THE PARENTAL FAMILIES OF AMERICANS IN BIRTH COHORTS 1890 - 1955: A CATEGORICAL,LINEAR EQUATION MODEL ESTIMATED FROM THE NORC GENERAL SOCIAL SURVEY*

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ABSTRACT. A linear, categorical statistical model with five variables, Father's Education, Father's occupation, Size of Place at Age 16, Mother's Emploment, and Total Siblings, is estimated with data from the 1972- 1978 NORC General Surveys to describe major substantive conclusions are: (1) The educational level of American parents increased at an accelerating rate from 1890 to 1955, (2) The proportion growing up in farm homes declined steadily. Farm fathers were less well educated but the educational difference grew steadily smaller, (3) The proportion of Americans growing up in cities of 50,000 or larger increased steadily, the trend being similar in both educational levels, (4) Metropolitan families increased at an accelerating rate, the acceleration being due to the acceleration in education attainment, (5) Farm families decreased at an approximately constant rate because two opposite trends - acceleration in Education and declining association between Education and Farm cancelled each other out, (6) Town families - non farm families living in cities under 50000 increased throughout the period, but faster before 1930 than afterwards, (7) Metropolitan families had consistently more children and more employment of mothers than Town families; farm families were slower in experiencing the trend toward working wives; farm families were about the same as town families in decreasing rates of fertility, so the urban/farm gap in fertility remained constant, (8) at the turn of the century higher status mothers were more likely to have small families and less likely to work. After 1910 the pattern changed, as better educated families opted for the pattern of working mothers and fewer children. By the birth cohort of 1955 the education difference in fertility had grown considerably while the education difference in maternal employment had reversed.

A. INTRODUCTION

What are the major social trends in the United States in the twentieth century? The list would probably include:

1. Increasing levels of education,
2. A changing occupational structure, in particular, the decline in farming.
3. Increasing urbanization.
4. More female labor force participation.
5. A long term decline in fertility.
6. The peak and end of massive Catholic and Jewish immigrations.
7. Transformation of the Black population from a rural Southern peasantry to a highly urbanized working class.
8. An upward trend in real incomes.
9. Increasing proportions of marriages ending in divorce.

Because these changes typically appear in separate graphs in separate chapters of reports and textbooks, one tends to view them as operating 'in parallel' somewhat like a nine-lane highway running from the era of William McKinley to that of Jimmy Carter. But this is a gross oversimplification since the variables form a system. If people left the farms, no wonder cities grew; It increased levels of education (e.g., in typing) may have prompted women to work for pay; urbanization may have inhibited large families, etc.

A precise understanding of these trends would require a multivariate model in which successive birth cohorts are born in various regions and communities, complete differing levels of schooling, enter diverse 'careers' in a variety of places, receive different economic rewards, produce different numbers of offspring, and experience a range of risks of marital dissolution - with each parameter worked out separately for Blacks and for whites of various national origins and 'generations'.

Such a model may be beyond our powers at this time. At the least, there are formidable obstacles - the paucity of good data on religion before the survey era, the absence of decennial Census data on educational attainment prior ot 1940, difficulties and sometimes impossibilities in obtaining Census tabulations other than those in published reports, the necessity for large case totals when dealing with minorities, changing levels of inflation and donation, etc. etc. Data problems aside, ambiguities of causal order would make the enterprise highly challenging.

Nevertheless, a stab at a crude version of such a model may be useful, if only to illuminate the pitfalls. Hence, the purpose of this essay: to estimate a simple, categorical, multi-variate model for the first five variables on the list-education, occupation, urbanization, female labor force participation, and fertility - for the period since 1890. Elaboration of the model to more detailed categories, disaggregation for racial and ethnic subgroups, the addition of income and marriage termination - all these remain as further tasks.

B. SPECIFYING THE SYSTEM

Even so modest an enterprise requires a trick-specifying the cases as individuals in various birth cohorts and the variables as characteristics of their parents.

An example: the model will say that for Americans born in 1934, 0.192 had farmer fathers (more exactly, farmer fathers when the subjects were around age 16, that is in 1950). That number has a definite meaning: about a fifth of the children in that cohort grew up in a farm home or a bit more casesonservatively, were exposed to farm life in their teens.

