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THE PROBLEM

Discussion of the more important problems of population suffers at the present time from a plethora of opinion and argumentation, and from a dearth of exact, objective, scientific observations. The principal reason for this state of affairs is the great difficulty inherent in the nature of the case, so far as concerns obtaining reliable and pertinent data, on an adequate statistical scale, regarding the reproduction of man. Official census and registration statistics furnish only a minimum of information useful for any penetrating analysis of the matter. There are, to be sure, considerable differences between different countries in the diversity and pertinence of their natality statistics. But even those having the better systems, from the point of view of the student of population problems—notably Holland and Sweden—leave much to be desired. Generally speaking only the grossest and crudest facts are officially recorded and tabulated, such as the total population by age, sex, color, etc., or the crude birth rate, uncorrected and unstandardized, etc.

It is common and undisputed knowledge that birth rates, however measured, have generally and with but few exceptions been falling for a considerable time past in most countries keeping such records. This is an obviously important phenomenon. But what the student of population wants to know is something about the causal factors—biological, social, economic, and/or other—lying behind the phenomenon. It is true that there can be, and has been, some definite progress made towards an understanding of the part played by some of these factors, through a study of the meager official data furnished by census and registration offices referred to above. Without exhausting the cases,

[1] From the Department of Biology of the School of Hygiene and Public Health, Johns Hopkins University; and the Division of Research of the Milbank Memorial Fund. The substance of this paper, which is preliminary in character, as explained in the text *infra,* was presented at the Annual Meeting of the Milbank Memorial Fund in New York on March 16, 1932, and to the Society of Hygiene in Baltimore on March 23, 1932.

there may be mentioned here, as examples of what can be made out of official statistical reports alone, such studies as those of Körösi,[2] Heron,[3] Yule,[4] Hill,[5] Elderton,[6] Pearl,[7] Dublin and Lotka,[8] Lotka,[9] Wicksell,[10] and Sanders.[11] But in most such cases, and others that might be cited, the investigators have been hampered and limited by the paucity and lack of penetrating relevance of the available data. This has led to the development of special studies of various aspects of the problems of human fertility, involving the collection of *ad hoc* data from diverse sources and in different ways. Such studies have certain definite statistical characteristics. To begin with, they rely in all cases upon the sampling method rather than that of enumeration or registration of the entire population. Further, they usually deal with differentiated samples: that is, with groups of people who in one way or another fall into special classes of the population. Being generally based upon non-official statistics their data are naturally looked upon with greater

[2] Körösi, J. An estimate of the degree of legitimate natality drawn from observations made at Budapest. *Jour. Roy. Stat. Soc.*, Vol. 57, pp. 690-702, 1894.

[3] Heron, D. On the relation of fertility in man to social status and on the changes in this relation that have taken place during the last fifty years. *Drapers' Company Research Mem., Studies in National Deterioration,* I. *London, (Dulau),* 1906.

[4] Yule, G. U. On the changes in the marriage and birth-rates in England and Wales during the past half-century; with an inquiry as to their probable causes. *Jour. Roy. Stat. Soc.*, Vol. 69, pp. 88-132, 1906: The growth of population and the factors which control it. *Jour. Roy. Stat. Soc.*, Vol. 88, pp. 1-58, 1925.

[5] Hill, J. A. Comparative fecundity of women of native and foreign parentage in the United States. *Publ. Amer. Stat. Assoc.*, Vol. 13, pp. 583-604, 1913.

[6] Elderton, E. M. Report on the English birth rate. Part I. England, north of the Humber. *Eugenics Lab. Mem.*, 19 and 20, Cambridge Univ, Press, 1914, pp. viii + 246.

[7] Pearl, R. The Biology of Population Growth. *New York* (Alfred A. Knopf), 1925. Pp. xiv + 260: Differential fertility. *Quart. Rev. Biol.*, Vol. 2, pp. 102-118, 1927.

[8] Dublin, L. I., and A. J. Lotka. On the true rate of natural increase as exemplified by the population of the United States, 1920. *Jour. Amer. Stat. Assoc.*, Vol. 20, pp. 305-339, 1925.

[9] Lotka, A. J. The spread of generations. *Human Biology,* Vol. 1, pp. 305-320, 1929: The structure of a growing population. *Ibid.*, Vol. 3, pp. 459-493, 1931.

[10] Wicksell, S. D. Nuptiality, fertility, and reproductivity. *Skandinavisk Aktuarietidskrift,* 1931, pp. 125-157.

[11] Sanders, J. The Declining Birth Rate in Rotterdam. A Statistical Analysis of the Drop in the Number of Children in 24,664 Rotterdam Families during the last 50 Years. *The Hague* (M. Nijhoff), 1931. Pp. xi + 179.

suspicion. They also inevitably receive a certain amount of irresponsible criticism from those whose prejudices run counter to some or all of whatever conclusions the author may reach. If the data are, in fact, sound such irresponsible criticism is without significance. Of more importance is the fact that in such special investigations the numbers involved are often smaller than is desirable for the reaching of sound conclusions. But in spite of some statistical defects and disabilities in these special studies they have materially advanced knowledge and broadened the point of view regarding some of the basic problems of human population here under discussion. If well conceived and carried out they have the enormous advantage of attacking more precisely formulated, more penetrating, and more significant questions, than can usually be attacked with only official government statistics as material. Into the category under discussion may be put, as examples and again without exhausting the available cases, such studies as those of Hewes,[12] Cattell,[13] Johnson and Stutzmann,[14] Brown, Greenwood, and Wood,[15] Savorgnan,[16] Spiegelberg,[17] Fürst and Lenz,[18] Phillips,[19] Davis,[20] Notestein,[21] Sydenstricker,[22,23] and Boldrini.[24]

[12] Hewes, A. Marital and occupational statistics of graduates of Mount Holyoke College. *Publ. Amer. Stat. Assoc.*, Vol. 12, pp. 771-797, 1911.

[13] Cattell, J. McK. Families of American men of science. *Pop. Sci. Mo.*, Vol. 86, pp. 504-515, 1915; *Sci. Mo.*, Vol. 4, pp. 248-262; Vol. 5, pp. 368-377, 1917.

[14] Johnson, R. H., and B. Stutzmann. Wellesley's birth rate. *Jour. Heredity,* Vol. 6, pp. 250-253, 1915.

[15] Brown, J. W., M. Greenwood, and F. Wood. The fertility of the English middle classes. A statistical study. *Eugenics Rev.*, Vol. 12, pp. 158-211, 1920.

[16] Savorgnan, F. La fecondità della aristocrazie; le case mediazzate della Germania. *Metron,* Vol. 3, pp. 439-468, 1923.

[17] Spiegelberg, R. Kinderreichtum und sozialer Aufstieg bei Kruppschen Arbeitern. *Arch. Rass.- u. Gesellsch.-Biol.,* Bd. 16, S. 267-275, 1924.

[18] Fürst, Th., and F. Lenz. Ein Beitrag zur Frage der Fortpflanzung verschiedener begabter Familien. *Arch. Rass.- u. Gesellsch.-Biol.,* Bd. 17, S. 353-359, 1926.

[19] Phillips, J. C. Further studies of the Harvard birth-rate—classes 1891-1900. *Harvard Graduates' Mag.*, March, 1926, pp. (of reprint) 1-12.

[20] Davis, Katherine B. Factors in the Sex Life of Twenty-two Hundred Women. *New York* (Harper and Bros.), 1929. Pp. xx + 430.

[21] Notestein, F. W. The decrease in size of families from 1890 to 1910. *Quart. Bull. Milbank Mem. Fund,* Vol. 9, pp. 181-188, 1931.

[22] Sydenstricker, E. A study of the fertility of native white women in a rural area of western New York. *Quart. Bull., Milbank Mem. Fund,* Vol. 10, pp. 17-32, 1932.

[23] Sydenstricker, E., and F. W. Notestein. Differential fertility according to social class. A study of 69,620 native white married women under 45 years of age

It is generally agreed by all persons competent to have an opinion on the subject that the practice of contraception (birth control) is a factor at least potentially capable of influencing the birth rate. There is no such widespread agreement as to how significant a factor it has been, and is now, in causing the decline of birth rates. Some persons think it is the only factor worthy of serious consideration. Others are of the opinion that it has played no significant rôle, up to the present time, in the movements of the birth rates of large population aggregates considered as wholes. Still others hold an intermediate position somewhere between these extremes.

There are several immediately apparent reasons for this diversity of opinion. In the first place no one really *knows* how extensively contraceptive measures of any sort are actually used by the general population of any country, taken as a whole. Secondly, for emotional or propagandist reasons, exaggerated inferences, in one direction or the other, are drawn from meager experience, statistically considered. The leaders of the birth control movement, for example, argue that information on contraceptive technique should be widely disseminated, because relatively few know anything about it. On the other hand those opposed to birth control argue that already information on the subject is so widespread, and the technique is put into practice so generally, as even to endanger the continued existence of some of the groups standing highest in the scale of civilization. Both sides to this controversy are in possession of the same objective evidence. One side knows nothing that the other does not know relating to what may be euphemistically called the "facts" in the case. What could indicate more clearly than this situation the need for more critical objective evidence, and less chatter about birth control, either for or against?

In the third place, there exists almost nothing in the way of critical, objective, unbiassed evaluation of the effectiveness of any or all contraceptive techniques, as actually practised in the population. If a few special studies such as those of Davis,[25] Brown, Greenwood, and

based upon the United States Census returns of 1910. *Jour. Amer. Stat. Assoc.*, Vol. 25, pp. 9-32, 1930.

[24] Boldrini, M. La fertilità dei biotipi. Saggio di demografia costituzionalistica. *Milano* (Società editrice "Vita e Pensiero"), 1931. Pp. xiii + 238.

[25] Davis, K. B. *Loc. cit.*, footnote 20.

Wood,[26] and Dickinson and Beam[27] are excepted, nearly all the so-called evidence as to the effectiveness of contraceptive practices comes from persons or organizations interested in birth control propaganda (for recent examples see Cooper[28] and Stopes[29]). But it is a sound human instinct to look somewhat askance at too obviously *ex parte* testimony, and to attach but little weight to any protestation of honesty or nobility of purpose which may accompany it. The major difficulty in the matter under discussion appears to be that there is considerable confusion of thought about the difference between the potentiality and the actuality of effectiveness of contraceptives. It is dubious logic to reason from the fact that a highly intelligent woman, thoroughly trained in biology in a university, and obsessed with an overwhelming fear of unwanted pregnancy is able to use a particular contraceptive device with unfailing success, to the conclusion that this contraceptive device is, or will be, equally effective as actually used by all women who resort to it in the general population. Nor can it be safely inferred from the same premise that birth control is a major factor in causing the decline in the birth rate.

What has been said may perhaps be taken to have set with sufficient clarity, even though briefly, the background of the two problems with which this present investigation is concerned. These problems may be stated concisely as follows:

1. To what extent statistically is any sort of contraceptive technique, device, or habit actually practised in a defined sample of the population of the United States at the present time?

2. What is the quantitative effectiveness exhibited by the various contraceptive techniques, considered both separately and all together, in reducing the relative frequency of pregnancy, as these techniques are actually used in a defined sample of the population of the United States at the present time?

[26] Brown, Greenwood, and Wood. *Loc. cit.*, footnote 15.

[27] Dickinson, R. L., and Lura Beam. A Thousand Marriages. A Medical Study of Sex Adjustment. *Baltimore* (Williams and Wilkins), 1931. Pp. xxv + 482.

