

# **DEMOGRAPHIC DESTINIES**

## **Interviews with Presidents of the Population Association of America**

### **Interviews Referencing Pascal K. Whelpton PAA President in 1941-42**



This series of interviews with Past PAA Presidents was initiated by Anders Lunde  
(PAA Historian, 1973 to 1982)

And continued by Jean van der Tak (PAA Historian, 1982 to 1994)

And then by John R. Weeks (PAA Historian, 1994 to present)

With the collaboration of the following members of the PAA History Committee:  
David Heer (2004 to 2007), Paul Demeny (2004 to 2012), Dennis Hodgson (2004 to  
present), Deborah McFarlane (2004 to 2018), Karen Hardee (2010 to present), Emily  
Merchant (2016 to present), and Win Brown (2018 to present)

## **PASCAL K. WHELPTON**

We do not have an interview with Pascal ("Pat") Whelpton, who was the seventh PAA President (1941-42). However, as Andy Lunde and Jean van der Tak (VDT) were interviewing other past presidents, they regularly asked questions about those early presidents whom they had been unable to interview. Below are the excerpted comments about Pascal Whelpton.

### **CAREER HIGHLIGHTS**

Pascal Whelpton was born in 1893 in Buffalo, New York. He graduated from Cornell University in 1915 with a B.S. degree in agriculture, and then did graduate work there, and also at the University of Nebraska. He became a farm management specialist for the U.S. Department of Agriculture, and also taught at Texas A & M College. In 1924 he joined Warren Thompson at the Scripps Foundation for Research in Population Problems, at Miami University in Oxford, Ohio. He became Associate Director there in 1940, and Director in 1953. During a leave from 1950-1953, he served as Director of the United Nations Population Division. He retired from the Scripps Foundation in 1963, and died the next year there in Oxford, Ohio.

### **From Andy Lunde's interview with Frank Notestein in 1973:**

**LUNDE:** When I used to talk to P.K. Whelpton, one thing I never asked was how he got started with cohort fertility. Was he, for example, influenced by Woofter?

**NOTESTEIN:** No, this came out of projection problems that he had. In the projection system, you pretend the events of this year are the events of a cohort passing through. Some of the stuff went wrong. And Pat said, "Well, let's do this by order of birth too. So you [project] not the childbearing experience of females age 20 this year, but the childbearing experience of childless women at age 20 this year. At what age do they have first children, second children and so forth. The assembly is a synthetic cohort. If you did this fairly age-specifically, you get one year in which 100 women have 108 children. That's a neat trick. Assuming he ran into these ridiculous things, this drove him into real cohorts. Synthetic cohorts become impossible. Pat was always looking for some way of getting a projection.

I think you probably have everything on Pat. That foundation [Scripps Foundation for Research in Population Problems] was originally two men and they were to take turns living around the world, but then the funds ran short. [Warren] Thompson was a better theorist than Pat. Pat was a better statistician; he came from agricultural economics. A very solid fellow. Clyde worked closely with him.

### **From Andy Lunde's interview with Conrad Taeuber in 1973:**

**LUNDE:** What other issues do you recall as being of particular interest in PAA meetings over the years?

**TAEUBER:** There were some rather intriguing methodological developments in measuring population growth, many of which can be attributed to Pat Whelpton. Lotka also brought them up; they worked very closely together. The whole development of demographic methodology came up again and again.

The Indianapolis Survey, which was a pioneering effort to interview women and their husbands in relation to contraceptive practices, family size, and the like, occupied a good deal of attention. The need for and eventual development of the Population Council occupied a certain amount of attention at

one stage.

**From Andy Lunde's interview with Clyde Kiser in 1973:**

**CLYDE KISER'S CAREER HIGHLIGHTS INCLUDE SEVERAL MENTIONS OF PAT**

**WHELPTON:** Clyde Kiser was born in 1904 in Bessemer City, North Carolina, where he has again lived since 1974. He received the A.B. in liberal arts in 1925 and the A.M. in sociology in 1927, both from the University of North Carolina in Chapel Hill, and the Ph.D. in sociology from Columbia University in 1932. As a member of the technical staff of the Milbank Memorial Fund in New York City from 1931 until his retirement at the end of 1970 (at which time he was Vice-President for Technical Affairs), he was deeply involved in the Milbank Fund's pioneering promotion of fertility and population studies in the U.S. and also in Latin America. (Kiser has described these activities in "The Work of the Milbank Memorial Fund in Population Since 1928," in Forty Years of Research in Human Fertility, proceedings of a May 1971 conference honoring him on his retirement from the Fund, edited by himself, 1971; and "The Role of the Milbank Memorial Fund in the Early History of the PAA," Population Index, October 1981). Among these activities, he, along with P.K. Whelpton, played a leading role in the conceptualization, planning, organization, and analysis of the 1941 Indianapolis Survey, progenitor of a subsequent long line of major U.S. fertility surveys. (He was coeditor with Whelpton of the five volumes summarizing results of that survey, Social and Psychological Factors Affecting Fertility, 1946-58). From 1942 to 1975, he was also a senior research demographer with the Office of Population Research at Princeton University, where his wife Louise Kiser was coeditor of Population Index from 1945 until shortly before her death in 1954. He was Adjunct Professor of Sociology at New York University in 1945-46 and served on many U.S. government committees dealing with population and fertility. He is the author or coauthor of several books and many articles on U.S. population and fertility in particular, including The Fertility of American Women (with Wilson Grabill and P.K. Whelpton), 1958, a 1950 census monograph, and Trends and Variations in Fertility in the United States (with Grabill and Arthur Campbell), 1968, a 1960 census monograph.

**From Andy Lunde's interview with Irene Taeuber in 1973:**

**LUNDE:** Irene, can you tell us a bit about the history of our organization?

**TAEUBER:** You've talked with a lot of people about the Association. You've gotten something of the nature of the group-- its exclusionary tendencies with reference to birth controllers; its concept of its own purity but also its uncertainty about that purity in that it did not put "scientific" in its title as the International Union did. I'd like to give a bit of a different perspective on the development of this association.

If you go back to the late 1920s, there were a few spots in the country where population analysis was developing. One of those was Warren Thompson, who had gotten the Scripps Foundation [for Research in Population Problems] interested in the dangers of the growth of the Far Eastern population. Thompson brought in P.K. Whelpton and where they started was with Thompson's continuing interest in the Far East and China and his broad general interests, along with Whelpton's interest in the development of demography, population projections. You had these two men in a basically isolated area.

.... I think our friends who are feeling guilty for having been an elitist establishment are in part still classifying themselves as elite. We were a very small group. Nobody else knew this field. In this early period, there was the question of what we were to be called. Pat Whelpton and other people wrote articles in which they talked about the people who were working in this field as "populationists."

And some of us decided that whatever we were or were not, we were not going to be "populationists." So, at conferences we started slipping in the word "demography."

That is how a new field got itself an organization. The development of the field and development of the organization went together. We've seen an intensification of that in recent years. With the movement of plans and programs into the field of fertility control, we have again the question of what demography is, what the field is, what the relation is between various sections.

**From Jean van der Tak's interview with Henry Shryock in 1988:**

**VDT:** Your mention of the international conference of 1954 reminds me of the IUSSP. I noticed that you were one of the 29 Americans among the 147 people who were first invited to be IUSSP members when IUSSP switched after the war from membership by national organizations to individual membership. Could you tell a bit about your involvement with IUSSP [International Union for the Scientific Study of Population]? Were you, for instance, involved in the IUSSP meeting held in New York in 1961?

**SHRYOCK:** I remember being there. I don't remember whether I had a paper at that time or not; seems to me I was busy working on my first migration book. But I was at the first IUSSP meeting after the war, in Geneva in 1949, and there I had several assignments. The person in charge of our delegation was Henry Pratt Fairchild of New York University, the very first president of PAA. He was quite an imposing character. Quite a gourmet. He was a friend of Oscar of the Waldorf, I remember. He also was suspected of some leftwing activities, with regard to immigration groups. He belonged to some organization and he used to take the membership file home from his office every night and hide it under his bed during the McCarthy era, I was told. He was instrumental in organizing the American delegation to that first IUSSP meeting after the war, along with Frank Lorimer, who was the secretary of IUSSP at that time. He was the executive director, based in the U.S.

At that 1949 meeting, Wilson Grabill, Calvin Beale and I had a paper forecasting, projecting, fertility for the U.S. I was the only one of the three who went. Frank Lorimer also had asked me to defend the late Thomas J. Woofter, who was the first one along with the Frenchman Pierre De Poid to get onto the idea of generation reproduction rates, rather than cross-sectional ones that had been developed by Dublin and Lotka. Lotka was giving a paper then in which he was very critical of Woofter--sort of brushing this off as, "Well, everyone had known this beforehand and it wasn't very important." P.K. Whelpton had told me that Woofter's work was what really inspired his getting into cohort fertility, which Whelpton developed and led to some of these field studies and so on. So I was supposed to get up and comment on the paper by Lotka, the great man, defending Woofter, which really put me on the spot. I was sort of a friend of Lotka too. But that went off not too badly.

**From an interview by Harry Rosenberg (substituting for Andy Lunde) with several past presidents, including C. Horace Hamilton, in this instance being questioned by Clyde Kiser in 1976:**

**KISER:** Notestein in one of his articles says that Scripps was interested in world population. He went up to Columbia University and was going through the card catalogue and ran across a reference to Thompson's book [dissertation on Malthus] and got impressed with Thompson and induced him to go with him on a trip to the Far East, in his yacht. They were gone for about a year and when they came back they had the plans for the Scripps Foundation.

**HAMILTON:** I think the Scripps Foundation played a big role coordinate with the Population Association of America. There were Thompson and [P.K.] Whelpton at Scripps, Clyde Kiser at the

Milbank Memorial Fund. Whelpton was an agricultural economist and taught down at Texas A & M College, where I had gone to school. I didn't meet him while I was there.

**From Jean van der Tak's interview with Dudley Kirk in 1989:**

**VDT:** You mentioned to me at a PAA meeting not too long ago that you felt more should be said about Warren Thompson. You noticed that he hadn't even been mentioned in the International Encyclopedia of Population [1982].

**KIRK:** And Whelpton, of course. The two of them were at the Scripps Foundation and they were always participants in the early meetings. Warren Thompson's book [Population Problems] was the textbook in the field for years, generations. It had five or six editions. I had a lot of respect for him. And I liked Pat Whelpton very much. Pat originally was sort of in Thompson's shadow.

**From Jean van der Tak's interview with Arthur Campbell in 1988:**

**VDT:** Now I'd like to turn to your connections with the Population Association of America, of which you were president in 1973-74. Do you recall when you first attended a meeting, when you first joined PAA?