But the figure does not say some other things:

It does not say a cross-sectional survey in 1950 would have found a fifth of the males to be farmers. (1) Since farmers have more children than non- farmers, they constitute a larger fraction of fathers-of-representative-individuals than of representative-individuals. This bias is well known from studies of intergenerational mobility where we are frequently reminded that the row frequencies are not estimates of any simple population. (2) Fathers of persons age 16 are not representative in age. As a rule-of-thumb, they are about 30 years older than their children (Blau

and Duncan, p.465). Fathers of in 1934 would be roughly 46 years of age in 1950 when their children were age 16. (3) Not all male workers are fathers. Some are single, some are married and childless. I doubt, however, this has much impact on occupational distributions - though our sample of fathers will not be a good estimate of the number of Catholic priests. (4) About 5 percent of the cases studied were living abroad at age 16 and their fathers would not appear in U.S. occupational data. (By the way, among male workers 45-54 in the 1950 Census, 14.4 percent were farmers or farm workers)

While parental data are problematic estimators of some logical class of older people they have considerable face validity as estimates of the sort of homes in which Americans grow up. Being a farmer and growing up on a farm are different things, but the latter can be of considerable importance. Mare (1979) discusses how changes in a number of parental background variables appear to affect national educational levels. In a subsequent essay, I shall examine the association between the variables in my model and a variety of behaviors and attitudes. Suffice it to say, there is evidence that each variable in the model is an influence on some outside variable.

On the technical side this specification has two advantages. First, by using recalled parental characteristics we can reach further back in time than by using respondent data. Since our data have a reasonable number of cases from birth cohorts back to 1890 we can infer some things about the U.S. society around the time of the Civil War from sdata collected in the 1970s. Second, by using some variabels for father (Education and Occupation) and others for mother (Labor Force Participation and Fertility) we can simplify the model considerably. Thus, we can aviod grabbling with Father's Education by Mother's Education by Father's Occupation by Mother's Occupation by etc. etc. if we are willing to stick with father's Education (see below for more discussion), father's occupation (since so many mothers didn't work), mother's Labor Force participation (since father's is not very problematical), mother's fertility (the standard approach) and the respondent's size of place as a child (since most children live with thier parents).

The specific variables are:

- Father's Education.
- Father's Occupation.
- Respondent's size of place at age 16.
- Mother's completed fertility.
- Mother's labor force participation after marriage.

Men generally marry after completing their schooling (Hogan, 1978). Thus it seems safe to put Father's education prior to wife's characteristics and events during his children's adoloscenses. The maternal variables are placed after Father's occupation and size of place although the decision is a bit arbitrary. There certainly must be cases where the wife's employment opporunities determine the husband's occupation and the family's location (e.g., the Queen of England) and one might argue that large families find farming and small town life especially attractive. Nevertheless, during the years considered here, I feel comfortable assuming the overwhelming flow of influence is from Father's occupation and family's location toward maternal work and fertility. Father's occupation and size of place are placed in a mutual influence loop. Obviously the two are related, but whether city dwellers find farm jobs scarce near home or rammers find it inconvenient to live

in cities is beyond me, so I assume both effects may operate. Similarly, it is unclear to me (and also, I gather, to demographers. See Cramer, 1980) whether working women tend to bear smaller families or whether larger broods inhibit labor force participation. I shall treat this pair as unordered also.

Data to estimate the model's parameters come from the NORC General Social Surveys (GSS) of 1972-3-4-5-6-78 (Davis *et al*., 1978). GSS is an annual personal interview sample survey (modified probability in 1972, 1973 and 1974, full probability in 1977 and 1978, half and half in 1975 and 1976) of Continental US. English speaking persons 18 years of age and older living in households. Since most GSS items are repeated verbatim each year, the surveys can be pooled to provide greater reliability. The six surveys used in most analysis here (mother's employment was not asked in 1972) included 9039 cases, of whom 6935 (0.767) had answers on all items (more on this since respondents who were not living with their own mothers at age 16 later). Questions used were:

Year of birth:	'In what year were you born?' (1973-75). 'What is your date of birth?' (1976-78).
Father's education:	'What is the highest grade in elementary school or high school that your father (or father substitute if not living with own father at age 16 finished and got credit for... . Did he ever get a high school diploma or a GED certificate?'
Father's occupation:	'What kind of work did your father (or father substitute) normally do while you were growing up? that is, what was his job called?' (Interviewers were further instructed - 'If more than one kind of work while respondent was growing up,a sk for work around the time R was 16 years old. If more than one job at that time, probe for the *main* job, i.e., the job at which person spent more hours.')
Size of place:	'Which of the categories on this card comes closest to the type of place you were living in when you were 16 years old... . In open counrty but not on a farm, on a farm, in a small city or town under 50000, in a medium size city 50000 to 250000, in a subarb near a large city, in a largeg city over 250000?'
Mother's labor force status:	'Did your mother ever work for pay for as long as a year, after she was married? Yes or No?'
Fertility:	'How many brothers and sisters did you have? Please count those born alive, but no longer living, as well as those alive now. Also include stepbrothers and stepsisters and children adopted by your parents

The questions are standard and straightforward. Strictly speaking the fertitily item goes beyond babies born to the respondent's own mother, but since respondents who were not living with their own mothers at age 16 were filtered out on the mother's labor force status, the error added here is probably small.