[28] Cooper, J. F. Technique of Contraception. The Principles and Practice of Anti-conceptional Methods. *New York* (Day-Nichols) 1928. Pp. xvi + 271.

[29] Stopes, Marie C. Preliminary notes on various technical aspects of the control of conception. Based on the analysed data from ten thousand cases attending the Mothers' Clinic London. *London* (Mothers' Clinic for Contraceptive Birth Control), 1930. Pp. 46.

These two questions make plain the purpose of the study. It is a modest effort to get some direct, objective, quantitative evidence, as precise as possible, and with every critical safeguard that we have been able to think of and put into practice to insure its accuracy and dependability, to help towards reaching a sounder judgment than is now possible about the real influence of birth control upon the movement of population. Because of the great expense in time, labor and money involved in collecting data of the accuracy and manifoldness requisite for critical work in this field it is obvious that the numbers cannot be expected to amount to any grand statistical heights. We shall have to be content with modest, but hopefully adequate samples. More will be said on this point in a later section. But it is hoped and believed that even with this and other limitations and disabilities which will presently appear, the investigation when completed will mark some real progress in an extremely difficult field. When so little is definitely known as is the case here, even the most modest contribution seems bound to have some usefulness, if only to show how the next attack on the problem may be more intelligently directed.

THE PLAN AND METHODS OF THE INVESTIGATION

History. This study had its inception in 1924. The general idea and plan were developed at that time in essentially their present form. A blank record was drawn up, and the late Dr. J. Whitridge Williams, professor of obstetrics in the School of Medicine of the Johns Hopkins University, made arrangements to have the plan put into operation in the obstetric wards of the Johns Hopkins Hospital. A few records were collected from that source at that time, but only a few. The plan languished and eventually died, chiefly because everyone involved in it was too fully occupied with other matters. Particularly the residents and internes on the service, upon whom devolved the labor of getting the data from the patients, were too busy to do it except in their spare time, and no funds were available to pay them anything for their trouble. The whole project thus lay fallow until the autumn of 1929. During this period general interest in the problems of population had greatly developed. A World Conference on population had been held;[30] an

[30] *Cf.*, Proceedings of the World Population Conference . . . . Geneva . . . 1927. Edited by Margaret Sanger. *London* (Arnold) 1927. Pp. 383.

International Union for the Scientific Investigation of Population Problems had been formed and put into operation;[31] various university departments and other institutions had embarked upon the active promotion and prosecution of research in the field. Among the latter was the Research Division of the Milbank Memorial Fund, which had most generously aided the International Union in its work. In 1929 an interest was expressed by Mr. Edgar Sydenstricker and Mr. John H. Kingsbury of the Milbank Memorial Fund to have the project continued on an adequate scale. This was made possible by a substantial grant for the year 1931, which was continued on a somewhat larger scale for the year 1932. I wish to express here my deep appreciation and gratitude for this aid.

With sufficient funds available to carry on the work the initial plans were critically reviewed and revised. At my request the following persons agreed to serve as an Advisory Committee in connection with the project: Dr. Carl G. Hartman, Dr. John R. Miner, Prof. Lowell J. Reed, Mr. Edgar Sydenstricker, and the late Dr. J. Whitridge Williams, with the writer as chairman. I am very grateful to this Committee for help in getting the project soundly organized. The staff began work on July 1, 1931 and the inflow of record cards started in August.

Plan. The plan of the investigation, in briefest outline, was to have filled out a simple but rather comprehensive history card for each woman delivered of a baby in the obstetric service of some hospital located in or near a large city east of the Mississippi River. The history carries basically two broad categories of information: first, the entire reproductive history of the woman, and, second, an account of her use of contraceptives. The history card actually used—5 x 7 inches in size—is shown in facsimile in Figs. 1 and 2.

Instructions. The details of the plan may best be made clear by the detailed, written instructions to the coöperative workers, which in their present revised form are as follows:

> The purpose of the investigation is to gather a mass of unbiassed objective information relative to two primary problems, viz. (1) The extent to which contraceptive (birth control) practices are employed by women in a large sample of the American urban population; and (2) the reproductive histories of this group of normal American women.

[31] *Cf.*, Bulletin of the International Union for the Scientific Investigation of Population Problems, Vols. I and II, 1930-31, *passim*.

HOSPITAL
OBST. NO.

DATE OF DELIVERY

LEGIT. OR ILLEGIT.

DO NOT WRITE IN THIS SPACE

COLOR	RACE STOCK	RELIGION	HAS PATIENT ANY GYNECOLOGICAL DISEASE? IF SO SPECIFY.
W. C.			

REPRODUCTIVE HISTORY
INCLUDING PRESENT ADMISSION

PREGNANCY	YEAR	RESULT
1		L. S. M. T. O.
2		L. S. M. T. O.
3		L. S. M. T. O.
4		L. S. M. T. O.
5		L. S. M. T. O.
6		L. S. M. T. O.
7		L. S. M. T. O.
8		L. S. M. T. O.
9		L. S. M. T. O.
10		L. S. M. T. O.
11		L. S. M. T. O.
12		L. S. M. T. O.
13		L. S. M. T. O.
14		L. S. M. T. O.
15		L. S. M. T. O.

L=LIVE BABY. S=STILL BORN.
M=SPONTANEOUS MISCARRIAGE
T=THERAPEUTIC ABORTION.
O=OTHER ABORTION

HAS PATIENT EVER USED ANY METHOD FOR PREVENTION OF CONCEPTION? YES. NO.
(FILL IN DETAILS ON OTHER SIDE OF CARD)

DATE OF BIRTH OF PATIENT?
DATE OF BIRTH OF HUSBAND?
DATE OF MARRIAGE?

WARD, PAY, OR PART PAY PATIENT

OCCUPATION OF HUSBAND?

EDUCATION OF PATIENT { ILLITERATE / ELEMENTARY SCHOOL / HIGH SCHOOL / COLLEGE

ECONOMIC POSITION { VERY POOR / POOR / MODERATE CIRCUMSTANCES / WELL-TO-DO / RICH

HAS PATIENT EVER HAD SELF-INDUCED ABORTION? YES. NO.
HAS PATIENT EVER HAD ABORTION INDUCED BY SOMEONE ELSE? YES. NO.
(IF ANSWER IS YES IN EITHER CASE, DESCRIBE METHOD USED)

NOTES:

THIS CARD WAS FILLED OUT BY:

OVER

FIG. 1. HISTORY CARD USED IN THE INVESTIGATION. OBVERSE

METHODS OF CONTRACEPTION USED
(TO BE FILLED IN WITH AS MUCH DETAIL AS POSSIBLE)

METHOD	CHECK USE	HOW LONG WAS EACH OF SPECIFIED METHODS PRACTISED?	WHAT IS PATIENT'S OPINION AS TO EFFECTIVENESS OF METHODS SHE HAS USED?
COITUS INTERRUPTUS (WITHDRAWAL)			
CONDOM { RUBBER / SKIN			
PESSARY ALONE			
PESSARY WITH MEDICATED JELLY			
PESSARY WITH DOUCHE			
MEDICATED VAGINAL SUPPOSITORIES OR JELLIES*			
DOUCHE ALONE—WATER			
DOUCHE ALONE—MEDICATED*			
INTRA-UTERINE MECHANICAL DEVICE*			
"SAFE PERIOD" (ABSTINENCE DURING PART OF MONTH)			
ANY OTHER METHOD*			

* SPECIFY KIND HERE:

DO NOT WRITE IN THIS SPACE

OVER

FIG. 2. HISTORY CARD USED IN THE INVESTIGATION. REVERSE

The plan for accomplishing this purpose, in which you are asked to coöperate, involves the following elements:

1. The regular and systematic filling out of a simple card form for each and every woman delivered in the obstetrical service of the hospital with which you are connected.

2. These cards will be furnished by the Department of Biology. They will be filled out by a designated member of the staff (resident, interne, or other but *not* a nurse).[32] For this service a fee of five cents per card will be paid.

3. The accumulated cards from the previous week properly filled in will be mailed each Monday morning, in self-addressed envelopes which will be furnished for the purpose. You will be reimbursed for the postage.

4. The data will be analyzed and tabulated in the Department of Biology, and from time to time progress reports upon the investigation will be issued.

Primary essentials to a successful and significant outcome to the investigation are:

1. Painstaking accuracy in getting the information and putting it on the cards.

2. Absence of selection of cases. *Every* case delivered in the hospital should be included.

3. Systematic and prompt return of the cards to the Department of Biology.

The Supervising Field Worker will explain the details of the plan and help you to get started. The work began with the leading hospitals in Baltimore, and has gradually extended to other cities in the eastern part of the United States.

INSTRUCTIONS FOR FILLING OUT THE CARDS

A. GENERAL INSTRUCTIONS

a. The records on the cards should always be made in ink.

b. Please write legibly. In particular be careful to make all *figures* perfectly legible.

c. Whenever *dates* are called for in the record *do not abbreviate,* but write them out in full, as, for example, March 27, 1930. Such a record for the date as 3/27/30 *is not acceptable.*

d. Before starting the work read *all* the instructions over carefully and thoughtfully, comparing them at each point with the card.

B. SPECIAL INSTRUCTIONS

1. HOSPITAL. The *name* of the hospital will be filled in here, either in writing or by means of a rubber stamp.

[32] The idea of this restriction was that the data should always be taken by medically trained persons, having the confidence of the patient on the one hand, and the technical knowledge and training on the other hand, to ensure the scientific accuracy and completeness of the records. As a matter of fact as the work progressed it has been necessary in a few cases to employ graduate nurses for the actual record making, working under the supervision of a staff member. In each such case they have done the work faithfully and intelligently.

2. OBST. NO. This means the obstetrical case or service number of the particular patient to whom the card applies, in the series of case histories of the particular hospital where the record is made. It should be filled in by the worker. It might be, for example, No. 18,476 of the case histories in the Obstetrical Service of the Johns Hopkins Hospital. The purpose of recording it on the card is to provide for the contingency that it might be necessary for us at some time to look up again the original hospital history.

3. DATE OF DELIVERY. Write out in full, as August 30, 1931, the date when the patient to whom the card applies was delivered of her baby (or alternatively the date when her pregnancy was terminated in some other way). This will also, of course, be the date of birth of the baby.

4. LEGIT. OR ILLEGIT. If the baby is *legitimate* draw a line around LEGIT. If the baby is *illegitimate* draw a line around ILLEGIT.

5. COLOR. If the woman to whom the card applies is *white,* draw a line around W. If the woman is *colored*—negro, mulatto, etc.—draw a line around C.

6. RACE STOCK. The purpose of this item is to get some record of the racial origins of the persons included in the records. There follows a printed list of the official designations of racial stocks which may be found represented in the American population. Against each of these titles is a code number. These code numbers may be used instead of the titles in filling out this item on the cards.

RACIAL CODE

00 Scandinavian
01 Swede
02 Norwegian
03 Dane
04 Finnish

10 German
11 Dutch
12 Flemish

20 Russian
21 Slovak
22 Lithuanian and Ruthenian
23 Polish
24 Magyar
25 Croatian
26 Bohemian and Moravian
27 Bulgarian, Servian, Montenegrin
28 Roumanian
29 Dalmatian, Bosnian and Herzegovinian

30 Hebrew

40 English
41 Irish
42 Scotch
43 Welsh

50 Italian, South
51 Italian, North
52 French
53 Portuguese
54 Spanish
55 Greek

60 Syrian
61 Armenian
62 Turkish

70 Cuban
71 Mexican
72 West Indian (except Cuban)
73 Spanish-American

80 Japanese
81 Chinese
82 Korean
83 East Indian
84 Pacific Islander

90 Negro

98 North American (to be qualified in every case by indication of racial stock from which descended)

Thus, if the woman is native born of native parents, the appropriate designation is $98 \begin{matrix} 98 \\ 98 \end{matrix}$.