**CAMPBELL:** I remember attending meetings at Princeton. The first meeting I attended was in the spring of 1947, when I remember T.J. Woofter making a spontaneous intervention about the usefulness of looking at fertility on a cohort basis rather than a period basis. He made quite a point of that. I don't think it was that particular remark that started Whelpton thinking about cohort fertility tables, but certainly that was the first I ever heard of it.

**VDT:** I was looking back at Clyde Kiser's 40 years of reminiscences on the Milbank Memorial Fund, a series of papers given at the time Kiser retired from the Fund in 1971 [Clyde V. Kiser, ed., Forty Years of Research in Human Fertility, Milbank Memorial Fund, 1971]. Someone [Wilson Grabill] remarked that Woofter inspired Whelpton in cohort fertility analysis ["A few might regard Woofter's paper on generation reproduction rates as a forerunner of Whelpton's work."]. I thought Whelpton had been doing it in the 1930s. No?

**CAMPBELL:** He had developed the component method of population projections in the 1930s, meaning that you make separate estimates for the different components of population change. But to my knowledge he hadn't started working on cohort fertility.

**VDT:** So maybe it really was Woofter that put Whelpton onto it.

**CAMPBELL:** Could be.



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Pascal Kidder Whelpton (1893-1964)

Author(s): John D. Durand

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PASCAL KIDDER WHELPTON 1893-1964

Demography has lost one of its most able leaders by the death of P. K. Whelpton, as he was known to members of the profession all over the world by the honoured signature of his numerous contributions, or "Pat," as he was called affectionately by his many friends.

Born in Buffalo, New York, on 22 February 1893, Pascal Kidder Whelpton died in Oxford, Ohio, on 6 April 1964. He was fully active until about two months before his death, when he underwent an exploratory operation which revealed an incurable cancer. He is survived by his wife, Lorene Parker Whelpton, two married sons, one married daughter, and six grandchildren.

Whelpton's death brought to an end forty years of energetic devotion to demographic studies. He was one of the recruits from allied disciplines who gave impetus to the modern development of demography in the United States before it became established as a field of academic specialization. He took his B.S. degree in agriculture at Cornell University in 1915 and continued in teaching, graduate studies, and extension work in agriculture, farm management, rural and agricultural economics until 1924, when he joined Warren S. Thompson at the Scripps Foundation for Research in Population Problems. From that time onward, he never severed his connection with the Scripps Foundation, though he had several leaves of absence for work elsewhere. He became Associate Director of the Foundation in 1940 and succeeded Thompson as Director in 1953. In 1963 he retired as Director, but retirement for Whelpton could only be nominal and he continued with undiminished zeal and energy his work on the Scripps Foundation's studies.

During 1938-40, on one of his temporary leaves from Scripps, Whelpton was with the Central Statistical Board of the U. S. Bureau of the Budget. He served in 1949 with the Department of the Army in Japan and during 1950-53, as Director of the Population Division in the United Nations secretariat. He was President of the Population Association of America during 1940-41 and Vice-President of the International Union for the Scientific Study of Population during 1954-57.

How much the development of American demography owes to P. K. Whelpton one can see by a glance at the appended select bibliography of his principal works cited in Population Index since its first issue. Thompson and Whelpton took the lead in the field of population forecasts in this country in the 1920's, when they devised their "component" method and applied it in the first series of Scripps Foundation projections of the United States population. (See their article, "Population of the United States," 1925, published in the September 1928 issue of the American Journal of Sociology.) They continued to be recognized as leading authorities in this field until the mid-1940's, when the Census Bureau took up the making of population projections as a regular function. The joint signature of Thompson and Whelpton gained wide reputation also by the publication of their Population Trends in the United States in 1933 and several other important works during the next few years on various aspects of demography and population policy questions. But it is mainly on Whelpton's independent contributions, especially in later years, that his claim to a place of enduring eminence in the annals of demography will rest.

A special preoccupation with fertility analysis became apparent in the titles of Whelpton's articles as early as the 1930's. During the 1940's and 1950's, his work with Kiser and others on the Indianapolis Study of Social and Psychological Factors Affecting Fertility established the first milestones along a major avenue of research in this field, which has led to rich findings. Whelpton continued as a prime mover of subsequent projects along this line, including notably the Growth of American Families studies carried out by the Scripps Foundation in 1955 and 1960, and as one of the principal collaborators in the national fertility surveys conducted by the Survey Research Center of the University of Michigan in more recent years. Shortly before his death he was engaged in the last phases of analysis of results of the 1960 Growth of American Families Study. He was unable to finish this, but his colleague, Arthur Campbell, has completed it, and it will be incorporated in a forthcoming publication of results of the study.

Whelpton's development of methods of analyzing the fertility of cohorts was a contribution of perhaps even more fundamental importance. His Cohort Fertility will undoubtedly be recognized as one of the classics of demography.

What Whelpton did to advance demography, on the worldwide front and particularly in the less developed countries, during the two and one-half years of his service as Director of the United Nations Population Division is not documented by published works bearing his signature. It is remembered with the highest appreciation by his former co-workers at the United Nations and will surely not be forgotten by the members of the Population Commission, the Preparatory Committee for the 1954 World Population Conference, the participants in the United Nations Seminar on Population Problems in Asia and the Far East (Bandung, 1955), the collaborators in The Mysore Population Study and The Determinants and Consequences of Population Trends, and the workers on demographic studies in many countries throughout the world, who had the benefit of his advice, cooperation, and support.

Nor will anyone who knew him forget the warmth of his kindly, outgoing personality, his gentle humour, ready sympathy, honesty, and



fairness, nor the tireless perseverance which was in large measure responsible for his enviable professional achievements.—John D. Durand

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[With Clyde V. Kiser.] Trends, determinants, and control in human fertility. *Annals of the American Academy of Political and Social Science* 237:112-122. Jan. 1945.

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Vol. 2. The intensive study: purpose, scope, methods, and partial results. 1950. Pp. 139-466.

Vol. 3. Further reports on hypotheses in the Indianapolis Study. 1952. Pp. 467-799.

Vol. 4. Further reports on hypotheses and other data from the Indianapolis study. 1954. Pp. 800-1086.

Vol. 5. Concluding reports and summary of chief findings from the Indianapolis study. 1958. Pp. 1087-1372.

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[With Ronald Freedman and Arthur A. Campbell.] *Family planning, sterility and population growth*. New York, McGraw-Hill, 1959. viii, 515 pp.

[With Arthur A. Campbell.] *Fertility tables for birth cohorts of American women*. Part 1. Annual and cumulative birth rates, by age, by order of birth for all women in cohorts of 1876 to 1943. Pp. 1-130 in: U. S. National Office of Vital Statistics. *Vital Statistics—Special Reports*. Vol. 51. Selected studies. No. 1. Washington, Jan. 29, 1960.

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Editor's note: These are a selection from about one hundred titles that have been cited in the bibliographies of Population Index. See also Title 3266, this issue.

#### MATHEMATICAL PREPARATION OF PROSPECTIVE GRADUATE STUDENTS

The Committee on the Undergraduate Program in Mathematics (CUPM) is a committee of the Mathematical Association of America. CUPM, operating under a grant from the National Science Foundation, is charged with making studies of and recommending improvements in undergraduate mathematics programs, thereby reflecting the basic concern of the Association for upgrading the content and teaching of college mathematics.

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The Panel wishes to make this draft available to mathematicians and BMSS subject-matter specialists in order to receive comments on the appropriateness and feasibility of the recommended program.

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**We do not have a presidential address for Pascal Whelpton, but this paper published in 1936 gives us a glimpse of his thinking just a few years prior to his PAA presidency.**

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Geographic and Economic Differentials in Fertility

Author(s): P. K. Whelpton

Source: *The Annals of the American Academy of Political and Social Science*, Nov., 1936, Vol. 188, The American People: Studies in Population (Nov., 1936), pp. 37-55

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# Geographic and Economic Differentials in Fertility

By P. K. WHELPTON

INTEREST in trends and differentials of fertility<sup>1</sup> by social, economic, and geographic groups in the United States is chiefly a development of the twentieth century. From 1800 to 1860 the Nation's population was growing rapidly—doubling in less than twenty-five years—and people seemed to be satisfied with the situation, judging from the scarcity of writings about it. During the latter part of the century growth commenced to slow up, and articles began to appear dealing with the decline in the birth rate, the differential between rates of native and foreign-born women, geographic differences in fertility, the effect of education on size of family, and similar topics. Popular attention was directed to these subjects at the turn of the century by the vigorous writing of Theodore Roosevelt, and particularly by his campaign against "race suicide." Since the World War, interest in these matters has increased

enormously, important additions have been made to the basic statistical data available, more thorough and painstaking analyses of these data have been carried out, and a wealth of knowledge has been accumulated. It is the purpose of this paper to discuss briefly some of the more important facts that have been established, and to point out portions of the field in which further studies are particularly needed.

## INTERSTATE DIFFERENTIALS

So many writers have called attention to the large differences in the fertility of women in various parts of the United States that it has become one of the better known demographic facts.<sup>2</sup> For the years about the 1930 census these differences may be shown accurately and concisely for native white, foreign-born white, and Negro women in the birth registration states by computing age specific birth rates and combining them to secure the total

<sup>1</sup> According to the definitions adopted by the Population Association of America, "Organization for Research in Population," *Human Biology*, V. 6, No. 1 (Feb. 1934), pp. 223-239, fertility means physiological capacity to participate in reproduction expressed in performance and therefore measurable; virtually synonymous with the birth performance of a group, correlative to mortality. Except as otherwise indicated, the fertility of all women is considered rather than that of married women. The effect on the numerical growth of population is the same if 90 per cent of women marry and bear three children each as if 45 per cent marry and bear six children each (no births occurring to single women and other things being equal). The fact that married women are twice as fertile in the second case is immaterial from the standpoint of increase of numbers, the essential point being the equal fertility of all women.

