board of Health as the final repository for these records; registration laws of long standing as in Massachusetts, and Michigan, specify the office of the Secretary of State. The chief difficulty in birth statistics is to secure even fairly complete registration. In some cities, New York, for instance, where the enforcement of the law is effective, registration of births is practically complete. In by far the largest proportion of cities, however, registration of births is far from reasonably satisfactory. Granted complete registration we may consider the following elements of birth statistics.

Births may be classed as (a) nuptial (legitimate) and (b) extra-nuptial (illegitimate). " Nuptial " births are related to the number of married women in a population, sometimes to the number of married women 15 to 44 years of age, to obtain "specific" birth rates. A further development is to relate the number of nuptial births to married women within narrower age groups (20 to 24 years, 25 to 29 years, etc.). Extra-nuptial births are classed against the total number of single (never married), widowed and divorced women. Rates for this class of births may be displayed specifically according to the ages of the mothers in relation to the corresponding age classes of single, widowed and divorced women combined. For certain purposes, all births regardless of whether the birth occurred in or out of wedlock are related (a) to the total population at all ages, (b) to the total of women aged 15 years or more, or to the total number of women in specific age classes.

Birth statistics are of practical interest to the insurance statis-

pandemic of influenza in tracing the children made fatherless or motherless, or both, as a result of fatalities ensuing from the disease. Instead, a house-to-house canvass was necessary in some cities.

tician because of the opportunity they present for computing an "exposed to risk" or estimated population at the ages under five years for life table purposes. The numbers of deaths at these single ages in successive calendar years are used, of course, for this purpose in conjunction with birth statistics. (The census enumeration of the child population at ages under five years is notoriously defective, and the insurance statistician and actuary who would understand the observational base of the life table child ages should be acquainted with the elements of birth statistics and their proper handling.)

By subtracting the crude death rate from the crude birth rate in a given calendar year, the *natural increase* of population per unit of that population (usually, per 1,000) may be computed. This latter ratio is the intimate concern of the statesman and publicist because it indicates the extent to which a population makes headway against the forces which oppose its numerical growth.

From the standpoint of social statistics, and the theory of social populations, this ratio of "natural increase" is significant. The student of sociology and of social statistics in classing populations, differentiates three primary orders: vitality classes, personality classes and social classes. Other classes, the product of advanced social evolution—political, industrial and economic are of secondary importance. The student of social statistics must be careful to identify classes of the social population in the genetic order in which differentiations appear.

Vitality classes are the first in order of development from the fact of human association. A high vitality class of population has a high birth rate and a low death rate. Medium vitality classes have a low birth rate and a low death rate; low vitality classes have a low birth rate and a high death rate.

We have seen how birth statistics lead to data on one phase of family function—the replenishment of population.

Another function of the family rarely referred to in social statistical literature is the safeguarding and nurture of the life committed to its care by the fact of birth, and the rearing of children to resistant, independent manhood and womanhood and to efficient citizenship. An admirable study recently completed in England* is worthy of attention. The interest of the casualty and social in-

* "The Mortalities of Birth, Infancy and Childhood," by Medical Research Committee, National Health Insurance, London, 1917.

surance statistician and actuary in these matters is fixed by the bearing of these data upon problems of maternity and family insurance.

Statistics of Infant and Child Mortality in the Study of Family Function.

The attack upon normal life of the family by improper inheritance and adverse environment and by the teeming world of bacterial life, must be considered in classes or stages. The usual studies of "infant mortality" are devoid of much meaning because of this failure to indicate the separate factors whose composite effect is the total death rate of very young children. Even in the present uncertain state of our knowledge of the facts of normal physiological progression, we may identify two radically different groups of causes of infant mortality—(a) those "developmental" factors characteristic of the ante-natal period and of the period immediately following birth and (b) the environmental factors such as infection, nutrition, housing and atmospheric conditions which begin to be felt practically at the end of the first month of post-natal life and continue up to the end of the first year, and thereafter. In other words the curve of the total mortality of infants under one year of age is compounded of two curves, each of which is in turn a compound of curves of diseases variably typical of these two periods.