If it is known that the woman is native born of native parents, but the parents were of German descent, the appropriate designation is $98 \begin{matrix} 98\text{-}10 \\ 98\text{-}10 \end{matrix}$.

If the woman is native born but of German parents the appropriate designation is $98 \begin{matrix} 10 \\ 10 \end{matrix}$, but if her father was German and her mother English, the appropriate designation is $98 \begin{matrix} 10 \\ 40 \end{matrix}$.

If the woman is a Russian Jewess, the appropriate designation is 30—20.

It is hoped that the above examples will make clear the method of procedure under this item. But if there is doubt or difficulty either write to Doctor Pearl or consult the Supervising Field Worker upon her next visit to your hospital, for further explanations and instructions.

7. RELIGION. Write in the religious affiliation or preference of the patient, as, for example: Methodist, Catholic, Jewish, etc.

8. GYNECOLOGICAL DISEASE. If the patient has, or at any time in her life has had any gynecological disease, such as, for example, salpingitis, uterine myomata, etc., write down its name in this space. If she has ever been surgically treated for any gynecological disorder this fact should be specified, as, for example, "dilation and curettage following abortion," etc.

9. REPRODUCTIVE HISTORY. The purpose of the three columns under this head is to include a succinct but complete record of all the pregnancies which the woman who is the subject of the card has ever had. It is one of the most important records of the whole study. Therefore great pains and care should be taken in filling it out, to the end that the resulting record may be accurate and complete.

a. *Pregnancy.* The first column prints the ordinal number of the patient's successive pregnancies, whatever their outcome, beginning with the first and going to the 16th. In case that some particular woman is pregnant for the 16th (or some greater) time, the table should be extended as far as necessary by attaching to her card a sheet of paper setting forth the additional data for which there is no space on the card.

b. *Year.* In this column is to be recorded the *year* in which each successive pregnancy *terminated.* Thus, if the patient had her first baby born in 1917, you will write in the year column, in the row marked "1," the figures 1917, and correspondingly, *mutatis mutandis,* for all other pregnancies, *including the present one.*

c. *Result.* Each of the patients' pregnancies must terminate, or have terminated, in one, and only one of the following ways: (1) By the birth of a live baby. If this is a fact draw a circle around the "L" in this column; (2) By the birth of a stillborn baby, in which event draw a line around the "S" in this column; (3) By a spontaneous miscarriage at any time in the course of the pregnancy, in which event draw a line around the letter "M" in this column; (4) By an abortion legitimately induced by a qualified medical man for therapeutic reasons (such as danger to the mother's life from some complicating disease) at any time during

pregnancy, in which event draw a line around the letter "T" in this column; (5) By an abortion induced for criminal or other non-therapeutic reasons, in which event draw a line around the letter "O" in this column.

In case a particular pregnancy results in *twins* the fact should be noted on the card, in connection with the year of that pregnancy. Further it should be noted for each of the pair of twins whether it was "L," "S," "M," "T," or "O," in the manner indicated above for single births.

HOSPITAL Sinai

OBST. NO. 12345

COLOR	RACE STOCK
(W.) C.	$98 \begin{matrix} 98 \\ 98 \end{matrix}$

REPRODUCTIVE HISTORY
INCLUDING PRESENT ADMISSION

PREGNANCY	YEAR	RESULT
1	1916	(L.) S. M. T. O.
2	1918	(L.) S. M. T. O.
3	1919	L. (S.) M. T. O.
4	1921	L. S. M. T. (O.)
5	1921	L. S. M. T. (O.)
Twins 6	1932	L. S. (M.) T. O.
7		L. S. M. T. O.
8		L. S. M. T. O.
9		L. S. M. T. O.
10		L. S. M. T. O.
11		L. S. M. T. O.
12		L. S. M. T. O.
13		L. S. M. T. O.
14		L. S. M. T. O.
15		L. S. M. T. O.

L=LIVE BABY. S=STILL BORN.
M=SPONTANEOUS MISCARRIAGE
T=THERAPEUTIC ABORTION.
O=OTHER ABORTION

FIG. 3. SHOWING HOW THE HYPOTHETICAL REPRODUCTIVE HISTORY DESCRIBED IN THE TEXT WILL APPEAR WHEN RECORDED ON THE CARD

The method of filling out the records under this general head *Reproductive History* may be made clearer by describing a hypothetical case and illustrating the filled out card.

A woman had her first pregnancy and a live baby in the first year after her marriage in 1916. This was followed by a second pregnancy and live baby two years later. In the following year a pregnancy led to a stillborn child. In the second year following she became pregnant twice, and resorted to an abortionist both times. There followed a long rest till the present pregnancy which resulted in a spontaneous miscarriage of twins.

The record of this woman's reproductive history would appear on the card as shown in Figure 3.

10. FIRST CONTRACEPTIVE QUESTION. If the patient has ever used any method or methods for the prevention of conception, or any methods which she used in the belief that they would produce such effect, draw a line about the word YES in this space.

If she has never used any such methods of any sort whatever, draw a line around the word NO in this space.

In case the answer is "yes," fuller details will be recorded on the other side of the card.

11. DATES OF BIRTH AND MARRIAGE. These three dates of the (a) birth of patient, (b) birth of her husband, and (c) of their marriage, are most important for the purposes of this investigation. Therefore great pains should be taken to get them accurately. In each case the date should be written out in full (as April 10, 1931) and *not abbreviated.*

In case the patient has been married more than once the necessary dates for *each* marriage (i. e., date of birth of husband and date of marriage) should be given. Also there should be entered the date of, and reason for (death, divorce, etc.), the termination of each marriage that has terminated. In case the married couple has ceased living together (desertion, separation, etc.) at any time, the date of such interruption of the married relation should be recorded. Also if, under such circumstances, marital relations are again resumed, the date of such resumption should be recorded.

12. WARD OR PAY PATIENT. If the patient occupies a free ward in the hospital and pays nothing draw a line around the word WARD. If the patient occupies a private room or pays the regular charges for her hospitalization, draw a line around the word PAY. If the patient pays for only a part of the regular charges, in either ward or private room, draw a line around the words PART PAY.

13. OCCUPATION. In this space write briefly but clearly, the occupations which have been followed by the patient's husband, as "machinist," "insurance agent," "unskilled laborer," "barber," etc.

14. EDUCATION. If the patient cannot read or write draw a line around the word ILLITERATE. If the patient has attended primary, intermediate, or other elementary grade schools, but has *not* attended high school, draw a line around the words ELEMENTARY SCHOOL. If the patient has attended high school but

has *not* attended college or university draw a line around the words HIGH SCHOOL. If the patient has attended a college or university, draw a line around the word COLLEGE.

15. ECONOMIC POSITION. The purpose of this item is to provide a further approximation to the social and economic status of the patient. It is realized that this is a difficult and embarrassing matter to take up directly with the patient. On this account the classification is purposely made very broad, because it is expected that only the interne's judgment or estimate of the situation will be given. But in most cases the interne will in fact have a fairly accurate notion of the economic status of each patient.

The classification is intended to have the following meanings:

If the patient is very poor; her family on the border line of actual subsistence requirements; sometimes requiring charity aid; draw a line around the words VERY POOR.

If the patient and her family are above the last mentioned status; never requiring charity aid; but compelled to live in the most careful and modest way; the typical workingman's family (except for the upper grades of skilled labor) draw a line around the word POOR.

If the patient and her family have enough to live on comfortably; educate the children through high school, enjoy modest luxuries and amusements, live in comfortable, well-kept homes; as the upper levels of skilled workmen, artisans, small shop-keepers, etc.; in short like the *average* of the great mass of the American population, draw a line around the words MODERATE CIRCUMSTANCES.

If the patient and her family are well-to-do; able to live in part from invested funds; perhaps belong to the professional classes; or managerial classes in business; are able to have whatever they want within moderate limits; send the children to college and university; draw a line around the word WELL-TO-DO.

If the patient or her family are rich or very rich; beyond the necessity of having to give serious consideration to economic matters because they have an invested fortune; draw a line around the word RICH.

16. INDUCED ABORTION. The questions here are self-explanatory. To indicate the answers draw a line around either YES or NO.

In case the answer is "yes" the method used should be described briefly, but as clearly as possible.

17. NOTES. This space is left for the purpose of permitting and encouraging the interne filling out the card to write down *anything whatever* that seems *to him (or her)* of special interest about the particular case recorded on the card. Here is your opportunity. Please use it.

18. THIS CARD WAS FILLED OUT BY: In this space should appear the *name*—not merely the initials—of the person filling out the card. If requested, the Department of Biology will furnish gratis a rubber stamp for this purpose.

19. METHODS OF CONTRACEPTION USED. We come now to the reverse side of the card. The information called for here forms, in a way, the keynote of the investigation. To get this information from the patient requires tact on the part of the worker, and the establishment of relations of mutual con-

fidence with the patient. Long experience in similar investigations has demonstrated, however, that it is possible to get the desired information in an accurate and trustworthy form in at least 99 per cent of all cases, provided the worker approaches the matter intelligently, sympathetically, and persistently. The Supervising Field Worker will give you personal instructions and suggestions regarding methods of handling the patient relative to this matter which have proved useful in previous experience. Do not accept a statement from the patient to the effect that she has never used any contraceptive method until by further questioning and study of her reproductive history in its entirety you are satisfied that her statement represents the real facts.

In the first column are listed all the commonly practiced methods of contraception. The patient may have used one or more, or none of these methods, or various combinations of them.

In the second column put check marks against any methods used.

In the third column write, in the same line as the checked methods, a statement of the length of time this specified method was used, as accurately as possible.

In the fourth column write down the patient's own opinion about the specified method.

Figure 4 gives an example of a hypothetical case which will indicate the sort of record desired.

The Handling of the Records. When the record cards reach the laboratory they are first checked in, as to numbers and source of origin, for the purpose of (a) keeping track of payments due the workers for the cards and postage, and (b) knowing what to send back to the workers in the way of supplies (blank cards and envelopes) so that their stock on hand may not be unduly depleted.

Each card is then gone over carefully and critically in detail to be sure (a) that each item of information called for has been duly entered: (b) that there are no inconsistencies or ambiguities in the record as it reaches us. If the card satisfactorily passes this scrutiny it is stamped with a serial number in the upper right-hand corner, and filed. If the card does not pass the inspection, a duplicate copy of it, *verbatim et litteratim,* exactly as it reaches us, is made. On this copy are placed blue pencil marks indicating the missing or doubtful items, and this copy together with a letter, discussing the matter and making plain what further information is wanted, is promptly mailed to the worker who originally sent it in, with a request that it be put in order and sent back to us as soon as possible. In the meantime the original is held in the laboratory here, without any serial number, until the case is cleared up, or it is found impossible to get the desired information. Only when the case has been disposed of in one or the other of these ways is it given a serial number and filed.