<sup>2</sup> O. E. Baker, *The Outlook for Rural Youth*, Washington, Coöperative Extension Work in Agriculture and Home Economics, 1934 (U. S. Department of Agriculture Extension Service Circular No. 203, Mimeographed); John S. Billings, "The Diminishing Birth Rate in the United States," *Forum*, V. 15 (June 1893), pp. 467-477; Warren S. Thompson, *Ratio of Children to Women in the United States, 1920*, Washington: Gov't Printing Office, 1931 (U. S. Bureau of the Census, Census Monograph 11); ——— and P. K. Whelpton, *Population Trends in the United States* (New York: McGraw-Hill Book Co., 1933), Chap. VIII; Walter F. Willcox, *Proportion of Children in the United States*, Washington: Gov't Printing Office, 1905; Allyn A. Young, "The Birth Rate in New Hampshire," *Journal of the American Statistical Association*, V. 9, No. 71 (Sept. 1905), pp. 263-291.

fertility rate.<sup>3</sup> For native whites the highest rates are found in the East South Central and the Mountain States, and the lowest in the Middle Atlantic and the Pacific States, the total fertility of the first mentioned group being 3,274, which is 94 per cent above the rate of 1,684 for the Pacific States (Table I). If individual states

white array of divisions. Among the states the highest rates are found in North Dakota (4,616) and West Virginia (4,474), and the lowest in California (2,000), Oregon (2,093), and New York (2,190).

Negro women are found to be most fertile in the South Atlantic and East South Central States (2,847 and 2,715)

TABLE I—TOTAL FERTILITY RATES<sup>a</sup> BY RACE AND NATIVITY, UNITED STATES AND DIVISIONS, 1929-1931

| Nativity and Race       | United States | New England | Middle Atlantic | East North Central | West North Central | South Atlantic | East South Central | West South Central | Mountain | Pacific |
|-------------------------|---------------|-------------|-----------------|--------------------|--------------------|----------------|--------------------|--------------------|----------|---------|
| Native White.....       | 2,393         | 2,060       | 1,983           | 2,260              | 2,498              | 2,899          | 3,274              | 2,774              | 2,997    | 1,684   |
| Foreign-born White..... | 2,561         | 2,772       | 2,441           | 2,603              | 3,123              | 2,794          | 2,448              | 2,840              | 4,026    | 2,078   |
| Negro.....              | 2,533         | 2,478       | 1,930           | 1,909              | 1,930              | 2,847          | 2,715              | 2,608              | 1,682    | 1,522   |

*In Per Cent of United States Permanent Maintenance Rate<sup>b</sup>*

|                         |     |     |     |     |     |     |     |     |     |    |
|-------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|
| Native White.....       | 103 | 88  | 85  | 97  | 107 | 124 | 141 | 119 | 129 | 72 |
| Foreign-born White..... | 110 | 119 | 105 | 112 | 134 | 120 | 105 | 122 | 173 | 89 |
| Negro.....              | 99  | 96  | 75  | 74  | 75  | 111 | 106 | 101 | 65  | 59 |

<sup>a</sup> In preparing this table, birth rates by five-year age periods from 15 to 49 were added and the sum multiplied by five. Births were adjusted for non-registration, using the percentages shown in P. K. Whelpton, "The Completeness of Birth Registration in the United States," *Journal of the American Statistical Association*, V. 29, No. 186 (June 1934), pp. 125-136.

<sup>b</sup> The permanent maintenance rate for whites is 2,329 and for Negroes 2,571. See text for explanation.

are considered, the differences are larger, the highest rate—3,465<sup>4</sup> in West Virginia and Kentucky—being more than double the lowest rate—1,583 in California. North Dakota (3,404) stands third from the top, and New York (1,724) next to the bottom.

Variations in the fertility of foreign-born white women occur on a somewhat larger scale, but with a different geographic distribution. The Mountain States have the highest rate (4,026) and the Pacific States the lowest (2,078) as before, but the East South Central States are six places lower and the West North Central three places higher than in the native

and least fertile in the Mountain and Pacific States (1,682 and 1,522). Interstate variations for Negroes, like those for foreign-born whites, are somewhat larger than those for native-born whites, in part probably because of greater fluctuations in their numbers and in their occupational groupings. The highest Negro total fertility rates are in North Carolina (3,388) and South Carolina (3,274), and the lowest in Colorado (1,443) and California (1,532).

Foreign-born whites have higher total fertility than native whites or Negroes in the United States as a whole, and also in each division except two—the South Atlantic and East South Central—where they are exceeded by the others.<sup>5</sup> Negroes stand

<sup>3</sup> The total fertility rate may be defined as the sum of the annual birth rates per 1,000 women by single years of age.

<sup>4</sup> New Mexico may have a still higher native white rate, but this cannot be definitely determined because births to native Mexican women are classified with those to native white women.

<sup>5</sup> For a discussion of race and nativity differentials see Frank Lorimer and Frederick Osborn, *Dynamics of Population* (New York: Macmillan



a close second to the foreign born and well above the native whites for the Nation, but in spite of this fact and contrary to the general opinion, they are outranked by the native whites in every division except New England. This anomalous situation is explained by differences in the geographic distribution of the two races. Nearly 80 per cent of the Negroes are concentrated in the Southern States, where total fertility is highest; hence their national rate is determined largely by the situation there. A majority (56 per cent) of native whites, on the contrary, live in the New England, Middle Atlantic, East North Central, and Pacific divisions, where their fertility is relatively low, which pulls down their rate for the United States.

### *Significance of differentials*

The significance of these differentials becomes more clear if a comparison is made between the various total fertility rates and the minimum required to maintain the population permanently at a stationary level. If no deaths occurred at ages below 50, the total fertility maintenance rate would be 2,058 for whites and 2,034 for Negroes.<sup>6</sup> But with mortality rates as they were in the United States during 1929-1931, the minimum is raised to 2,329 for whites and 2,571 for Negroes.<sup>7</sup> In states where mortality

conditions are more favorable than the United States average, this minimum would be decreased somewhat; but these differences are not large, a rate of 2,269 being required for the permanent maintenance of the white population in South Dakota, the state with lowest white mortality, and a rate of 2,452 in Colorado, the state with the highest white mortality.<sup>8</sup> In the comparisons that follow, the United States rates will be taken as the standard, for while this will understate somewhat the margin above maintenance for some states in 1929-1931, the drop in the birth rate since then has reduced the margin by a large amount.

Assuming that the United States white maintenance rate of 2,329 applies to both native and foreign-born white women, the native white birth rate is below the permanent replacement level by about 11 per cent in the New England States, 15 per cent in the Middle Atlantic States, and 28 per cent in the Pacific States. In contrast there is an excess above maintenance of about 7 per cent in the West North Central, 25 per cent in the South Atlantic, 41 per cent in the East South Central, 19 per cent in the West South Central, and 29 per cent in the Mountain States, and nearly 3 per cent for the Nation as a whole. Birth rates for foreign-born white women are above permanent maintenance requirements in all divisions except the Pacific, where the deficit is about 11 per cent. In the other divisions the surplus varies from a low of 5 per cent in the Middle Atlantic to a high of 73 per

Co., 1934), Chap. III; Warren S. Thompson, *Ratio of Children to Women in the United States, 1920*, *op. cit.*; ——— and P. K. Whelpton, *Population Trends in the United States*, *op. cit.*

<sup>6</sup> Using a ten-year average sex ratio at birth.

<sup>7</sup> Based on the official life tables for whites and Negroes appearing in U. S. Bureau of the Census, "Life Tables for White Males, White Females, Negro Males, and Negro Females, Continental United States, 1930," *Vital Statistics—Special Reports*, V. 1, No. 20 (July 27, 1936), pp. 389-399. No life tables have been published for native whites, foreign-born whites, and Negroes by individual states.

<sup>8</sup> Based on the life tables for white persons in each state published by Louis I. Dublin and Alfred J. Lotka, *Length of Life, A Study of the Life Table*, New York: Ronald Press, 1936. According to these tables a rate of 2,707 is required for the "white" population in New Mexico, but Mexican deaths were registered as white deaths in that state, hence the facts for the actual white population are not available.



cent in the Mountain States. Negro birth rates lack about 1.5 per cent of meeting permanent maintenance requirements in the United States, because of deficiencies of about 25 per cent in the northern states and nearly 40 per cent in the western. In the South Atlantic States they have an excess of 10.7 per cent, but this drops to 5.6 per cent in the East South Central States and 1.4 in the West South Central States.

*Variations are not new*

While the existence in recent years of large interstate variations in fertility has become well known, it has not been widely realized that these are not new, but date back at least to 1800.<sup>9</sup> Because the birth registration area was not established until 1915, they cannot be measured by rates calculated from births, but can be indicated by the number of children under 5 per 1,000 women aged 20 to 44, which can be computed from census data as far back as 1800 for whites and 1850 for Negroes.<sup>10</sup> For 1930 these ratios show interstate differentials quite similar to those in total fertility, hence they should be reliable for earlier years.

In 1800 the East North Central and East South Central States—the Nation's frontier at that time—had the most fertile white population and the New England States the least fertile, the ratio of children to women being about 1,875 in the former and 1,164 in the latter (Table II). The Middle Atlantic and South Atlantic States were not far below the New England States, however, the main geographic

differential then being between the older settled coast states and the newer ones west of the Appalachians. The spread between the highest and lowest state fertility rates increased steadily from 1800 to 1830, the 1830 ratio of the West North Central States being over twice that of the New England States. Since that time the largest white divisional rate has been in the neighborhood of twice the lowest, with the West North Central, West South Central, and East South Central States heading the list in turn, and the New England States being at the bottom until 1910, when they were replaced by the Pacific.

Interdivisional differentials in fertility of Negroes are also of long standing. In 1850 their ratio of children to women was 1,190 in the West North Central States, about twice as large as their ratio in New England. This relation of about 2 to 1 has been maintained in succeeding decades, but the South Atlantic States have had the highest ratios most of the time, and the Pacific or Mountain States the lowest.

The higher fertility of foreign-born whites as compared with native-born whites or Negroes, pointed out for 1929–1931 in Table I, is found in 1920 and 1910 to a much larger degree, particularly in 1920 (Table II). Studies of vital statistics available for certain states indicate that it had existed for many decades.<sup>11</sup> Native white ratios were also higher than Negro ratios in 1920 and 1910 in most divisions. At earlier census years the relative showing of the Negroes was more favorable, especially in the Southern States.

<sup>9</sup> Baker carried his computations back to 1800, but Willcox did not go back of 1850, Billings of 1880, or Young of 1890.

<sup>10</sup> It is necessary to estimate the proportion of women 40–49 who were 40–44 in 1830 to 1860, and to make other estimates for earlier years.

<sup>11</sup> Joseph John Spengler, *The Fecundity of Native and Foreign-born Women in New England*, Washington: Brookings Institution, 1930 (Brookings Institution pamphlet series, V. 2, No. 1, June 30, 1930).