Under the first period of "birth mortality," we may consider the diseases which are registered as "premature birth," "congenital malformations" and "atrophy, debility and marasmus" and others associated immediately with the crisis of birth; and under the second period or stage, true infantile environmental mortality, beginning in force approximately at the end of the first month of life, the infections such as whooping cough, measles, scarlet fever and tuberculosis, and the nutritional diseases. Study of infant mortality with the subject of maternity insurance in mind should be made with these distinctions fully in view. A proper base for computing "annual" calendar year mortality in the first year of life is the average of the number of births registered for that and the preceding calendar year. In the succeeding years of childhood up to five the base should be the number of survivors into a given age in that calendar year of the "average" births of one, two, three and four prior calendar years. After five years of age the

graduated "initial" censal population for each year of age will be found to be a fairly satisfactory base. Continuation of this process of computing q_x's up to the average age at marriage, and the reduction of an initial radix or cohort of, say, 100,000 at age 0 by these q_x values, will give the proportion of the population entering a generation who reach the age of reproducing that generation. We have thus a measure of the relative effectiveness of the family in its nurture of the life committed to its care by the processes of nature. The actuary's life table becomes the "statement of account" of social stewardship for the families of a given generation. Repetition of this measure of family function from one censal point to another will show the net effect upon the capacity of the family to perform its natural functions, of the factors of natality, fertility and mortality.

Registration Sources on the Size of the Family in the Study of Family Function.

Before dropping the discussion of dynamic demologic data, we may consider the possible uses of facts on the size of families registered on certificates of birth and death. In Switzerland and in Australasia, notably, the bill of personal and statistical particulars on birth and death certificates requires the registration of (*a*) the number of live-born issue and (*b*) the number of such issue living at the time of registry of the death of married, widowed or divorced persons and upon registry of a birth to a married, widowed or divorced woman. Discarding for the moment the question of differential mortality between parents of large, medium and small families, these registrations of size of family serve as random samples of the population living in the registration year. The data may be assembled and studied in precisely the same manner as outlined for census enumerations of families.

In a censal year where the living population is enumerated according to size of completed and continuing fertility family classes, the registered mortality data of similar kind may be used to show the comparative death rates of the several "size of family" classes, qualified according to age, race-stock or other demologic groups.

Data on the size of families of deceased married men serve as a base for estimating the need for widows' or mothers' pensions and other forms of insurance protecting children. From that standpoint alone, the casualty and social insurance statistician and actuary is concerned with the registration facts for families.

4. STRUCTURE AND COMPOSITION OF SOCIETY IN SOCIAL UNITS OF THE FAMILY AT POINTS IN TIME. HISTORY OF THE FAMILY.

Conclusions on the status and history of the family, and the bearing of these conclusions upon the fundamentals of casualty and social insurance, may be made by two methods: the comparative and the historical—granted the existence of suitable descriptive data and analytic processes. "Each method," to quote Giddings, "consists of the recognition of coherences among the observed phenomena, combined with an inference that phenomena that persist together, or that change together, are cause and effect, or are effects of a common cause. The comparative method is an observation of identical coherences of social phenomena in two or more places, or in two or more populations. . . . The historical method is an observation of coherences through periods of time." The subject-matter, registration sources and descriptive methods of our first three classes of family statistics in their social bearings, may thus be incorporated into general social statistics which support a practical sociology based upon methods of scientific inquiry.

Is it not pertinent that we ask ourselves at this point, whether insurance science of the future will be based primarily upon the facts of human *association,* and less, as in the present and past, upon facts of mere *aggregation?* With respect to certain insurable incidents, are we legislating socially, and statistifying, without a proper foundation of sound social fact?