METHODS OF CONTRACEPTION USED

(TO BE FILLED IN WITH AS MUCH DETAIL AS POSSIBLE)

METHOD	CHECK USE	HOW LONG WAS EACH OF SPECIFIED METHODS PRACTISED?	WHAT IS PATIENT'S OPINION AS TO EFFECTIVENESS OF METHODS SHE HAS USED?
COITUS INTERRUPTUS (WITHDRAWAL)	✓	First 18 months after marriage.	Fairly safe but not satisfying to either husband or wife.
CONDOM {RUBBER / SKIN}	✓	Occasionally throughout wedlock, especially when travelling.	Unsatisfactory. Accidentally broke with resulting pregnancy.
PESSARY ALONE			
PESSARY WITH MEDICATED JELLY			
PESSARY WITH DOUCHE	✓	Regularly since abandonment of coitus interruptus until Jan. 1929.	Safe, but too much trouble.
MEDICATED VAGINAL SUPPOSITORIES OR JELLIES*			
DOUCHE ALONE—WATER			
DOUCHE ALONE—MEDICATED*			
INTRA-UTERINE MECHANICAL DEVICE*	✓	From Jan. 1929 to March, 1931, when all contraception was stopped to produce "wanted" baby.	Perfectly satisfactory.
"SAFE PERIOD" (ABSTINENCE DURING PART OF MONTH)			
ANY OTHER METHOD*			

*SPECIFY KIND HERE: Gold "hairpin" inserted in uterus by physician. Monthly inspection, removal, and cleaning by physician.

DO NOT WRITE IN THIS SPACE

OVER

FIG. 4. REVERSE SIDE OF RECORD CARD FILLED IN FOR A HYPOTHETICAL CASE

As the clerical staff in the office finds time they compute and enter on the finished cards certain data regarding elapsed times [33] (ages of husband and wife, duration of marriage, exposure to risk of pregnancy, etc.), make current tabulations of a few of the more important items of immediate interest, etc.

Eventually the records will be transferred to Hollerith punch cards for mechanical tabulation.

Coöperating Hospitals. The present paper deals with the first 2,000 completed cases only, and with but a very small fraction of the different sorts of tabulations and analyses which will eventually be made. As this paper goes to press the total number of hospitals coöperating in the work, either during some limited period in the past or regularly, is 131, and the total number of finished cards in the file is 13,008. It is expected that the collection of data will be continued until December 31, 1932. On that date the record taking will be stopped, and the complete analysis of the data pushed forward as rapidly as possible.

Table 1 shows the cities, hospitals, and persons filling out the cards, included in the first 2,000 cases.

TABLE 1

List of Hospitals Coöperating in the First Two Thousand Cases

Hospital	*Persons making the records*
BALTIMORE	
The Johns Hopkins Hospital	Dr. E. P. Harrison; Dr. Katherine Kuder
University of Maryland Hospital	Dr. W. P. Dailey; Dr. W. A. Hart
Sinai Hospital	Dr. Sarah Roskis; Dr. Cohen
Union Memorial Hospital	Dr. J. M. Haws
Franklin Square Hospital	Dr. M. S. Schreiber
The Church Home and Infirmary	Dr. William L. Millea; Dr. Hedges
Provident (Colored) Hospital	Dr. Berkeley Butler
South Baltimore General Hospital	Dr. J. G. Feeman
West Baltimore General Hospital	Dr. Arthur C. Tiemeyer; Dr. John Rozum; Dr. Philip L. Lerner

[33] *Cf.* Pearl, R., and J. R. Miner. A table for ascertaining elapsed time in years and decimals of a year between any two dates. *Quart. Bull. Milbank Mem. Fund,* Vol. 10, pp. 151-153, 1932.

TABLE 1—*Continued*

Hospital	*Persons making the records*
PHILADELPHIA	
Abington Memorial Hospital	Dr. E. G. McDaniel, Jr.
University of Pennsylvania Hospital	Dr. R. B. Schutz
Woman's Hospital	Dr. Maytum; Dr. Carrie Hearn
Philadelphia Lying-In Hospital (Red Service)	Dr. Wyatt C. Simpson
Philadelphia Lying-In Hospital (Blue Service)	Dr. A. B. Peacock
Jefferson Medical College Hospital	Dr. C. E. Wolfrom
Kensington Hospital	Dr. J. M. Lemmon
Chestnut Hill Hospital	Dr. W. R. Thompson
Lankenau Maternity Hospital	Dr. Clark Brown; Dr. Bradford Green
Delaware County Hospital	Dr. Joseph Argoff
WASHINGTON, D. C.	
Washington Sanitarium	Dr. Edna Patterson; Dr. L. E. Kress
CHICAGO	
Presbyterian Hospital	Dr. Harry Boysen
Women's and Children's Hospital	Dr. Emily A. Svoboda
Chicago Lying-In Hospital and Dispensary	Dr. Beatrice Tucker
Lutheran Memorial Hospital	Dr. Helen L. Button
Research and Educational Hospital	Dr. Florence Hark
Augustana Hospital	Dr. John A. Booker
Chicago Memorial Hospital	Dr. Nathan Krupkin
Evangelical Deaconess Hospital	Miss Emma M. Schaab, R. N.
Mt. Sinai Hospital	Dr. Milton Steinberg
Wesley Memorial Hospital	Miss Bess Cooley
Frances E. Willard Hospital	Dr. Irene Sherman
Bethany Sanitarium	Miss Lela Moyer
Swedish Covenant Hospital	Dr. M. Elizabeth Downing
Michael Reese Hospital	Dr. Gemma Lichtenstein
St. Luke's Hospital	Dr. D. J. Ladd
NEW YORK CITY	
Harlem (Municipal) Hospital	Dr. Hyman Lieber
Lutheran Hospital of Manhattan	Dr. Helen Harmand
Booth Memorial Hospital	Dr. Frances E. Shields
Fifth Avenue Hospital	Dr. Frances E. Shields

It will be seen from Table 1 that the first 2,000 cases came from the clientele of 39 hospitals located in five large cities. The total population of these five cities in 1930 was 13,549,588.[34]

Acknowledgments. I wish to take this opportunity of expressing my deep gratitude to the workers listed above for the painstaking care with which they have filled out the records, and their interest and enthusiasm in a laborious task undertaken in the face of other pressing dūties and obligations. The mere pittance of 5 cents per card which we are able to pay is a grotesquely inadequate compensation for the time and trouble required. Without the fine spirit of unselfish altruism towards a scientific project on the part of these busy hospital workers the investigation would have been impossible. Also I wish to record my appreciation of the coöperative spirit and breadth of vision on the part of the chiefs of the obstetric services in permitting this work to be done in their hospitals.

Three Supervising Field Workers have been connected with the work to date. They are Iva M. Miller, M. D., C. P. H., (to the end of February, 1932), Gertrude Sturges, M. D. and Dorothy Cobb Adams, M. D. (from February, 1932, on). Theirs has been the often difficult and sometimes trying task of securing the coöperation of the hospital staffs in the first instance; then instructing the hospital workers in filling out the cards; and finally checking and rechecking their early reports. No praise is too high for the work they have done. During the period covered by the first 2,000 cases the office work in the laboratory connected with the project was most efficiently and intelligently performed by Helen Trybulowski (Mrs. Eric N.) Gillis.

Finally our warmest thanks are extended to Dr. George W. Kosmak, for his interest in the project and invaluable help in enlisting the cooperation of obstetricians in all parts of the country; and to Dr. Linsly R. Williams, for his help in organizing the work in New York City.

SOME CHARACTERISTICS OF THE DATA

In any statistical study it is of the highest methodological importance to examine critically and formulate clearly the characteristics of the sample of the population forming its basis. The extent or degree to which the sample is differentiated (selected) from the population in

[34] Fifteenth Census of the United States: 1930. Population, Vol. I. Number and Distribution of Inhabitants. *Washington, D. C.* (Gov't. Printing Office) 1931. Pp. iv + 1268.

general should be as clearly apprehended and defined as possible. Such differentiation or selection definitely limits the breadth of possible generalization from the results.

From a statistical standpoint at least, the following general statements may at once be made about the material which has been, and will be, collected in this investigation.

The present data come from a portion of the general population of women living in the United States, and represent a *selected* group in respect of the following items, at least:

1. All the women are urban dwellers, in large cities.

The desirability of the study of these problems in rural populations is fully recognized. But we have not yet been able to devise any practical method of getting the data for such populations.

2. All the women have been delivered of a baby in a hospital at some date since July 1, 1931.

At least two sorts of selections are implied in this fact. The first is that which is implied in the fact that not all women have their babies in hospitals. Whether those who do are differentiated in any important biological characteristics from those who do not is unknown, but also improbable. It is of interest to note that the number of urban women who regularly resort to hospitals to have their babies is larger than might perhaps be supposed. The most recent data[35] available (June 11, 1932) give 708,889 births occurring in 1930 in all hospitals in the United States registered with the American Medical Association. In 1928 (the latest figures available) the total number of births in the U. S. Birth Registration Area (which was officially estimated at that time to include 94.4 per cent of the population) was 2,233,149. It thus appears that something of the order roughly of a third of all deliveries at the present time are taking place in hospitals. In large cities the proportion is probably still higher.

The second implied sort of selection is more important. Our sample includes only women who were overtly fertile during the period of the study. No women permanently sterile for physiological or pathological reasons pertaining to themselves or their consorts can possibly be included in the records. No women temporarily sterile during the period of the investigation (July 1, 1931 to December 31, 1932) or during a prior period of nine months before the first date—for any reason whatsoever—can possibly appear in the data.

[35] "Hospital Number" of the *Jour. Amer. Med. Assoc.*, Vol. 98, p. 2067, 1932.

The first of these limitations has no further bearing upon this investigation than that implicit in the fact itself. That is to say, we have deliberately chosen for this investigation a methodology which confines its universe of discourse to fertile matings, and conversely excludes childless matings (both those physiologically sterile—that is matings in which pregnancy never occurs—and those, if any, in which pregnancies have always terminated in unrecorded abortions). There is nothing in this procedure that can be justly criticised. Any investigator has the privilege to adjust his *Fragestellung* so as to limit his universe of discourse within defined bounds. Since this point will not be discussed again in this paper it may be of interest to see about what percentage of matings is excluded by restricting the data to those that are fertile. Writing in 1866 Matthews Duncan [36] (p. 186) reached the conclusion, from a process of statistical reasoning perhaps somewhat less than perfect, that "15 per cent of all the marriages between fifteen and forty-five years of age, as they occur in our population, are sterile." By "our population" here is meant Edinburgh and Glasgow. Lotka [37] concludes his careful and thorough study of the matter with the following words:

"The *effective* or *gross* sterility of marriages of American (white) wives has been computed as 17.1 per cent. Of this about 1.2 per cent is due to the premature death of wives who otherwise would eventually have had a child; 2.0 per cent further is due to premature deaths of husbands whose wives would otherwise eventually have had a child. A further 0.8 per cent is due to childlessness resulting from divorces in couples that would eventually have had a child.

"The *net* sterility of marriages of American (white) wives is accordingly 17.1 — 1.2 — 2.0 — 0.8 = 13.1 per cent."

Notestein [38] shows in his Table 2 (p. 184) that the percentage in a sample of native white married women, once married, and living north of the Mason and Dixon Line, aged 40-44 at the 1910 census, who had borne no children ranged from 10.6 per cent in the "Farm Owners" class to 19.8 per cent in the "Professional" class. Corresponding figures for women 60-64 years of age at the same time range from 4.4 per cent in the "Unskilled Laborer" class to 14.7 per cent in the "Professional"

[36] Duncan, J. M. Fecundity, Fertility, Sterility and Allied Topics. *Edinburgh* (A. and C. Black) 1866. Pp. xvi + 378.

[37] Lotka, A. J. Sterility in American marriages. *Proc. Nat. Acad. Sci.,* Vol. 14, pp. 99-109, 1928.