## RURAL-URBAN DIFFERENTIALS

One of the explanations for these interstate differentials emphasized by many writers<sup>12</sup> is the relative impor-

resulting from closer contact with nature, from the fact that farming is more of a family affair than most other occupations, from differences in rural and urban incomes, or from other in-

TABLE II—CHILDREN 0-4 PER 1,000 WOMEN AGED 20-44\* BY RACE AND NATIVITY, UNITED STATES AND DIVISIONS, 1800 TO 1930

| Race and Nativity                 | United States | New England | Middle Atlantic | East North Central | West North Central | South Atlantic | East South Central | West South Central | Mountain | Pacific |
|-----------------------------------|---------------|-------------|-----------------|--------------------|--------------------|----------------|--------------------|--------------------|----------|---------|
| White <sup>b</sup> :              |               |             |                 |                    |                    |                |                    |                    |          |         |
| 1800.....                         | 1,342         | 1,164       | 1,334           | 1,918              | .....              | 1,402          | 1,875              | .....              | ...      | ...     |
| 1810.....                         | 1,358         | 1,111       | 1,365           | 1,777              | 1,915              | 1,382          | 1,794              | 1,446              | ...      | ...     |
| 1820.....                         | 1,295         | 980         | 1,244           | 1,683              | 1,768              | 1,330          | 1,708              | 1,483              | ...      | ...     |
| 1830.....                         | 1,145         | 826         | 1,044           | 1,473              | 1,685              | 1,189          | 1,530              | 1,369              | ...      | ...     |
| 1840.....                         | 1,085         | 770         | 951             | 1,280              | 1,446              | 1,162          | 1,424              | 1,310              | ...      | ...     |
| 1850.....                         | 892           | 636         | 776             | 1,037              | 1,122              | 957            | 1,115              | 1,061              | 875      | 896     |
| 1860.....                         | 905           | 639         | 784             | 1,016              | 1,118              | 940            | 1,056              | 1,103              | 1,054    | 1,035   |
| 1870.....                         | 814           | 564         | 702             | 892                | 1,012              | 833            | 922                | 953                | 982      | 916     |
| 1880.....                         | 780           | 520         | 648             | 781                | 930                | 879            | 952                | 1,066              | 892      | 808     |
| 1890.....                         | 685           | 456         | 563             | 668                | 797                | 802            | 873                | 994                | 770      | 600     |
| 1900.....                         | 666           | 497         | 567             | 620                | 731                | 802            | 855                | 942                | 742      | 532     |
| 1910.....                         | 631           | 505         | 554             | 576                | 650                | 780            | 836                | 861                | 680      | 478     |
| 1920.....                         | 604           | 543         | 562             | 570                | 605                | 720            | 760                | 706                | 686      | 447     |
| 1930.....                         | 506           | 467         | 447             | 482                | 520                | 618            | 680                | 586                | 582      | 357     |
| Native white <sup>b</sup> :       |               |             |                 |                    |                    |                |                    |                    |          |         |
| 1910.....                         | 594           | 389         | 454             | 522                | 603                | 779            | 837                | 855                | 644      | 436     |
| 1920.....                         | 555           | 407         | 442             | 509                | 569                | 738            | 759                | 699                | 647      | 404     |
| 1930.....                         | 499           | 419         | 417             | 473                | 510                | 620            | 681                | 585                | 575      | 350     |
| Foreign-born white <sup>b</sup> : |               |             |                 |                    |                    |                |                    |                    |          |         |
| 1910.....                         | 785           | 696         | 770             | 821                | 951                | 818            | 773                | 960                | 847      | 645     |
| 1920.....                         | 838           | 802         | 841             | 873                | 953                | 894            | 788                | 806                | 920      | 638     |
| 1930.....                         | 548           | 601         | 535             | 542                | 677                | 580            | 542                | 620                | 696      | 408     |
| Negro:                            |               |             |                 |                    |                    |                |                    |                    |          |         |
| 1850.....                         | 1,087         | 628         | 688             | 971                | 1,190              | 1,144          | 1,156              | 857                | ...      | ...     |
| 1860.....                         | 1,072         | 582         | 635             | 946                | 1,223              | 1,128          | 1,126              | 939                | ...      | 646     |
| 1870.....                         | 997           | 503         | 569             | 848                | 933                | 1,023          | 1,043              | 1,019              | 516      | 636     |
| 1880.....                         | 1,090         | 505         | 546             | 777                | 850                | 1,138          | 1,136              | 1,173              | 487      | 301     |
| 1890.....                         | 930           | 426         | 434             | 596                | 686                | 968            | 970                | 1,047              | 456      | 301     |
| 1900.....                         | 845           | 400         | 379             | 439                | 489                | 934            | 876                | 916                | 300      | 379     |
| 1910.....                         | 736           | 401         | 336             | 373                | 393                | 838            | 768                | 764                | 271      | 293     |
| 1920.....                         | 608           | 456         | 327             | 324                | 340                | 738            | 640                | 605                | 286      | 296     |
| 1930.....                         | 554           | 515         | 369             | 371                | 370                | 647            | 613                | 563                | 349      | 286     |

\* In an attempt to improve the comparability of native white and foreign-born white ratios, and of white and Negro ratios all ratios have been adjusted for under-enumeration, and all except those for whites in 1800 to 1820 have been standardized to the age distribution of U. S. women in 1930. The number of white children 0-4 enumerated has been increased by 5 per cent, and of Negro children by 11 per cent in the North, 13.5 per cent in the South, 8 per cent in the West, and 13 per cent in the United States, these being the factors obtained from a study of data for 1925-1930.

<sup>b</sup> Mexicans were included in the white population by the Bureau of the Census prior to 1930.

tance of agriculture as compared with industry and trade in a state's economy, or of the rural population as compared with the urban. Whether

fluences, the fact remains that human fertility has been much higher in the more agricultural states than in the more industrial states for over a cen-

<sup>12</sup> E. B. Andrews, "Are There Too Many of Us?" *North American Review*, V. 155 (Nov. 1892), pp. 596-607; O. E. Baker, *op. cit.*; Cyrus M. Edson, "American Life and Physical Deterioration," *North American Review*, V. 157 (Oct. 1893), pp. 440-451; Joseph A. Hill, "Comparative Fecundity of Women of Native and Foreign Parentage in the United States," *Journal of the American Statistical Association*, V. 13, No. 103 (Dec. 1913), pp. 583-604; Frank Lorimer and Frederick Osborn, *op. cit.*, Chap. II; Warren S.

Thompson, *Ratio of Children to Women, 1920*, *op. cit.*; ——— and P. K. Whelpton, *Population Trends in the United States*, *op. cit.*; P. K. Whelpton, "Industrial Development and Population Growth," *Social Forces*, V. 6, Nos. 3-4 (March-June 1928), pp. 458-467, 629-638; Sanford R. Winston, "The Relation of Certain Social Factors to Fertility," *American Journal of Sociology*, V. 35, No. 5 (March 1930), pp. 753-764.

ture. Beginning with 1820 the states may be arrayed according to the proportion of the occupied persons engaged in agriculture as shown by the census. Dividing this array into quartiles shows that the group in which agriculture has been most important has had ratios of children to white women from 37 to 73 per cent higher than the group in which agriculture has been least important (Table III). Ratios for native white

dren has been fairly stable in the most industrial states since 1910 but has declined by one fourth in the most agricultural states.

The differential between the fertility of rural and urban people shows up clearly within states as well as from one state to another, as Hart has brought out for Iowa.<sup>13</sup> Utilizing 1915 data from Iowa counties he correlated the number of children under 5 per 1,000 women 21 to 44 with several

TABLE III—CHILDREN 0-4 PER 1,000 WHITE WOMEN AGED 20-44, FOR STATES GROUPED IN QUARTILES ACCORDING TO PER CENT OF OCCUPIED PERSONS 10 YEARS OF AGE AND OLDER ENGAGED IN AGRICULTURE \*

| Year                | First<br>Quartile <sup>a</sup> | Second<br>Quartile | Third<br>Quartile | Fourth<br>Quartile | First Quartile<br>in Per Cent<br>of Fourth |
|---------------------|--------------------------------|--------------------|-------------------|--------------------|--|
| <i>All White</i>    |                                |                    |                   |                    |  |
| 1820.....           | 1,465                          | 1,382              | 1,215             | 1,060              | 138  |
| 1830.....           | 1,414                          | 1,381              | 1,104             | 958                | 148  |
| 1840.....           | 1,357                          | 1,243              | 1,077             | 878                | 155  |
| 1850.....           | 1,103                          | 991                | 900               | 725                | 152  |
| 1860.....           | 1,058                          | 1,021              | 882               | 740                | 143  |
| 1870.....           | 893                            | 920                | 771               | 653                | 137  |
| 1880.....           | 957                            | 831                | 700               | 602                | 159  |
| 1890.....           | 908                            | 752                | 653               | 525                | 173  |
| 1900.....           | 894                            | 711                | 603               | 541                | 165  |
| 1910.....           | 851                            | 670                | 576               | 518                | 164  |
| 1920.....           | 754                            | 618                | 566               | 526                | 143  |
| 1930.....           | 635                            | 543                | 495               | 421                | 151  |
| <i>Native White</i> |                                |                    |                   |                    |  |
| 1910.....           | 845                            | 654                | 531               | 439                | 192  |
| 1920.....           | 748                            | 595                | 545               | 435                | 172  |
| 1930.....           | 634                            | 542                | 494               | 404                | 157  |

\* Computed from data in current census reports. Mexicans are included with whites prior to 1930. No allowance is made for under-enumeration of children, nor for variations in age distribution of women. Adjusting for these matters should not affect the inter-quartile or intercensal differences significantly.

<sup>a</sup> Having the highest percentage of occupied persons engaged in agriculture.

women since 1910 also show a direct relation between agriculture and human fertility. If recent trends among native whites continue, however, the agricultural-industrial differential will soon disappear, as their ratio of chil-

other factors such as the per cent of the population in incorporated places, per

<sup>13</sup> Hornell Norris Hart, *Differential Fecundity in Iowa*, Iowa City: University of Iowa, June 1, 1922 (University of Iowa Studies, Studies in Child Welfare, V. 2, No. 2, first series No. 62).

cent foreign born, school attendance, home ownership, and religious affiliation. The zero order correlation between fertility and per cent urban was  $-.74 \pm .03$ , while the 38 partial correlations computed varied in value between  $-.59 \pm .04$  and  $-.84 \pm .02$ , all being highly significant.<sup>14</sup>

That the relation between human fertility and the proportion of the population living in rural communities or engaged in agriculture is not a simple one has been shown by Winston.<sup>15</sup> Using data from the 1920 census and the National Bureau of Economic Research, he correlated (*x*) children under 15 per 1,000 native white women 15-54 who had ever married with (*a*) per capita current income ( $r = -.86 \pm .03$ ), (*b*) per cent of the population illiterate ( $r = .62 \pm .06$ ),<sup>16</sup> and (*c*) per cent of the population urban ( $r = -.74 \pm .04$ ). The attempt to hold constant the interrelationships between *a*, *b*, and *c* by the method of partial correlation reduced the coefficients considerably, especially the last two,  $r_{ax-bc}$  being  $-.60 \pm .06$ ,  $r_{bx-ac}$  being  $.36 \pm .08$ , and  $r_{cx-ab}$  being  $-.30 \pm .09$ . The last two are not significant, while the first is, which raises the question whether it is the high proportion of the rural population in a state or the low per capita income apparently associated with a high proportion of rural dwellers that is the important factor in determining the birth

rate. It should be pointed out, however, that Winston was dealing with married women only, and that the proportion of women 15-54 who are married is much higher in rural than in urban communities. Differences in the fertility of two groups of women may be due as much to variations in the proportion marrying as to variations in the average number of births per woman after marriage.

#### RURAL FERTILITY AND DISTANCE FROM CITIES

In view of the higher fertility observed among people living in rural areas as compared with those in urban centers, many demographers have thought that rural fertility might be directly related with distance from cities. For example, Brunner and Kolb examined the ratio of children under 10 to women 20 to 45 for counties around Des Moines, and concluded that "there appears to be a relationship between the birth rate and the distance from the city of any measured unit of population, such as the people of a group of counties."<sup>17</sup> Beck makes a similar statement after studying birth rates in Ohio by place of residence of the mother. "Within rural territory in 1930, birth rates were lowest in the counties in which large cities were located. Counties near large cities had lower birth rates than those some distance away."<sup>18</sup>

To throw more light on this matter a study was undertaken recently by the Scripps Foundation for Research in Population Problems in cooperation with the Research Committee on Urbanism of the National Resources

<sup>14</sup> The significance of correlation coefficients discussed in this paper is determined according to values in H. A. Wallace and G. W. Snedecor, *Correlation and Machine Calculation*, Ames, Iowa: Iowa State College, 1929, revised 1931 (Iowa State College of Agriculture and Mechanic Arts Official Publication, V. 23, No. 35), which are taken from R. A. Fisher, *Statistical Methods for Research Workers*, 3d edition, Oliver and Boyd, 1930.

<sup>15</sup> Sanford R. Winston, *op. cit.*

<sup>16</sup> The relation between education and fertility is discussed in detail in the paper by Dr. Notestein in this volume.

<sup>17</sup> Edmund de S. Brunner and J. H. Kolb, *Rural Social Trends* (New York: McGraw-Hill Book Co., 1933), pp. 114-115.

<sup>18</sup> P. G. Beck, *Recent Trends in the Rural Population of Ohio*, Wooster, Ohio: Agricultural Experiment Station, May 1934, Bull. No. 533, p. 26.

Committee, utilizing township data from the 1930 census. Areas selected for study were those in which a block of many small townships chiefly rural extended out from some large city, without approaching too close to another city. Only the rural population of this area was dealt with, the population of the small towns being deducted. Fertility was measured by children under 5 per 1,000 persons 15-44 and correlated with such factors as distance from city, race and nativity, age composition, sex ratio, per cent of farm land in crops, and value of farm land per acre.

### *Findings of the study*

Preliminary figures which have been obtained to date for areas around Rochester, New York; Columbus, Ohio; central Indiana cities; Des Moines, Iowa; Asheville and central North Carolina cities; Atlanta, Georgia; Dallas and Fort Worth, Texas; and Spokane, Washington, show widely varying conditions. Around Rochester there is no apparent relation between the ratio of children to persons and distance of township from Rochester, an array by distance showing slight but erratic fluctuations, and zero order and partial correlation coefficients being less than .05. As distance from the central Indiana cities increases, human fertility declines slightly on the whole. In the good farming section to the northwest of Columbus, fertility decreases as distance from the city increases up to 35 miles, beyond which it rises. In this area the zero order correlation between the ratio of children to persons and distance is  $-.28$ , and the partial correlations between  $-.26$  and  $-.31$ , most of them being significant.<sup>19</sup> To

the southeast of Columbus, where the land becomes poorer from a farming standpoint, the ratio rises from 196 per 1,000 persons at 5-9 miles to 294 at 55-59 miles, and  $r = .35$  which is significant. Apparently, however, it is not the distance from Columbus that is the important influence, but the difference in economic conditions.<sup>20</sup>

The findings for Iowa in this study agree to some extent with those of Brunner and Kolb. To the northwest of Des Moines there is no trend in the ratio of children to persons by townships for 55 miles. From 55 to 79 miles, however, there is a zone with higher fertility than on either side, but within which there are erratic fluctuations. A similar condition occurs to the south, except that the zone of high fertility is 20 to 49 miles from Des Moines.

Around Asheville, North Carolina there is a marked rise in the ratio of children to persons ( $x$ ) as distance from the city ( $a$ ) increases, the zero order correlation coefficient being .37 (.28 being highly significant). This ratio also is correlated with the per cent of farm land in crops ( $r_{b \cdot x}$  equals  $-.40$ ), which is not particularly associated with distance from Asheville ( $r_{ab \cdot x}$  equals .13). In central North Carolina the relative number of children also goes up rapidly with distance from city,<sup>21</sup> the rise being almost as marked for areas around cities of 5,000 to 10,000 as around those over 50,000. In all cases, however, there is some tendency for the percentage of farm land in crops to decline as distance increases, which probably indicates that progressively poorer farming condi-

<sup>19</sup> For a discussion of the relation between fertility of the farm population and farm income, see Frank Lorimer and Frederick Osborn, *op. cit.*, pp. 88-92.

<sup>20</sup> With 80 townships the lower limit for significance is .217 with two variables, .269 with three, and .304 with four.

<sup>21</sup> Areas around the following sized cities were studied: over 50,000 population, 25,000-50,000, 10,000-25,000, 5,000-10,000, and 2,500-5,000.



tions play a significant part in determining the observed trend in human fertility. The situation around Atlanta is more like that around Columbus, the ratio of children to persons rising rapidly with distance to the north and into a poorer and hillier farming region, but varying irregularly with distance to the south where the trend is to a better farming area on the whole.

Going west from Fort Worth the ratio of children to persons rises fairly steadily from 220 per 1,000 in townships whose centers are 10-14 miles from the city to 285 per 1,000 in those 75-79 miles away. East of Dallas the increase is smaller, from 238 nearby to 260 at 60-64 miles. In both cases there is a marked change in type of farming, Fort Worth and Dallas being located on the level black land which is more fertile than the rolling land to the east and west.

An analysis by correlation of townships around Spokane shows a zero order coefficient of .11 between the ratio of children to persons and distance to the southeast, and of .35 between fertility and distance to the west, the latter being significant. The use of partial correlation and inclusion of some of the other factors mentioned above raised the former coefficient somewhat, but not enough to make it significant.

Summing up, there is conflicting evidence in these data regarding the relation between distance from city and human fertility. Where distance is associated with changes in farming conditions, and probably with the economic status of the farm population, a direct relationship appears, but this is lacking in the more uniform areas of the northern states. This entire matter requires further study, and any conclusions drawn at the present time should be highly tentative.

### INTERCITY DIFFERENTIALS

Not only has there been a differential between the rates of reproduction of women in agricultural and industrial or rural and urban areas, but also a differential between cities of various sizes.<sup>22</sup> Just as rural life has been associated with higher human fertility than has urban life, so also have small cities been associated with higher fertility than have large cities. In the United States as a whole and in seven of the nine geographic divisions, the 1930 ratio of children to native white women rises rapidly and with slight interruption from a low value in the metropolitan centers to a medium value in places of 2,500 to 10,000, and to high values in the rural-nonfarm and rural-farm portions of the population (Table IV). In the two divisions where the upward trend is sharply broken, the explanation probably is the small number of cities in a group, and peculiarities of one or more of these cities. Thus, Salt Lake City is the only place between 100,000 and 250,000 in the Mountain States, and Baltimore is the only city over 500,000 in the South Atlantic States. The presence of Washington, D. C. in the 250,000 to 500,000 group of the latter division also disturbs the trend. The relation between size of city and human fertility is clearly shown for foreign-born whites and Negroes as well as native whites, though the trend is less regular. Native white ratios for cities of 10,000 to 25,000 are nearly one third higher than for cities of over 500,000 in the entire United States, and from one fifth to one half higher in the various divisions. Similarly, places of 2,500 to 10,000 have ratios which are above those of cities of 100,-

<sup>22</sup> Frank Lorimer and Frederick Osborn, *op. cit.*, Chap. II; Warren S. Thompson, *Ratio of Children to Women, 1920, op. cit.*

TABLE IV—CHILDREN 0-4 PER 1,000 WOMEN AGED 20-44 <sup>a</sup> FOR COMMUNITIES OF DIFFERENT SIZES BY DIVISIONS, 1930 <sup>b</sup>