[38] Notestein, F. W. *Loc. cit.,* footnote 21.

class. Sanders [39] finds, for completed families (taken as marriages lasting 15 or more years) the percentage with no children to run from 6.2 per cent (marriages contracted 1879-1893) through 7.1 (1893-1903) to 10.0 (1904-1913).

The second limitation to the generality of the present data consequent upon its restriction to women delivered in a hospital is more important. It is obvious that one reason why a woman, who would otherwise fall within our collecting net, had no baby during the period covered may have been that she was practising contraception with 100 per cent effectiveness during that time. To the extent that such women (otherwise eligible) existed they are automatically excluded from the present data. This means that the present data will insofar underestimate the proportion of women practising contraception in the defined sample. But from this fact the false inference should not be drawn that *all* the women, who would have been delivered in hospital during the period of this study if they had had a baby, did not have a baby because they practised contraception with perfect efficiency. All women who do not practise contraception are not always pregnant. In the present case all that is really known is that otherwise eligible women who did not become pregnant during the period defined above are automatically excluded from the data. There is no logical warrant from this fact alone—and it is again emphasized that this fact is all we know in the premises—to draw inferences as to *why* such women did not become pregnant. To find out these reasons demands a special *ad hoc* investigation, which forms no part of the present purpose of this preliminary paper.

3. There are definite geographical limitations to the data discussed in this paper. These are defined in Table 1 *supra.*

4. No data were collected from hospitals controlled by the Roman Catholic Church.

The reason for this voluntary limitation on the collecting of material is a simple one. The Catholic Church is officially opposed to the practice of contraception. Even if Catholic hospitals were willing to coöperate in such an investigation as this, it is improbable that a patient of that faith who had in fact practised contraception would be willing to admit it to a Catholic physician in a Catholic hospital. Catholic women are included in the data. But they attended non-Catholic hospitals for their deliveries.

[39] Sanders, J. *Loc. cit.,* footnote 11.

In addition to the above differentiations of the present sample from the general population of women there are some others of a social or economic character which will now be dealt with in separate sections.

Race. In the first 2,000 cases here discussed 1,390, or 69.5 per cent, were white women; and 610, or 30.5 per cent, were colored (negro). These proportions have no particular demographic significance. The negro population of the five cities contributing to the present sample forms a much smaller fraction of the total population than 30 per cent. But some purely negro hospitals (as the Provident in Baltimore) are included in the records, and others (as Harlem in New York) have a high proportion of negroes in their clientele. Furthermore it appears to be the fact that in many large cities the negroes have become, as a group, well aware of the superior medical service in the large hospitals that is either theirs for the asking, or in the worst case by the payment of small fees. Many a Baltimore cook is proud of the fact that every one of her six, eight, or ten children, as the case may be, has been born in the Johns Hopkins Hospital. It is, however, probable that as larger numbers of the records are tabulated the percentage of negroes in the totals will be smaller than in the first 2,000, where the Baltimore and Philadelphia hospitals are rather heavily weighted.

Economic Status. As stated above, the plan of the study was to have *every* woman delivered of a baby in any of the coöperating hospitals included in the records. Early in the work, however, it was made apparent that this was an unattainable ideal. Many obstetricians refused to permit the collection of the information from their private cases, although perfectly willing to coöperate in the completest way so far as concerned ward cases and pay patients not the private cases of any particular physician. This position automatically and almost completely cuts out of the records women in the higher economic and social brackets. It was possible, however, to bear this limitation of the data with some equanimity, because of two considerations. The first is that it seems reasonably certain, on the basis of common knowledge, that there are but relatively few women in the highest economic and social brackets in the populations of large cities who do not practise some form of what they at least believe to be contraception. In the second place where information is most needed regarding the problems of this study is in respect of the masses—the less fortunate economically. It is just here that the present material furnishes information.

Table 2 shows the distribution of the 2,000 cases into the five broad economic classes defined in an earlier section of this paper.

TABLE 2

Economic Status of the 2,000 Cases Here Discussed

CLASS	WHITE		NEGRO		TOTAL	
	Number	Per cent	Number	Per cent	Number	Per cent
Very poor	174	12.5	252	41.3	426	21.30
Poor	704	50.6	338	55.4	1,042	52.10
Moderate Circumstances	476	34.2	20	3.3	496	24.80
Well-to-do	35	2.5	...	...	35	1.75
Rich	1	.1	...	...	1	.05
Totals	1,390	99.9	610	100.0	2,000	100.00

From Table 2 it appears that, in this sample of 2,000, over 63 per cent of the white group and over 96 per cent of the negro group fell below the "Moderate Circumstances" grade as defined earlier.

A cursory examination of the records of the occupations of the husbands in this series of cases leads one to the tentative view that the whole distribution as shown in Table 2 is definitely pushed down towards the lower end of the scale as a result of the general economic and industrial depression prevailing during the period covered by the investigation. In many cases in the records skilled artisans, for example, who in good times would fall into the "Moderate Circumstances" group, had been long unemployed and were in actual fact "poor," and in some cases "very poor" at the time the records were made.

Education. Table 3 gives the distributions relative to the extent of the formal education of these 2,000 women. The significance of the classes has been explained in an earlier section.

TABLE 3

Education of the 2,000 Women Studied

HIGHEST STAGE OF FORMAL EDUCATION RECEIVED	WHITE		NEGRO		TOTAL	
	Number	Per cent	Number	Per cent	Number	Per cent
Illiterate	36	2.6	29	4.7	65	3.25
Elementary	903	65.0	417	68.4	1,320	66.00
High School	394	28.3	148	24.3	542	27.10
College or University	57	4.1	16	2.6	73	3.65
Totals	1,390	100.0	610	100.0	2,000	100.00

Two points brought out by Table 3 seem noteworthy. The first is that the proportion of women in this sample with the record of attendance at a high school (including those attending college or university, because presumably all of the latter had first gone through high school) is fairly high and perhaps not very far below the corresponding proportion in the general urban population.[40] The second is that the proportionate figures are so nearly the same for the colored and white groups.

Marital Status. Out of the 2,000 women included in this paper 1,824, or 91.2 per cent, were living in wedlock at the time of the making of the record, and 176, or 8.8 per cent, were not. Nearly all of the latter were young unmarried girls having their first illegitimate child. In the white group 1,348, or 97 per cent, of the mothers were married, and 42, or 3 per cent, were unmarried. In the negro group 476, or 78.1 per cent, were married, and 134, or 21.9 per cent, were unmarried. This difference between the two racial groups is in accord with normal expectation in its sense.

Reliability. There is no particular *a priori* reason to doubt the reliability of the information recorded on the cards save in one respect to be presently discussed. Experience has shown that all family records are subject to natural errors arising from forgetfulness and carelessness. Some mothers do become vague about how many children they have had, and may forget the particular years in which they were pregnant. But in such respects the figures here dealt with are on no worse footing than are the official returns of the Census Bureau. As a matter of fact the present data are presumably on a higher plane of accuracy, in general, than any census data, because they are collected by trained medical men and women, and in the atmosphere of medical institutions (hospitals) with high standards of scientific accuracy in the making of records. The recorder has the individual under observation usually from ten days to two weeks before making the record.

[40] I have not been able to locate any definitive figure for any general population on this point. But from casual remarks of well-informed educators which I have come upon in cursory reading I infer that roughly something of the order of 50 per cent of the total population of girls within high school age limits attend high school for some period of time. A press release of the Department of the Interior, as of June 30, 1932, states that "Enrollment . . . . of high school age boys and girls" is "approximately 50 per cent today." This is based upon the findings of the National Survey of Secondary Education provided for by Congress and lasting three years, which was directed by Dr. Leonard V. Koos of the University of Chicago. Until the complete report has been published and studied it is impossible to form any judgment as to the statistical reliability and significance of this figure of 50 per cent. Mr. H. E. Buchholz, the well known authority on educational matters, to whom I am indebted for bringing this news release to my attention, tells me that in his opinion 45 per cent would probably be nearer the truth.

But in one important respect the present records are more intimately personal than official vital statistics; though not more so, be it noted, than obstetric and gynecological histories taken regularly and generally from patients in those departments of a modern, teaching hospital. We ask the patient whether she has used any method to avoid becoming pregnant. Her response may take one or the other of three forms. She may say yes, or no, or refuse to answer. If the answer is yes, there would seem to be no reason to doubt that she is telling the truth. There would be no motive to allege that she had practised contraception when she had not. Furthermore if she answers "yes" to the first question she must then describe in detail the methods used. It would be idle to allege that a trained medical worker, accustomed to taking case histories from patients, would not know if the woman were lying in this direction.

In the case of the third alternative (refusal by the patient to answer) the case would not appear in the records at all. Experience in this investigation, and in earlier unpublished studies of a similar character to the present one, has demonstrated that the number of women who flatly refuse to discuss this matter with their hospital physician, is extremely small—so small as not to affect the adequacy of the sampling in an appreciable degree.

This leaves for discussion only the second alternative. There may be a motive for a patient to say that she has not practised contraception when she has. This motive may be either personal, or religious, or social, or some sort of vague fear of consequences. Thus a Catholic patient in a Catholic hospital with a priest beside her bed would presumably be disinclined to say that she had practised contraception. But, as already stated, we have not included Catholic hospitals in our study, and for just this reason. Furthermore it needs to be considered that, again, a medical man or women trained in history taking, becomes adept in detecting falsehoods in the patient's statements. Notations on the cards indeed occasionally tell of the breaking down of an original "no" to the contraception question, and the eliciting of a final affirmative answer and the whole detailed story. The whole relationship between patients and their physicians works greatly in favor of the getting of accurate and reliable answers. Normal women trust their physicians. After a

delivery they are grateful for the care and attention they have had. They have no fear of the violation of their confidences. Another point is that the reproductive record itself often gives the recording physician a clue to further questioning if a women at first says she has not practised contraception but actually has.

The methodology of the scientific study of human behavior in sexual matters has lately been discussed with critical acumen by Harvey.[41] His final conclusion is (p. 185) that: "Combining the questionnaire with the case study, as complementary functions of the same method, should yield the most productive as well as the most reliable results in the study of human sexual behavior." It will be plain from what has preceded that a combination of the case and questionnaire techniques is precisely the methodology of this present investigation. As in the case method a technically trained person gets the data from the individual; the information is kept within a prescribed pattern as in the questionnaire; the multiplication of cases is achieved by the employment of many trained observers. The inevitable small loss in uniformity of viewpoint which this latter point entails will, to a considerable extent, be compensated for in the end result by the large amount of material which will be obtained—so large as to be statistically respectable.

Altogether, after careful study of these records, and many years experience in collecting data regarding sexual matters, I have a considerable degree of confidence in the general accuracy of these records. I am sure they are not 100 per cent accurate, in the sense of the physical sciences. No records in human biology, "official" or otherwise, ever are, and are not likely to be. But I am equally confident that these records as to contraception are of the same general order of individual reliability as age records in a census report, and more reliable than records of cause of death in mortality statistics. In the present case, just as in demographic statistics generally, the data may be regarded as sufficiently accurate individually to warrant careful analysis, and at the same time containing enough errors to compel caution in drawing conclusions.