| Nativity and Size of Community | United States | New England | Middle Atlantic | East North Central | West North Central | South Atlantic | East South Central | West South Central | Mountain | Pacific |
|--------------------------------|---------------|-------------|-----------------|--------------------|--------------------|----------------|--------------------|--------------------|----------|---------|
| <b>Native white:</b>           |               |             |                 |                    |                    |                |                    |                    |          |         |
| 500,000 and over . . . . .     | 325           | 328         | 327             | 348                | 319                | 384            | ...                | ...                | ...      | 230     |
| 250,000-500,000 . . . . .      | 335           | 348         | 334             | 372                | 313                | 296            | 381                | 354                | 321      | 275     |
| 100,000-250,000 . . . . .      | 373           | 352         | 357             | 418                | 378                | 360            | 418                | 353                | 478      | 319     |
| 25,000-100,000 . . . . .       | 390           | 386         | 375             | 413                | 381                | 422            | 416                | 386                | 375      | 305     |
| 10,000-25,000 . . . . .        | 430           | 419         | 429             | 462                | 409                | 463            | 456                | 419                | 412      | 358     |
| 2,500-10,000 . . . . .         | 462           | 445         | 450             | 476                | 440                | 505            | 490                | 458                | 507      | 391     |
| Rural-nonfarm . . . . .        | 609           | 532         | 587             | 600                | 529                | 707            | 724                | 618                | 640      | 480     |
| Rural-farm . . . . .           | 752           | 622         | 649             | 670                | 696                | 839            | 858                | 803                | 787      | 541     |
| <b>Foreign-born white:</b>     |               |             |                 |                    |                    |                |                    |                    |          |         |
| 500,000 and over . . . . .     | 460           | 550         | 452             | 489                | 456                | 547            | ...                | ...                | ...      | 313     |
| 250,000-500,000 . . . . .      | 491           | 611         | 558             | 520                | 469                | 422            | 495                | 426                | 423      | 348     |
| 100,000-250,000 . . . . .      | 574           | 577         | 601             | 619                | 550                | 511            | 403                | 526                | 570      | 405     |
| 25,000-100,000 . . . . .       | 550           | 576         | 576             | 529                | 501                | 538            | 475                | 571                | 486      | 385     |
| 10,000-25,000 . . . . .        | 630           | 634         | 688             | 597                | 555                | 598            | 546                | 561                | 528      | 398     |
| 2,500-10,000 . . . . .         | 631           | 647         | 683             | 581                | 593                | 619            | 603                | 649                | 646      | 462     |
| Rural-nonfarm . . . . .        | 690           | 649         | 761             | 677                | 665                | 755            | 596                | 654                | 716      | 505     |
| Rural-farm . . . . .           | 925           | 847         | 910             | 950                | 1,048              | 775            | 825                | 1,070              | 1,029    | 687     |
| <b>Negro:</b>                  |               |             |                 |                    |                    |                |                    |                    |          |         |
| 500,000 and over . . . . .     | 327           | 369         | 324             | 314                | 284                | 400            | ...                | ...                | ...      | 241     |
| 250,000-500,000 . . . . .      | 333           | 645         | 406             | 371                | 237                | 335            | 320                | 329                | 278      | 254     |
| 100,000-250,000 . . . . .      | 359           | 549         | 454             | 418                | 388                | 346            | 329                | 254                | 434      | 320     |
| 25,000-100,000 . . . . .       | 355           | 487         | 371             | 430                | 377                | 356            | 342                | 298                | 280      | 319     |
| 10,000-25,000 . . . . .        | 394           | 561         | 459             | 462                | 416                | 402            | 362                | 350                | 309      | 263     |
| 2,500-10,000 . . . . .         | 413           | 685         | 412             | 489                | 401                | 443            | 415                | 359                | 360      | 338     |
| Rural-nonfarm . . . . .        | 605           | 668         | 570             | 547                | 549                | 672            | 551                | 524                | 433      | 405     |
| Rural-farm . . . . .           | 885           | 637         | 768             | 794                | 751                | 981            | 845                | 817                | 711      | 776     |

<sup>a</sup> The number of white children enumerated is increased by 5 per cent and that of Negro children by 11 per cent in the North, 13.5 in the South, 8 in the West, and 13 in the United States to allow for under-enumeration, and the age distribution of the women is standardized to that of United States women in 1930.

<sup>b</sup> From material prepared by the Scripps Foundation for Research in Population Problems in coöperation with the National Resources Committee.

000 to 500,000 by one fifth in the East South Central division (the smallest differential), and by one half in the South Atlantic division (the largest differential).

### *Interdivisional variations*

That an important part of the interstate differentials in fertility mentioned earlier results from differences in distribution of the population between cities of various sizes is apparent from Table IV. The largest interdivisional spread in the native white ratios for any size group occurs in the largest cities, their ratio of 384 in the South Atlantic States being 1.67 times that of 230 in the Pacific States. Among cities of 10,000 to 25,000 the interdivisional variation is much less, the highest ratio—463 in the South Atlantic States—being only 1.29 times the lowest ratio—358 in the Pacific States. When the size groups are

combined within divisions the differences become much larger, the ratio of 681 in the East South Central States being 1.95 times that of 350 in the Pacific States (Table II).

The low fertility of the Pacific States as a whole, which was pointed out before, is emphasized when communities are grouped by size. The lowest native white ratios for each size group are found in that division, the lowest foreign-born ratios in seven of the eight groups, and the lowest Negro ratios in five of the eight groups (Table IV). Six of the high ratios for native whites are found in the south and two in the Mountain division, seven of the high foreign-born white ratios are found in the northeast, and the top ratios for Negroes are divided between the New England and South Atlantic divisions.<sup>23</sup>

<sup>23</sup> It is possible that the high New England values are more apparent than real, due to the

In most of the size groups the foreign-born white ratios are well above others, but the differences between native white and Negro ratios are small when based on a population of sufficient size. The chief exceptions to the latter generalization are (1) the rural-farm group in the South Atlantic States, where the Negro ratio is 17 per cent above that of native whites, and (2) cities and the rural-nonfarm group in the East and West South Central States, where the native white ratios

white-collar class—the lower the fertility. This is illustrated for cities of 100,000 and over by arraying them according to the proportion of occupied males engaged in the latter group of occupations and subdividing into quartiles (Table V). Although the ranking is done without regard to race and nativity so as to classify the city rather than the race or nativity group, it is found that native whites, foreign-born whites, and Negroes each show a marked rise in the standardized ratio

TABLE V—CHILDREN 0-4 PER 1,000<sup>a</sup> WOMEN AGED 20-44 <sup>a</sup> FOR CITIES OF 100,000 OR OVER GROUPED IN QUARTILES ACCORDING TO PER CENT OF OCCUPIED MALES 10 YEARS OF AGE AND OLDER ENGAGED IN TRADE, CLERICAL, PROFESSIONAL, AND PUBLIC SERVICE,<sup>1</sup> 1930

| Race and Nativity       | First Quartile <sup>b</sup> | Second Quartile | Third Quartile | Fourth Quartile | Fourth Quartile in Per Cent of First |
|-------------------------|-----------------------------|-----------------|----------------|-----------------|--------------------------------------|
| Native white.....       | 310                         | 333             | 362            | 395             | 127                                  |
| Foreign-born white..... | 424                         | 489             | 543            | 553             | 130                                  |
| Negro.....              | 305                         | 317             | 371            | 376             | 123                                  |

<sup>a</sup> The number of white children enumerated is increased by 5 per cent and that of Negro children by 11 per cent in the North, 13.5 per cent in the South, and 8 per cent in the West to allow for underenumeration, and the age distribution of the women is standardized to that of United States women in 1930.

<sup>b</sup> Having the highest percentage of occupied males in the selected occupations.

average over 20 per cent above the Negro ratios.

#### *Occupational variations*

Human fertility not only varies with the size of cities, but within a size class it varies with the importance of different occupations, as has been shown at different times.<sup>24</sup> On the whole, the more important the manufacturing occupations are in a city the higher its birth rate, while the more important the trade, clerical, professional, and public service occupations—which contain more of the so-called

of children to women as the importance of the white-collar occupations goes down. The native white and Negro ratios increase rather similarly, from 310 and 305 to 395 and 376 respectively, while the foreign-born white ratios increase more rapidly, from 424 to 553.

A similar relation between type of city and human fertility existed in 1920. For example, twenty cities of 25,000 or more which had the highest ratios of children under 5 to native white women 20-44 in 1920 included 16 heavy industrial centers, 2 southern textile or tobacco centers, and 2 Utah cities with a high proportion of Mormons. In contrast, the 26 cities with lowest ratios (under 300) were of a quite different type, including 19 com-

use of too large a factor in adjusting for underenumeration. Moreover, there are comparatively few Negroes in these states.

<sup>24</sup> Warren S. Thompson, *Ratio of Children to Women, 1920*, op. cit., pp. 48-56.



mercial or suburban localities and 7 light industrial localities (with textile or knitting mills, watch manufacturing, and so forth).<sup>25</sup>

#### DIFFERENTIALS IN CENSUS-TRACT CITIES

Through coöperation between the Bureau of the Census and local organizations in eight cities (Boston, Buffalo, Cincinnati, Chicago, Cleveland, Columbus, Indianapolis, and Pittsburgh), a number of items from the 1930 census of population were published by tracts for these cities. In consequence it has become possible to analyze in some detail the differences that occur in human fertility between various parts of a city.<sup>26</sup> Several economic or social factors which might be expected to have some relation to birth rates can be computed, namely: (a) average monthly rental, (b) the importance of various types of occupations, (c) the proportion of homes owned, (d) the proportion of families in one-family dwellings, and (e) the percentage of women 10 and over employed. These are not perfect measures of income or living conditions, but should be indicative, at least. In addition, the following factors can be computed: (f) the proportion of white women married, and (g) the proportions of white women 15-44 who were foreign born and (h) who were in the most fertile age periods (20-34), each of which is related to births per 1,000 white women 20-44. Fertility ( $x$ ) is measured by the number of children under 5 per 1,000 white women 15-44.

<sup>25</sup> Frank Lorimer and Frederick Osborn, *op. cit.*, pp. 65-66; Warren S. Thompson, *Ratio of Children to Women, 1920*, *op. cit.*

<sup>26</sup> The following analysis is based on work done during recent months by the Scripps Foundation for Research in Population Problems in coöperation with the Research Committee on Urbanism of the National Resources Committee.

#### *Average monthly rental*

Among the economic factors correlated with fertility, the most significant relationship was found in the case of average monthly rental, the value for  $r_{ax}$  varying from —.50 in Columbus to —.82 in Buffalo and Pittsburgh (Table VI). Apparently there is a strong tendency for larger families to be found in those tracts where rents are lower. In studying single families rather than tract groups, Ogburn found a marked association between rent and size of family in the households of 60,000 native white women of native parentage living in places of 5,000 or over in the East North Central States.<sup>27</sup> In towns of about 5,000 the average size of family (wife aged 40-44) was 5.22 where the rent was less than \$10, and families steadily became smaller as rent rose until they averaged only 3.42 in the rental group \$50-\$75. A similar downward trend was found in these rental groups in larger cities, but as rent rose over \$100 monthly there was a tendency for the number of persons per family to increase, especially in Chicago. Census tract data for Buffalo, Columbus, and Chicago also show a slight tendency for fertility to vary directly with rent in the high rent districts, but an inverse relation is clear in Boston and Indianapolis. The number of tracts involved is too small for definite conclusions to be drawn.

It seems safe to assume that the amount of rent paid is an extremely good indication of income or economic status, and hence that there is a highly significant inverse relation between income and fertility, except perhaps in the highest income groups. To some

<sup>27</sup> William F. Ogburn with the assistance of Clark Tibbitts, "The Family and Its Functions," in *Recent Social Trends*, V. 1 (New York: McGraw-Hill Book Co., 1933), pp. 661-708.

TABLE VI.—CORRELATION COEFFICIENTS BETWEEN CHILDREN 0-4 PER 1,000 WHITE WOMEN AGED 15-44 AND VARIOUS FACTORS, EIGHT CITIES BY CENSUS TRACTS, 1930<sup>a</sup>

|  | Boston<br>(96 tracts)                     | Buffalo<br>(65 tracts)           | Chicago<br>(64 areas)            | Cincinnati<br>(107 tracts)       | Cleveland<br>(201 tracts)        | Columbus<br>(45 tracts)          | Indianapolis<br>(83 tracts)      | Pittsburgh<br>(140 tracts)       |
|--|---|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|
| a. Average monthly rental.....   | $r_{as}$<br>-.70<br>-.55<br>-.72          | $r_{as}$<br>-.82<br>-.77<br>-.79 | $r_{as}$<br>-.65<br>-.69<br>-.58 | $r_{as}$<br>-.56<br>-.52<br>-.53 | $r_{as}$<br>-.60<br>-.57<br>-.34 | $r_{as}$<br>-.50<br>-.53<br>-.44 | $r_{as}$<br>-.63<br>-.57<br>-.63 | $r_{as}$<br>-.82<br>-.64<br>-.83 |
| b. Per cent of workers in manufacturing <sup>b</sup> .....                   | $r_{bs}$<br>.76<br>.60<br>-.64            | $r_{bs}$<br>.72<br>.52<br>-.73   | $r_{bs}$<br>.56<br>(.30)<br>-.76 | $r_{bs}$<br>.67<br>.66<br>-.72   | $r_{bs}$<br>.71<br>.66<br>-.81   | $r_{bs}$<br>.60<br>-.73<br>-.73  | $r_{bs}$<br>.65<br>-.59<br>-.84  | $r_{bs}$<br>.77<br>-.64<br>-.74  |
| c. Per cent of homes owned.....  | $r_{cs}$<br>(-.11) <sup>c</sup><br>(-.12) | $r_{cs}$<br>(-.10)<br>(-.21)     | $r_{cs}$<br>.69<br>-.79          | $r_{cs}$<br>(-.07)<br>(-.67)     | $r_{cs}$<br>(.12)<br>-.51        | $r_{cs}$<br>(.22)<br>-.70        | $r_{cs}$<br>(.14)<br>-.50        | $r_{cs}$<br>(.05)<br>-.31        |
| d. Per cent of families in one-family dwellings.....                         | $r_{ds}$<br>-.20 <sup>a</sup>             | $r_{ds}$<br>(-.16)               | $r_{ds}$<br>.54                  | $r_{ds}$<br>.... <sup>d</sup>    | $r_{ds}$<br>(.06)                | $r_{ds}$<br>.48                  | $r_{ds}$<br>.41                  | $r_{ds}$<br>(.12)                |
| e. Per cent of women 10 and over employed.....                               | $r_{es}$<br>-.74<br>-.83                  | $r_{es}$<br>-.82<br>-.82         | $r_{es}$<br>-.86<br>-.90         | $r_{es}$<br>-.40<br>-.54         | $r_{es}$<br>-.62<br>-.81         | $r_{es}$<br>-.67<br>-.86         | $r_{es}$<br>-.58<br>-.77         | $r_{es}$<br>-.77<br>-.86         |
| f. Per cent of white women 15 and over married,<br>widowed, or divorced..... | $r_{fs}$<br>.73                           | $r_{fs}$<br>.62                  | $r_{fs}$<br>.76                  | $r_{fs}$<br>.69                  | $r_{fs}$<br>.66                  | $r_{fs}$<br>.81                  | $r_{fs}$<br>.76                  | $r_{fs}$<br>.78                  |
| g. Per cent of white women 15-44 foreign-born.....                           | $r_{gs}$<br>.28                           | $r_{gs}$<br>.46                  | $r_{gs}$<br>.37                  | $r_{gs}$<br>-.36                 | $r_{gs}$<br>.59                  | $r_{gs}$<br>.36*                 | $r_{gs}$<br>(-.02)               | $r_{gs}$<br>.28                  |
| h. Per cent of white women 15-44 who are 20-34.....                          | $r_{hs}$<br>-.60                          | $r_{hs}$<br>-.29*                | $r_{hs}$<br>-.66                 | $r_{hs}$<br>(-.12)               | $r_{hs}$<br>-.30                 | $r_{hs}$<br>(.15)                | $r_{hs}$<br>.44                  | $r_{hs}$<br>-.43                 |
| Multiple correlation coefficients.....                                       | $R_{as}$<br>.83                           | $R_{as}$<br>.91                  | $R_{as}$<br>.91                  | $R_{as}$<br>.72                  | $R_{as}$<br>.79                  | $R_{as}$<br>.65                  | $R_{as}$<br>.79                  | $R_{as}$<br>.88                  |
|  | $R_{bs}$<br>.82                           | $R_{bs}$<br>.87                  | $R_{bs}$<br>.88                  | $R_{bs}$<br>.78                  | $R_{bs}$<br>.79                  | $R_{bs}$<br>.85                  | $R_{bs}$<br>.85                  | $R_{bs}$<br>.88                  |
|  | $R_{cs}$<br>.81                           | $R_{cs}$<br>.77                  | $R_{cs}$<br>.81                  | $R_{cs}$<br>.75                  | $R_{cs}$<br>.80                  | $R_{cs}$<br>.87                  | $R_{cs}$<br>.83                  | $R_{cs}$<br>.87                  |
|  | $R_{ds}$<br>.86                           | $R_{ds}$<br>.93                  | $R_{ds}$<br>.91                  | $R_{ds}$<br>.72                  | $R_{ds}$<br>.82                  | $R_{ds}$<br>.86                  | $R_{ds}$<br>.79                  | $R_{ds}$<br>.90                  |
|  | $R_{es}$<br>.86                           | $R_{es}$<br>.91                  | $R_{es}$<br>.91                  | $R_{es}$<br>.72                  | $R_{es}$<br>.80                  | $R_{es}$<br>.85                  | $R_{es}$<br>.85                  | $R_{es}$<br>.88                  |
|  | $R_{fs}$<br>.84                           | $R_{fs}$<br>.88                  | $R_{fs}$<br>.90                  | $R_{fs}$<br>.79                  | $R_{fs}$<br>.82                  | $R_{fs}$<br>.87                  | $R_{fs}$<br>.85                  | $R_{fs}$<br>.88                  |

<sup>a</sup> From material prepared by the Scripps Foundation for Research in Population Problems in cooperation with the National Resources Committee. Tracts having more than 15 per cent Negroes were omitted from the analysis in an attempt to deal with the white population.

<sup>b</sup> The proportion of occupied persons 10 years of age and over (excluding those engaged in domestic and personal service) who are engaged in manufacturing.

<sup>c</sup> Coefficients which are significant but not highly significant are designated by an asterisk; those which are not significant are in parentheses.

<sup>d</sup> The number of families in one-family dwellings was not published for Cincinnati.

extent, of course, the presence of additional persons to feed and clothe may force a family to economize on rent; in other words, there is a selective factor tending to draw larger families to low rent districts. But it seems doubtful that this could explain more than a small part of the relationship; in all probability, most of it is a real result of difference in economic status.

This relationship between fertility by tracts and economic status as indicated by rent paid substantiates results obtained earlier by Raymond Pearl.<sup>28</sup> Studying data obtained from 581 white and 145 Negro women through the Baltimore Bureau of Contraceptive Advice, he found an association between births per 10 years of married life and family income in dollars per week. For whites  $r$  equaled  $-.230 \pm .027$ , and for Negroes  $-.173 \pm .055$ .

### *Occupations*

Another economic factor highly related to human fertility in the census-tract cities is the proportion of occupied persons over 10 years of age (excluding those in domestic and personal service) engaged in manufacturing. The more important the manufacturing occupations are as a means of livelihood, the higher is the ratio of children to women,  $r_{bx}$  varying between .56 in Chicago and .77 in Pittsburgh (Table VI). But there is also a close inverse relation between this factor and average monthly rental,  $r_{ab}$  varying from  $-.64$  in Boston to  $-.84$  in Indianapolis. Low rents, a high proportion of workers in manufacturing, and high fertility all appear to go together. Persons belonging to the white-collar class probably compose a smaller proportion of the work-

ers in manufacturing than in the other main occupational groups—clerical, trade, and professional—though transportation may be an exception. Apparently average incomes are lower in manufacturing than in other pursuits, or else these workers are less interested in putting up a front, for on the whole they live in cheaper houses. That they should bear the expense of rearing more children could be explained by their having higher biological fertility, greater desire for children, less ambition for a higher standard of living, or less knowledge regarding contraceptive measures, of which the latter two seem more probable.

### *Home ownership and one-family homes*

Little relationship was found to exist between the proportion of homes owned and the ratio of children to women. In one city—Chicago—there was a significant direct correlation ( $r_{cx} = .69$ ), but in the other seven cities the coefficient not only was too small to be significant, but was negative in three cases.

In Columbus, Chicago, and Indianapolis there was some direct relation between fertility and the proportion of families in one-family dwellings ( $r_{dx} = .48, .54$ , and  $.41$  respectively), but none in the other cities, the small coefficients being negative in some cases and positive in others.

### *Employment of women*

As would be expected, the ratio of children to women varied more with the proportion of women married than with any of the economic factors mentioned above. Attempts to eliminate its effect by the method of partial correlation raised some of the coefficients referred to above and lowered others, but in no case was the change large enough to affect the validity of what has been said. The highest degree of

<sup>28</sup> Raymond Pearl, "Fertility and Economic Status," *Human Biology*, V. 4, No. 4 (Dec. 1932), pp. 525-553.

correlation occurred between the proportion of women married and the proportion employed,  $r_{ef}$  varying between  $-.54$  in Cincinnati and  $-.90$  in Chicago, and being above  $-.76$  in seven of the eight cities. This does not tell which is the cause and which the result—whether women go to work because they prefer it to marriage, or because wages are so low as to make it difficult for a man to support a wife and children on his income—but the effect on fertility would seem much the same.

In most of the eight census-tract cities the bulk of the variation in fertility of all white women between tracts can be accounted for by differences in average monthly rental together with differences in the proportion of women married or employed. Using multiple correlation analysis with rental, marriage, and fertility, the value of  $R_{af\pi}$  varies between  $.78$  in Cincinnati and  $.88$  in Chicago and Pittsburgh. Substituting per cent employed for per cent married results in minor changes, values for  $R_{aew}$  varying between  $.72$  in Cincinnati and  $.91$  in Buffalo and Chicago. These combinations give the highest correlations between fertility and two variables in six of the eight cities, the exceptions being Boston and Cleveland, where certain other combinations are higher by  $.01$  and  $.02$  respectively.

The addition of other variables does not increase the value of the multiple coefficient as a rule. The best results are obtained by adding either the proportion of women 15–44 who are 20–34 or who are foreign born, but even here the improvement is not large enough to be significant.