RESULTS

A. *Fertility*

As a first step in the examination of the records it will be useful to examine the frequency distributions of the 2,000 women by number of

[41] Harvey, O. L. The scientific study of human sexual behavior. *Jour. Soc. Psychol.*, Vol. 3, pp. 161-188, 1932.

pregnancies which they have experienced. The data are presented in Table 4. In this table the first column gives the total number of *pregnancies* (*not* births) *ever* experienced. The following columns headed respectively "Number" and "Per cent" give the absolute and relative frequencies of the women who have experienced each of the designated numbers of pregnancies. The columns headed "Per cent children ever born, 1927" give the percentage of frequencies of mothers in the U. S. Birth Registration Area who in 1927 bore a child and had in total, including that child, borne the number of children designated [42]

TABLE 4

Frequency Distributions of 2,000 Women by Number of Pregnancies Ever Experienced, Together with Distributions of Mothers of the Year 1927, in the U. S. Birth Registration Area, by Number of Children Ever Born

NUMBER OF PREGNANCIES	WHITE			NEGRO			TOTAL		
	No.	Per cent	Per cent children ever born 1927	No.	Per cent	Per cent children ever born 1927	No.	Per cent	Per cent children ever born 1927
1	593	42.7	30.21	236	38.7	29.15	829	41.45	30.04
2	285	20.5	22.20	129	21.1	17.94	414	20.70	21.76
3	169	12.2	14.79	76	12.5	12.94	245	12.25	14.62
4	116	8.3	10.11	54	8.9	10.06	170	8.50	10.13
5	78	5.6	6.85	35	5.7	7.75	113	5.65	6.96
6	41	2.9	4.96	28	4.6	5.97	69	3.45	5.07
7	36	2.6	3.57	9	1.5	4.64	45	2.25	3.68
8	21	1.5	2.59	13	2.1	3.49	34	1.70	2.68
9	9	.6	1.77	7	1.1	2.52	16	.80	1.84
10	25	1.8	1.24	12	2.0	1.99	37	1.85	1.31
11	9	.6	.75	3	.5	1.29	12	.60	.81
12	2	.14	.47	5	.8	.92	7	.35	.51
13	2	.14	.24	1	.2	.58	3	.15	.28
14	1	.07	.13	2	.3	.33	3	.15	.15
15	2	.14	.06	..	..	.20	2	.10	.07
16	..	..	.03	..	..	.10	..	..	.04
17	1	.07	.02	..	..	.05	1	.05	.02
18 and over...	..	..	.02	..	..	.06	..	..	.02
Totals	1,390	99.86	100.01	610	100.00	99.98	2,000	100.00	99.99

[42] These Birth Registration Area figures are computed from data given in Table II, pp. 43-47, of Birth, Stillbirth, and Infant Mortality Statistics . . . . 1927. Part I. *Washington* (Bureau of the Census). 1930.

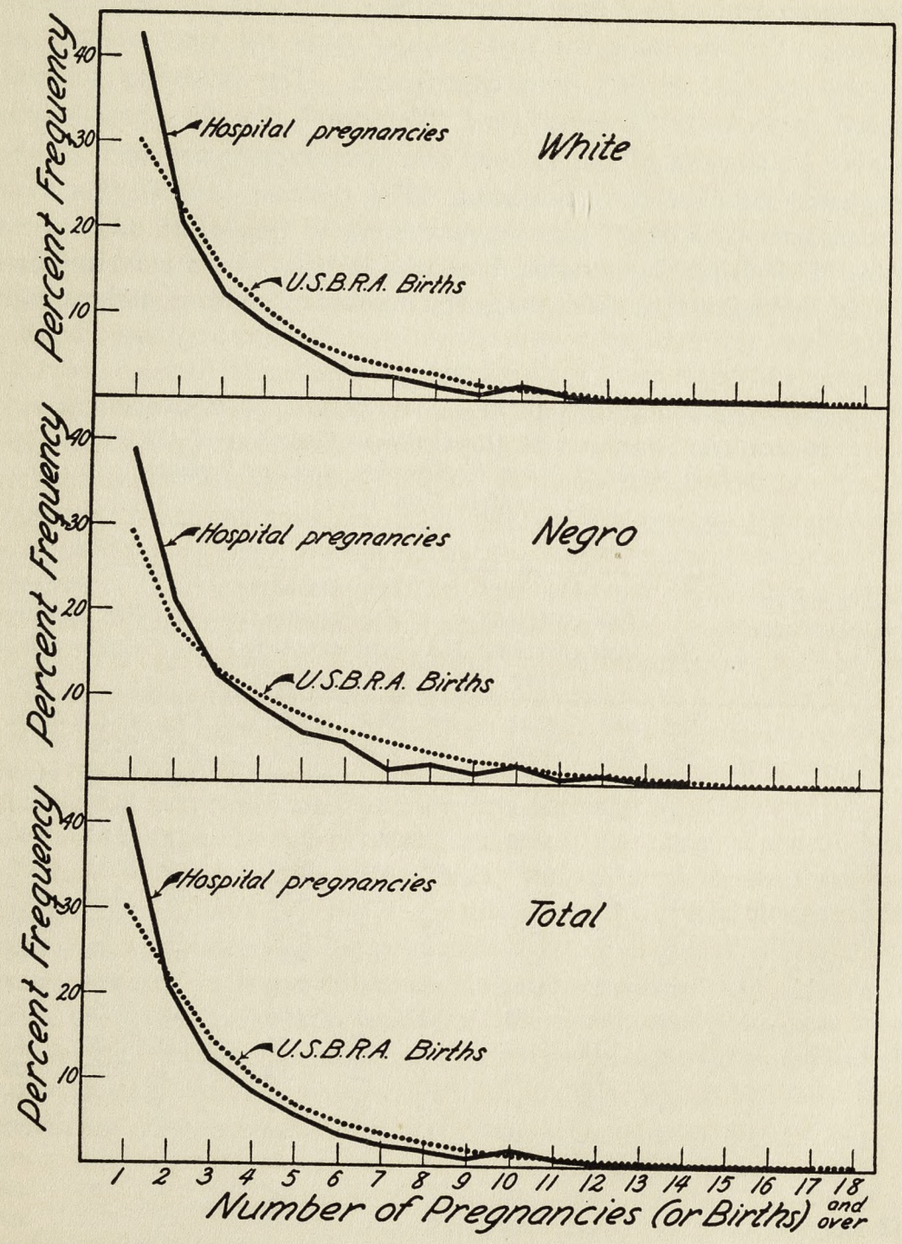

FIG. 5. NUMBER OF PREGNANCIES EVER EXPERIENCED BY WOMEN OF PRESENT SAMPLE (SOLID LINES) AND NUMBER OF CHILDREN EVER BORN (U. S. B. R. A., 1927) (DOTTED LINES)

in the first column of Table 4. These figures are not, of course, strictly comparable with the pregnancy figures of the present data. But they are the nearest comparable of anything available in official statistical reports for the general population. Furthermore, total pregnancies and total children born, are highly correlated variables. The essential data of Table 4 are shown graphically in Fig. 5.

The following points are to be noted from Table 4 and Fig. 5:

1. In the present sample of material there is a remarkably close agreement between the white and negro groups in respect of the relative (percentage) frequency of women who have experienced the various numbers of pregnancies. While there is a systematic difference between the two curves in the direction of higher fertility in the negroes, the difference is not as great as perhaps might have been expected. The white group shows a considerably higher percentage of single (first) pregnancies than the negro group. An increasing proportion of first pregnancies among white women in this country, accompanying the declining birth rate, has been noted by various observers.

2. The proportion of single (first) pregnancies is much higher, in both the white and negro groups, than the corresponding proportion of first (only) births among women in the Birth Registration Area bearing children in 1927. On the other hand the percentages of women (B. R. A. 1927) who have borne 3 or more children are practically uniformly higher than the corresponding percentages for the pregnancies among the women of the present sample. Taken at face value this indicates that this group of 2,000 women delivered of babies in hospitals between July 1931 and March 1932, had, during their lives, exhibited a distinctly lower fertility rate than had the women in the B. R. A., who had a baby in 1927. This is so for both the white and the negro groups separately, and consequently necessarily so for the total.

3. The point just discussed may be shown in another way. 1,978,345 women who produced babies in the B. R. A. in 1927 had, in their whole lives up to that time, borne a total of 6,395,858 children. This gives an average of 3.23 children ever born, per mother. In contrast to this the 2,000 women of the present sample had experienced, in total, 5,496 pregnancies during their lives up to the time of record, giving an average of 2.75 pregnancies per woman. For white women only (respectively 1,775,313 and 1,390) the numbers of children ever born and pregnancies ever experienced are respectively 5,651,007 and 3,731, leading to averages of 3.18 children per mother and 2.68 pregnancies per woman. The

apparent difference in fertility between the two samples is still more marked in the negroes. 193,689 B. R. A. mothers of 1927 had produced, up to that time, a total of 708,524 children, an average of 3.66 children per mother. The 610 negro women in the present sample had experienced in total, up to the time of record, 1,765 pregnancies, or an average of 2.89 pregnancies per woman.

4. It cannot, however, be assumed on the basis of the preceding evidence alone that the differences between our sample and the B. R. A. mothers of 1927 discussed in the two preceding paragraphs are representative of real differences in fertility. A part of the apparent differences may possibly be due to significantly different age distributions of the mothers in the B. R. A. and the present sample. This point will be discussed in detail later, when the complete material is available.

In section C below the question of fertility will be further considered, and in a more precise way.

B. *Contraception*

Frequency. Table 5 gives the data regarding the proportion of these 2,000 women who have at some time, or regularly, practised contraception, or at least what they supposed to be contraception.

TABLE 5

Showing the Absolute and Relative Numbers, Among 2,000 Women of (a) Those Who Have Used Some Method or Methods for Preventing Conception, and (b) Those Who Deny Any Use of Such Methods

	WHITE		NEGRO		TOTAL	
	Number	Per cent	Number	Per cent	Number	Per cent
a. Those who have used some method, or methods, regularly or intermittently, for preventing conception	497	35.8	94	15.4	591	29.55
b. Those who deny the use of any method for preventing conception.	893	64.2	516	84.6	1,409	70.45
Totals	1,390	100.0	610	100.0	2,000	100.00

The following comments may be made upon Table 5:

1. In this group of 2,000 women taken as a whole the practice of some form of contraception was rather more than twice as prevalent relatively among the white women than it was among the negro women. This result accords with what would be expected *a priori.* The American negro, probably generally and certainly under urban conditions, exercises less prudence and foresight than white people do in all sexual matters. Another way in which this is shown is in the relative prevalence of venereal diseases, which are generally much more common among the negroes than among the whites. The use of contraceptive methods demands some degree of intelligent foresight. This is an attribute, or a combination of attributes, more prevalent among whites than among negroes. The experience of contraceptive clinics in cities has shown that any method of contraception known at present is not particularly effective with the general population of negroes. They need something which is more automatic and requires less intelligent cooperation and foresight on the part of the individual.

2. Just under 36 per cent of the 1,390 white women had ever used any means to prevent conception. For the 1,348 married white women living in wedlock the percentage practising contraception rises insignificantly to 36.6 per cent. There appear to be no precisely comparable data from other sources. In Davis's [43] group of 1,000 married women 692 were college or university graduates, and only 62 had less than a high school education. The group belonged to a much higher average social level than the women furnishing the present data. In the Davis group the percentage reporting the use of contraceptive methods was 74.11 per cent (Table 1, p. 14) as against the 36.6 per cent for white married women in the present material. The 62 with "less than high school" education (of whom, however, 39 had attended "one to three years in high school") gave 64.51 per cent affirmative answers as to the use of contraceptive methods. The schedules for the collection of the data used by Brown, Greenwood, and Wood [44] were not drawn in such a way as to lead to great precision in the returns on the question of practice of contraception. The statement made by these authors is (p. 199): "Among collegians a minimum of 47.4% [of families] and

[43] Davis, Katherine B. *Loc. cit.,* footnote 20.

[44] Brown, Greenwood and Wood. *Loc. cit.,* footnote 15.

perhaps as many as 62.13% are ostensibly of limited fertility;[45] the corresponding figures for non-collegians are 39.87% and 54.95%." Their Table XLV (p. 200) indicates that the lower percentages quoted are the ones which should presumably be compared with the present data, if any comparison at all is to be made. They are the percentages of those definitely replying "yes" to the question "was family intentionally limited?" The figure of 39.87 per cent for the non-collegiate group is not far from the 36.6 per cent shown by the married white women in the present sample. But again it must be emphasized that the social, economic and educational level of the Brown, Greenwood, Wood non-collegiate group was much higher than that of the present sample. Their non-collegiate group consisted of sisters (or cousins) of those in the collegiate group. The material of Dickinson and Beam[46] furnishes little that is pertinent to the present point under discussion. These authors apparently assumed *a priori* that, amongst their group of private patients consulting a gynecologist, virtually 100 per cent practised contraception. They say (p. 248):

> The hypothesis is that in this series birth is usually controlled. This is safe to assume because it was true in the great majority of cases where the question was raised. There was no need to ask every patient about this: only those with serious conditions contra-indicating pregnancy; those seen after childbirth; or for problems of sexual or reproductive life. Such cases afford 532 instances of information as to how fertility was or was not controlled. Only twenty-five, or fewer than one in twenty, had never used any form of control. In 507 cases some form was used, or was unnecessary because of sterility or sterilization.

3. As has already been pointed out in an earlier section of this paper, the percentages in Table 5 of those practicing contraception are to be regarded as minimum figures. We are justified in saying that in this sample of material *at least* 35.8 per cent of the white women, and 15.4 per cent of the negro women had practised some form of interference with conception. It will doubtless be alleged that some of the women recorded as not having practised contraception gave false information on the point, and should really be included with the positive group. I have given reasons earlier in this paper for the belief that the number of such women, if any, is probably very small. But let us make the assumption that 20 per cent of the white women who said that they had never practised contraception lied when they said so. Transferring

[45] What the authors mean by "ostensibly of limited fertility" is, I think, that the schedules taken at their face value indicate that in the stated percentages of mated pairs some sort of conscious effort was made to reduce the fertility of the mating.

[46] Dickinson and Beam. *Loc. cit.*, footnote 27.

them to the other group would give a hypothetical total of 675.6 women admitting the practice of contraception. But this is still only 48.7 per cent, or less than half, of the total white women (1,390) in the sample. This is, however, an extreme assumption of unreliability in the data. No one connected in any way with the work, or having direct contact with the patients, would entertain it for a moment. It represents probably at least ten times any actual falsification that may possibly be present in the data on the point.

4. In sum, it appears that among the 2,000 women in this sample, coming preponderantly from the lower social and economic classes in large urban centers, the practice of contraception is far less prevalent than it has been assumed to be by some of those who have discussed the problem of declining birth rates, and is much less frequent than in the classes on higher social and economic levels.

Methods of Contraception Used. The data regarding the methods of contraception used by the 591 women in the sample of 2,000 who used such methods at all, are given in Table 6. It should be noted that in many cases a woman tried different techniques at different times. This explains why the totals in the table are greater than the numbers of women practising contraception. If a particular mated pair tried first coitus interruptus, and then later adopted the use of a pessary as a contraceptive technique an entry under each of these headings is included in the figures of Table 6.

TABLE 6

Method of Contraception Used

METHOD	WHITE		NEGRO		TOTAL	
	Number	Per cent	Number	Per cent	Number	Per cent
Condom	237	30.3	30	21.6	267	29.0
Douche alone (medicated)	161	20.6	58	41.7	219	23.8
Coitus interruptus	144	18.4	16	11.5	160	17.4
Douche alone (water)	129	16.5	19	13.7	148	16.1
Vaginal suppository	41	5.2	4	2.9	45	4.9
Other	32	4.1	7	5.0	39	4.2
Safe period	16	2.0	4	2.9	20	2.2
Pessary and jelly	10	1.3	1	0.7	11	1.2
Pessary and douche	7	0.9	...	...	7	0.7
Pessary alone	4	0.5	...	...	4	0.4
Mechanical intrauterine device	1	0.1	...	...	1	0.1
Totals	782	99.9	139	100.0	921	100.0

From Table 6 the following points may be noted:

1. The 591 women in this sample who have practised contraception regularly or intermittently have evidently not found any single method generally or permanently satisfactory. Thus the 497 white women admitting some practice of contraception had, in total, a method frequency of 782, giving an average of 1.57 methods per person. For the 94 negro women the method frequency is 139, leading to an average of 1.48. For the whole 591 women the method frequency is 921, giving an average of 1.56 methods tried per person.

2. The three oldest, best known, and in that sense standard methods of contraception, condom, douche, and coitus interruptus, are the most popular among this sample of women. Thus among the white women in the sample 85.8 per cent of the attempted family limitation is chargeable to these three methods together (and including both plain and medicated douches). The percentage rises to the still higher figure of 88.5 among the negro women in the sample. For all the 591 women together the percentage is 86.3. It is plain that the newer and more artistic methods generally advocated by birth-control clinics,[47] have not yet generally reached the group of women from which this sample comes.

3. Both the white and negro groups in this sample favor the douche alone (again counting both the plain and medicated douches together) over all other forms of contraception. The relative (percentage) frequency for this technique is 37.1 for the white group; 55.4 for the negroes; and 39.9 for both groups together. The reason for the racial difference in these percentages is probably a two-fold one. In the first place the negroes in this sample were less addicted to coitus interruptus than the whites. This is what one would expect who knows anything of negro psychology. In the second place the economic factor enters. As a regular contraceptive practice condoms are more expensive than douches even when the latter are medicated. Also they are generally less hedonistically satisfactory to the male partner.

4. In the practice of the methods of contraception listed in Table 6 the male is the responsible party who takes the trouble of limiting the family in the case of two methods (condom and coitus interruptus).

[47] *Cf.* Cooper. *Loc. cit.,* footnote 28; Stopes. *Loc. cit.,* footnote 29; Himes, N. E. Contraceptive methods: The types recommended by nine English birth control clinics. *New England Jour. Med.,* Vol. 202, pp. 866-873, 1930; Dickinson, R. L., and Louise S. Bryant. Control of Conception. An illustrated medical manual. *Baltimore* (Williams & Wilkins) 1931. Pp. xii + 290.

In the use of the "safe period" the responsibility may be roughly said to be divided equally between the two partners to the enterprise. In case of all the other methods the female has to take all the trouble and do all the work of preventing conception. Classifying the relative (percentage) frequencies of Table 6 on this basis it appears that in this sample the white men alone bore 48.7 per cent of the total burden of family limitation; the white couples together on a 50-50 basis 2 per cent of the burden; and the white women alone 49.3 per cent of the burden. The negroes in this sample, however, managed differently. Among them the males assumed only 33.1 per cent of the total responsibility; the couples conjointly 2.9 per cent; and the women alone 64 per cent. Again this result seems to be consilient with negro psychology generally.

C. *Effectiveness of Contraception as Practiced*

It has been pointed out earlier in this paper that there is often a regrettable failure to distinguish sharply between the *potential* effectiveness of contraceptive methods in the hands of intelligent and careful persons technically advised in birth control clinics or by physicians, and their *actual* effectiveness as practiced in the general population. It is the latter category with which we are solely concerned in this investigation. The data give the entire reproductive histories—and particularly the number and dates of the pregnancies—of two groups of women; the C + women who have tried to prevent conception and the C — women who have made no such attempt. Even if there is some inaccuracy in the records on the C — side, the total amount of attempted contraception in the C — group is insignificantly small as compared with the C + group. The present data, then, permit an answer to this question: Is the rate of occurrence of pregnancy per 100 person-years exposure to risk of pregnancy different in the two groups of women, and if so by what amount and in what direction? A clear-cut answer to this question is the first step necessary to any scientific understanding of the effect of contraception, *as actually practised in the population,* upon the growth of population.

In this first preliminary paper no attempt will be made to give anything more than a rough crude answer to this question. All methods of contraception will be treated together; no attempt will be made to separate regular from intermittent use of contraceptives; no account will be taken of possible differences in the age distribution of the two

groups. The only purpose of presenting any figures now is to give some indication of the trend of the data. It would be obviously foolish to enter upon a refined statistical analysis of the first 2,000 cases alone, when it is probable that there will ultimately be available for such analysis more than 15,000 such cases. In subsequent reports upon the whole mass of material the analysis will go into great detail.

Exposure to risk of pregnancy. Owing to the care exercised in the collection of the present data to get precise records of dates it is possible to calculate more refined rates than is usually the case with official statistics. In particular it is possible to determine with considerable precision the exposure to risk of pregnancy. There are two basic physiological postulates here which should be clearly stated. They are:

a. A woman past puberty but not past the menopause is assumed to be exposed to risk of becoming pregnant when she is more or less regularly indulging in sexual intercourse, as in the married state.

b. A woman, who in all other respects conforms to the specifications of postulate *a* above, is *not* exposed to risk of becoming pregnant during those periods of time in which she *is* already pregnant. It is physiologically impossible for a woman to *become* pregnant while she *is* pregnant.[48]

The figures for "Person-years exposure to risk of pregnancy" given in Table 7 were, then, computed in the following way.

As a first step there is calculated for each women her *individual* total number of years of exposure to risk of pregnancy thus:

In the case of married women:

From the total number of years (and fractions of a year[49]) between (from) the date of the woman's marriage and (to) the date of delivery from her last pregnancy there is *subtracted*

0.750 year for each living child she has borne;
0.750 year for each still-born child she has borne;
0.250 year for each spontaneous miscarriage she has had;
0.375 year for each therapeutic abortion she has had;
0.250 year for each other abortion she has had.

These subtractions are made because of the physiological fact that a woman is not at the risk of *becoming* pregnant during the time that she is *already* pregnant.

In the case of unmarried women (illegitimate births):

Since the time of the beginning of the illicit sexual intercourse which led to the illegitimate birth is not known, and for obvious reasons cannot usually be accurately found out in an investigation of this kind, it is necessary to make some sort of arbitrary assumption. After careful consideration it has been decided to assume for the present (i. e., until evidence appears for some better figure) that, *on the average,* a woman has been exposed to risk of illicit pregnancy *one year* before the pregnancy begins.

The second step is to obtain the total exposure to risk of pregnancy for the group of women (in this report 2,000 women). This is done by *adding together* the individual figures obtained for each woman in the group in the manner above described.

[48] This statement neglects, for practical reasons, the dubious "evidence" for the possibility of the excessively infrequent occurrence of human superfoetation.

[49] Computed from the recorded dates by the use of the table of Pearl and Miner. *Loc. cit.,* footnote 33.

Since the assumptions made in computing the exposure to risk in the case of illegitimate pregnancies may be thought to be dubious, it has seemed prudent first to set up the results in Table 7 for married women living in wedlock only. There the exposure to risk, and in consequence the rates, have a degree of accuracy greater than has usually been the case in investigations on human reproduction.

From Table 7 the following points are to be noted:

1. The data included in the table comprise in total 6,869.26 person-years exposure of married women to the risk of becoming pregnant, with 5,176 resulting pregnancies. Even though preliminary, this is a respectable body of material. It is roughly equivalent in amount to what one would get in the way of data from observing the reproductive activities of the population of a city of 175,000 to 200,000 inhabitants, say such as Worcester, Mass., for a period of a year.