#### RELIGIOUS DIFFERENTIALS

Although there is little statistical evidence bearing on the comparative fertility of Protestants, Catholics, and

members of other religious groups, there seems to be a widespread idea that Catholics have larger families than Protestants, and Mormons the largest families of all. Whether these differentials are due to the holding of one set of religious views rather than another, or whether they result from other differences associated with membership in certain religious groups, are questions likely to be overlooked.

In 1924 Holmes<sup>29</sup> called attention to differentials in fertility of families of college students grouped by religion, Protestant families averaging 3.48 children, and Catholic 4.44. Families with one Protestant and one Catholic parent were the smallest of all, averaging about 3.1 children, but were not numerous. Holmes was careful to point out, however, that the religious groups were unlike in other matters which would be expected to have a bearing on their fertility. The proportion of foreign-born whites, for example, was significantly higher among Catholics than among Protestants.

A religious differential similar to the above was found by Thompson<sup>30</sup> in another study of college students' families. Here, too, other differences which might affect fertility were associated with religious affiliation. The occupational status of Catholic families in Thompson's study averaged a little lower than that of the Protestant families, for a higher proportion of the Catholic students came from the homes of skilled laborers, and among fathers in the white-collar groups the Catholics seemed to be in positions less well paid. Differences

<sup>29</sup> S. J. Holmes, "The Size of College Families," *Journal of Heredity*, V. 15, No. 10 (Oct. 1924), pp. 407–415.

<sup>30</sup> Warren S. Thompson, "Size of the Families from which College Students Come," *Journal of the American Statistical Association*, V. 20, n.s. No. 152 (Dec. 1925), pp. 481–495.

in nativity and parentage increased the complexity of the situation.

A more recent study by Stouffer<sup>31</sup> shows confinement rates to be higher in Catholic than in non-Catholic families in Wisconsin cities during 1919 to 1930. Both stillbirths and live births are included in computing confinement rates, and twin births are counted as one confinement. The use of birth rates instead of confinement rates would not affect the conclusions. More important, this differential is found when the religious groups are

and 3½ years of married life than the first, which indicates that they may be yet larger in families of completed fertility.

During the period covered by his study, Stouffer finds that the Catholic confinement rate has decreased relative to the Protestant rate in most of the sub-groups, usually because the latter has declined less rapidly than the former.<sup>32</sup> In one case where both Protestant and Catholic rates increased, the former rose more rapidly than the latter.

TABLE VII—AVERAGE CONFINEMENT RATES, BY RELIGION, OCCUPATION, RESIDENCE, AND INTERVAL AFTER MARRIAGE \*

| Area and Occupation                                     | Wife Under 21 at Marriage   |              |                              |              | Wife 21-25 at Marriage      |              |                              |              |
|---|-----------------------------|--------------|------------------------------|--------------|-----------------------------|--------------|------------------------------|--------------|
|   | First 3 ½ Years of Marriage |              | Second 3 ½ Years of Marriage |              | First 3 ½ Years of Marriage |              | Second 3 ½ Years of Marriage |              |
|   | Catholic                    | Non-Catholic | Catholic                     | Non-Catholic | Catholic                    | Non-Catholic | Catholic                     | Non-Catholic |
| Milwaukee and suburbs:                                  |                             |              |                              |              |                             |              |                              |              |
| Unskilled and semiskilled.....                          | 126.4                       | 118.1        | 74.8                         | 63.6         | 105.9                       | 84.4         | 67.6                         | 51.1         |
| Skilled.....  | 122.1                       | 109.5        | 75.9                         | 61.5         | 103.6                       | 83.6         | 61.8                         | 50.7         |
| White collar (Clerical, Professional, Proprietary)..... | 108.3                       | 92.5         | 64.2                         | 56.6         | 90.8                        | 72.5         | 66.3                         | 48.3         |
| Other cities:   |                             |              |                              |              |                             |              |                              |              |
| Unskilled and semiskilled.....                          | 131.2                       | 123.0        | 74.7                         | 70.4         | 108.7                       | 94.2         | 71.1                         | 58.0         |
| Skilled.....  | 120.3                       | 114.0        | 80.5                         | 66.6         | 104.2                       | 88.7         | 74.0                         | 55.0         |
| White collar (Clerical, Professional, Proprietary)..... | 115.1                       | 102.2        | 72.3                         | 58.9         | 98.0                        | 75.5         | 74.4                         | 52.4         |

\* From Samuel A. Stouffer, "Trends in the Fertility of Catholics and Non-Catholics," *American Journal of Sociology*, V. 41, No. 2 (Sept. 1935), p. 158.

subdivided into three occupational classes—unskilled and semiskilled, skilled, and white-collar (clerical, professional, proprietary)—as is shown in Table VII. On the whole, differentials are smaller in the unskilled and skilled classes than in the white-collar classes, perhaps in part because the latter probably is the least homogeneous. If it could be further subdivided, a smaller religious differential might be shown. On the other hand, differentials are larger during the sec-

A rough idea of the high birth rate of Mormons in comparison with that of other religious groups may be had from ratios of children to women for communities in Utah.<sup>33</sup> In most census years these ratios have been larger for communities of any size in Utah than in other states. After studying the facts Thompson has concluded

that Mormonism is the chief influence keeping the birth rate of Utah communities above that of the surrounding states cannot be questioned. And Utah is the best example in the United States of a community

<sup>31</sup> S. A. Stouffer, "Trends in the Fertility of Catholics and Non-Catholics," *American Journal of Sociology*, V. 41, No. 2 (Sept. 1935), pp. 143-166.

<sup>32</sup> S. A. Stouffer, *op. cit.*, Charts II and III.

<sup>33</sup> Warren S. Thompson, *Ratio of Children to Women, 1920, op. cit.*, pp. 135-136.

in which religion does exercise a decided influence on the birth rate.

### FUTURE NEEDS

Although much has been added during recent years to our knowledge regarding social, economic, and geographic differentials in the birth rate, there are still many things that are not known and about which basic data are needed. Some of these data no doubt will require special studies by various research organizations. Others should be provided by the Federal Government as it improves and extends its statistical activities in the course of time.<sup>34</sup> Plans have already been made by the officials in charge regarding some of these matters, and no doubt will be made for others as soon as there is a prospect of obtaining the necessary Federal appropriations or the coöperation of state officials and local registrars. The latter is particularly needed in solving certain minor problems, such as the classification of all Mexican births and deaths as Mexican, instead of the present practice which varies from classifying all as white in some areas to all as Mexican in others.

### *Complete registration and enumeration*

An immediate important need is information on the completeness of birth and death registration and of the enumeration of population. It is well known that an important proportion of births and deaths are not registered, that many young children are not counted by the census enumerators, and that the size of these omissions varies between racial groups and between different parts of the United

States. Estimates of these omissions have been made by a few demographers, but these are not in complete agreement, and the differences affect the conclusions drawn, for example, as to the relative fertility of whites and Negroes in the South. Securing complete registration and enumeration is a gigantic task which will take years to carry out, but in the meantime sample studies could be made that would indicate the reliability of the official figures.

### *Residence, age, and parentage of mother*

Another gap in our knowledge of fertility rates—soon to be remedied by the Division of Vital Statistics—occurs because of the registering of births by place of occurrence rather than by place of residence of mother. The past practice does not affect state differentials significantly but does have an important effect on differentials between cities and rural areas, since a high proportion of births occur in hospitals, most of which are located in cities. By the time the next census provides the number of urban and rural women on which to compute rates, births will be available by place of residence, and it will no longer be necessary to make comparisons of rural-urban fertility through ratios of children to women rather than through birth rates.

Associated with the foregoing is the lack of data regarding births by age of mother for cities and counties. When births are classified by residence of mother it will be important to have them further classified by age of mother, so that age specific birth rates can be computed. Fertility differentials between smaller areas can then be measured much more accurately than at present, when it is necessary to rely on ratios of children to women

<sup>34</sup> See Warren S. Thompson, "Consumer Demand for Vital Statistics," *American Journal of Public Health*, V. 26, No. 5 (May 1936), pp. 499-501.



standardized for age differences by the indirect method. It may be that a tabulation of births by age of mother for these areas will not be worth making except for three years centering on a census, because of the shifts in population through migration. But at least it should be available for use in connection with each census.

At the present time official demographic data are not adequate for more than rough guesses as to the comparative fertility of native white women of native parentage and those of foreign parentage. As better coöperation is gradually obtained from physicians and local registrars, it may be feasible eventually to provide space on the birth certificate for entering the birthplace of the baby's grandparents, which would make it possible to tabulate and publish births by parentage at comparatively moderate additional expense. Studies of parentage differentials in fertility could then be made.

#### *Occupation of father*

Similarly, it may become practicable in the course of time to obtain information on the birth certificate regarding occupation of father, which would be comparable with information in the census schedule regarding occupation of husband of each married woman and would permit the computation of birth rates by occupation. In the past the Division of Vital Statistics has tabulated births by order of birth, by age of mother, and by occupation of father, which throws some light on occupational differentials. However, the differentials thus shown must be much smaller than the true differentials, for a smaller proportion of wives aged 40-44 would be bearing children in the less fertile occupational groups than in the more fertile groups. Other information re-

garding occupational differentials has been obtained from special studies based on interviews with relatively small groups, tabulation of unpublished data in the 1910 census regarding number of children ever born,<sup>35</sup> and correlation analysis such as presented in an earlier section of this paper. Nevertheless, a great advance would be made if birth rates by age of mother and occupation of father could be computed from data in Vital Statistics and Census Reports.

#### *Religious data*

As indicated in the discussion of religious differentials, our knowledge regarding their extent and trends is limited to a few sample studies. These constitute only a beginning, so it is to be hoped that many more studies of a similar nature can be carried on in the near future among religious groups in other parts of the Nation.

#### *Biological and human factors*

While the expansion of official demographic statistics will be of great help in answering certain questions regarding fertility, there are many basic problems on which they cannot be expected to throw much light. To what extent are differences in birth rates due to: (a) causes not under human control, e.g., biological; (b) human action not directed toward birth limitation, e.g., faulty diet; and (c) the practice of abortion or contraception? What are the biological causes, how are they operating, and what is likely to be their effect on differentials in the future? What are the human actions which have unconsciously brought about differentials, and how may they be modified? Why have people been practicing abortion

<sup>35</sup> See article by F. W. Notestein in this volume.

or contraception, what methods have they been using, and what has determined the variations in the extent to which different groups have endeavored to limit their families?

Various individuals and organizations have been studying these problems and already have obtained information of great help in answering

such questions as those just raised. As more is done in these lines other extremely important problems will be nearer solution, namely, ought society to do anything intended to influence birth rate differentials, and if so, what rates should be set up as most desirable for various groups and what action should be taken to secure them?

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