2. The mean number of years exposure to risk of pregnancy for each married woman exposed in this experience was approximately one year greater for the C+ white women than for the C— white women, and 0.84 of a year greater for the C+ negro women than for the C— negro women. This means that the women in this experience who practised contraception had been longer married on the average than those who did not practise it, since the mean number of years exposure per person is, for married women, the same as the mean number of years married per person *less* the time spent being pregnant. It is possible, though not asserted as a fact on the basis of the present data, that continuing experience of marriage tends to lead to the adoption of contraceptive practices by the married pair. This is a matter which will be analyzed in the final working up of the material.

3. The present data indicate that the average duration of the marriages of women delivered in hospitals in large cities is something upwards of 4 years. This observation is of some interest as indicating

TABLE 7

Pregnancy Rates per 100 Person-years Exposure to Risk of Becoming Pregnant Among Married Women (a) Who Have, and (b) Who Have Not Used Contraceptive Methods

In this Table C+ *Denotes Women Who Have Regularly or Intermittently Used Contraceptive Methods*
C— *Denotes Women Who are Reported Never to Have Used Contraceptive Methods*

GROUP	NUMBER OF WOMEN		PERSON-YEARS EXPOSURE TO RISK OF PREGNANCY		AVERAGE NUMBER OF YEARS OF EXPOSURE PER WOMAN		TOTAL PREGNANCIES EXPERIENCED		PREGNANCY RATE PER 100 PERSON-YEARS EXPOSURE		MEAN NUMBER OF PREGNANCIES PER WOMAN	
	C+	C—	C+	C—	C+	C—	C+	C—	C+	C—	C+	C—
White	493	855	2,168.77	2,940.56	4.40	3.44	1,376	2,294	63.44	78.01	2.79	2.68
Negro	88	388	385.59	1,374.34	4.38	3.54	365	1,141	94.66	83.02	4.15	2.94
Total experience ...	581	1,243	2,554.36	4,314.90	4.40	3.47	1,741	3,435	68.16	79.61	3.00	2.76

that it is not solely the young bride who seeks the hospital to get through the somewhat terrifying experience of her first confinement.

4. There is no substantial difference between the whites and the negroes in this experience in respect of the mean number of years per woman of exposure to risk of pregnancy.

5. The mean number of pregnancies per married woman (shown in the last column of the table) as experienced throughout the entire reproductive life up to the time of the record, is *higher* for the C + women than for the C — women, by an insignificant amount in the white group, and by a considerable amount among the negroes. This result, on its face, would seem to indicate that the contraceptive techniques employed by the C + women had something less than zero effectiveness. Although it is by exactly the same kind of statistical procedure as this that birth control propagandists procure evidence of the effectiveness of their particular techniques, the results cannot be taken at their face value, either in the present case or in theirs. The statistical fallacy lies in the fact that the simple average numbers of pregnancies per woman take no account of differences in exposure to risk in the C + and C — groups. This leads us to

6. The pregnancy rate per 100 person-years exposure to risk of pregnancy is 14.57 points lower in the C + group of white married women than in the C — group. That is to say, with the methods of contraception actually practised by the white married women in this sample there was a concomitant reduction in the pregnancy rate per person per unit of time of slightly under 20 per cent below that which obtained in a comparable group of C — women during approximately the same time. This is obviously not a particularly high degree of effectiveness. But it must be again clearly understood that we are not dealing here with theoretical potential effectiveness, but with actual effectiveness, as practised, in and by this group of women. Furthermore, no attempt is made in this preliminary analysis to get at the causes of the relative ineffectiveness of the contraceptive practices in the mass. In some cases it is known to have been due to periodic interruptions of the practice in order to have "wanted" children. In other cases it is known to be due to carelessness and indifference. But in the present preliminary study the only attempt is to indicate roughly the *demographic* effectiveness of contraception in a particular sample of the population, as distinguished from individual instrumental, or technical effectiveness. In short, what we have here is an expression of the

effect which contraception, *as actually practised,* had upon the pregnancy rate of 493 white women, in contrast to the pregnancy rate of 855 white women, of a similar sort and under similar circumstances, who made no attempt to interfere with their natural fertility. The difference is not as great as it might have been predicted to be.

7. In the case of the negro married women the pregnancy rate per 100 person-years exposure to risk of pregnancy is considerably *higher* among the C + women than it is among the C — women.

8. It is of interest to compare the findings set forth in Table 7 with other direct investigations from non-propagandist sources regarding the effectiveness of contraception as actually practised. Davis [50] found in her first questionnaire group of 1,000 women, taken from considerably higher social, educational, and economic planes than the present sample that (p. 16): "the group which used contraceptive measures has a higher average of pregnancies and of children than the group which did not use them." There was, however, no attempt in her study to determine true pregnancy rates, taking account of exposure to risk. For reasons stated above, the average-per-person figures of either pregnancies or children cannot be taken at their face value. Furthermore, probably in association with their higher social-economic status, the women in Dr. Davis' group showed distinctly lower fertility than the women in the present sample, insofar as it may be roughly judged from averages per person. Thus her C + group had an average of 2.50 pregnancies per woman as against 2.79 in the present C + group; and her C — group had an average of 1.65 pregnancies as against 2.68 in the present C — group.

Brown, Greenwood, and Wood [51] dealt with data from 634 married English women of the middle classes, in the English sense—a considerably higher social and economic level than characterized the 2,000 women of the present study. Of these English women 492 had attended a college or university; the remainder, 155 in number, had not; but were, however, sisters or cousins of those who had. In this material it was found that there was (p. 199) "no sensible difference between the size of family in 'limited' [i. e., those in which some form of contraception had been practised] and 'unlimited' marriages."

9. The data of Table 7, as well as the findings of other workers discussed in the preceding paragraph suggest that, in general, women

[50] Davis, Katherine B. *Loc. cit.,* footnote 20.

[51] Brown, Greenwood, and Wood. *Loc. cit.,* footnote 15.

who practise contraception are innately more fertile than women who do not, or than a random sample of women in general. In a recent paper [52] it has been shown that a group of 816 women sent by physicians to a birth control clinic in Baltimore for advice and instructions as to contraceptive methods were considerably more fertile than the general population from which they came. The reasoning on which this conclusion is based is as follows (*loc. cit.* p. 14):

> The 816 women here discussed are a selected, and therefore presumably a differentiated group. They are women who were referred to the Bureau for Contraceptive Advice. The medical records show that in many cases a part of the reasons, which led the patient's physician to send them to the Bureau, was that they had already exhibited unusually high fertility. Just how far these women are differentiated from the general population of married women cannot be exactly determined from any data at present available, but a rough idea about the matter may be had from the following considerations. It is shown earlier in this report that these 816 women had exhibited, on the average, almost exactly one pregnancy for every two years of their married lives up to the time of coming to the Bureau. If a group of married women exhibits an average of one pregnancy in every two years it follows that in any given single year, on the average, about one-half of the women in the group would be expected to be pregnant. There were 173,323 married women aged 15 years and over in Baltimore in 1930. But of these roughly 27.5 per cent were 45 or more years of age. Allowing for this, there are left about 125,660 within the normal reproductive period of life. If all of these had performed at the same rate of fertility as the 816 women who had been clients of the Bureau, it would be expected that about 68,839 of them would have been pregnant during 1930. Deduct 20 per cent of this figure to allow roughly for miscarriages, abortions, etc., and there are left about 50,264 expected births in Baltimore in 1930, on the assumption that all married women in the city are as fertile as the sample of 816, with which we are dealing. Actually the number of births in Baltimore in 1930 was 14,948. Hence it appears from this rough calculation that the women who have come to the Bureau for advice have exhibited a much higher rate of fertility than the general population, perhaps even as much as three times higher, though this would seem to be probably an over-estimate.

Brown, Greenwood, and Wood (pp. 199-200) had the idea that probably the reason for their finding of substantially equal sized families with or without the practice of contraception was "that the women who were naturally of greater than average fertility resorted in greater proportion to the use of artificial means and consequently emerged with an about average fertility." But they go on to state that: "We have failed to obtain any statistical confirmation of this, either by a comparison of fertilities in the first years of marriage (i. e., at an epoch when preventive measures would be less commonly used), or by correlating

[52] Pearl, R. Statistical report of the fourth year's operations of the Bureau of Contraceptive Advice. *Fourth Rept. Bur. Cont. Adv. Baltimore,* pp. 3-15, 1932.

fertility with restriction for health constant. The schedule did not provide for a statement as to when restrictive measures were adopted so that an analysis of fertilities before and after the introduction of preventive measures could not be made."

SUMMARY

1. This paper is a preliminary report on the first 2,000 cases in an investigation of the prevalence and effectiveness of the use of contraceptives in a sample of the American population living in large cities east of the Mississippi. The purpose of the investigation is to get direct, observed evidence of a critical character on a disputed phase of the population problem—namely, the actual as distinguished from either the theoretical or the potential effect of contraceptive practices upon the realization or overt expression of natural fertility in a defined sample of the population. The total mass of material will be much larger when the study is completed. Anything in the way of definitive conclusions now would be premature, and is not attempted.

2. The methodology of the study is a combination of the case method with certain features of the questionnaire method. The data are collected from women undergoing parturition in the obstetric clinics of hospitals, and are obtained and recorded by physicians trained in obstetrics.

3. The 2,000 cases here discussed come almost entirely from the lower economic and social levels; they represent deliveries in 38 different hospitals in five cities, Baltimore, Washington, Philadelphia, New York, and Chicago; 69.5 per cent are whites and 30.5 per cent are negroes; 32.4 per cent of the white women and 26.9 per cent of the negro women had attended high school or some higher institution of learning; 97 per cent of the white women and 78.1 per cent of the negro women were married and living in wedlock.

4. The 2,000 women had experienced during their lives 5,496 pregnancies, or an average of 2.75 pregnancies per woman. For the whites the corresponding figures are 3,731 pregnancies and 2.68 per woman; for the negroes 1,765 pregnancies or 2.89 per woman.

5. Some attempt to prevent conception had been made by 35.8 per cent of the white women, and by 15.4 per cent of the negro women. The corresponding percentages for white married women living in wedlock was 36.6 per cent.

6. The different methods of contraception used were such and were so distributed that, in this sample, the white men alone bore 48.7 per cent of the total burden of family limitation; the white couples conjointly 2 per cent of the burden; and the white women alone 49.3 per cent of the burden. Among the negroes the males assumed only 33.1 per cent of the total responsibility; the couples conjointly 2.9 per cent; and the women alone 64 per cent.

7. A new and more precise method of calculating person-years of exposure to risk of pregnancy is described.

8. The mean number of years of exposure to risk of pregnancy for each married woman exposed was, in this experience, approximately one year greater for the C + (contraception practised) white women than for the C — (contraception not practised) white women, and 0.84 year greater for the C + negro women than for the C — negro women.

9. The mean number of pregnancies per married woman as experienced throughout the entire reproductive life up to the time of record was *higher* for the C + women than for the C — women in this sample, by an insignificant amount in the white group and by a considerable amount among the negroes.

10. The pregnancy rate per 100 person-years exposure to risk of pregnancy is 14.57 points lower in the C + group of white women than in the C — group. In other words the methods of contraception actually practised by this group of married white women were accompanied by a reduction in the pregnancy rate per person per unit of time of only about 20 per cent below that which obtained in a comparable group of C — women during approximately the same time.

11. In the case of the negro married women in this sample the pregnancy rate per 100 person years exposure to risk of pregnancy is considerably *higher* among the C + women than it is among the C — women.

12. There is some reason to think, though it is not yet demonstrated, that women who practise contraception are innately more fertile than women who do not, or than a random sample of women in general.