Having specified the system and the measures of its variables, I will describe the estimates, beginning with Father's Education.

1. Father's Education

The trend for father's education is definitely up - the later the date of birth, the more likely one is to have grown up in a home where father is a high school graduate. Finding the best number to describe the trend, however, is complicated by two problems: 'don't knows' end nonlinearity.

Inspection of the raw data suggested the best dichotomy to be 0-11 years of schooling versus 12 or more; a lower cut would give too few 'lows' in later years, a higher cut would make 'highs' scarce in early cohorts. Respondent who said 'yes' or 'no' to 'Did he ever get a high school diploma or a GED certificate?' were scored high or low. Among those answering 'don't knows on diploma, those indicating 12 or more on fathers highest grade also scored 'high' and those indicating 0-11 were scored 'low'. (These assigned cases comprimise about 2 percent of the total scores.) In addition about 9 percent of the cases were 'Don't KNow' on both measures and 12 percent were 'inapplicable' (see Appendix for details). Table I summarizes: 0.266 of the total, 0.303 of those with a father and 0.338 of those with an answer on paternal education scored high. Depending on one's definition, between a quarter and a third of the adult population grew up in homes where the fahter was a high school graduate. And it is fairly safe to generalize these figures to mothers. Table II shows the association for parental educations (years completed).

TABLE I
Father's education (GSS 1972-1980)

Category	N	Proportions		
High school graduate	2837	0.266	0.303	0.338
Less than high school graduate	5545	0.521	0.593	0.662
Don't Know	967	0.091	0.103	--
No father or father substitute	1303	0.122	--	--
Total	10652	1.000	0.999	1.000

TABLE II
Mother's and father's schooling--Years completed (Proportion reporting mother completed 12 or more years of school)

Father's Education

Date of Birth	0-11		12+		Difference
1940-1960	0.347		0.806		+.0459
		(876)		(891)	
1920-1939	0.208		0.722		+0.514
		(1,273)		(507)	
Before 1920	0.084		0.0706		+0.622
		(798)		(201)	

Depending on the birth cohort, between 71 and 81 percent of the high school fathers married high school wives. and between 65 and 92 percent of 0-11 fathers married 0-11 wives. While the association appeares to be declining (Rockwell, 1976), in the period studied most Americans grew yp in homes where both or neither parents were high school graduates. Homogamy probably accentuates any effects of paternal education, in that the numbers used for father's education really tap trends in the educational levels of both parents.

Figure 2 shows the basic data for analyzing change in father's education It plots birth cohort by four paternal categories: high school graduate or more, less than high school graduate, inapplicable (not living with a male head at age 16), and Don't Know for 10451 cases from the 1972-1978 GSS.

The proportion High School or more rises steadily from 0.093 for the 198 persons born around 1890 (1888-1892) to 0.476 for the 818 persons born around 1955 (1953 - 1957).

The proportion Less than High School fluctuates from 0.521 to 0.641 for birth cohorts up to 1920 then drops, and reaches a low of 0.340 for those born around 1955.

The proportion inapplicable is essentially constant (see Appendix A)

The proportion 'Don't Know' declines steadily from more than 0.200 in the 1890 and 1895 groups to about 0.030 in the youngest birth cohorts

The higher proportion 'Don't Know' in the older cohorts makes sense (ex post facto) as a 'forgetting curve' applying the common sense hypothesis that the older the cohort, the less likely one's father is still around to discuss his career. If such forgetting is uncorrelated with true paternal education, no bias would ensue. Unfortunately, the data contain strong indirect evidence against this comfortable assumption.

If 'D. K. Dads' are selected from particular levels of education, then their sons and daughters should be nonrandom on variables correlated with father's education. Respondent's own education is an excellent test since father's and children's educations show product moment correlations of about 0.40 (Jenks, Appendix Tables A2.2 through A.2.12). Table B.l (see Appendix B) gives the proportion of respondents with 12 or more years of schooling and 13 or more years of schooling

for fathers reported as 0-11 years, 12 years, 13 or more, Inapplicable, and Don't Know, for 10461 respondents in the 1972-78 pooled GSS. The results after 'median of three' smoothing (Hartwig and Dearing, 1979) appear in Figures 3A and 3B. The figures suggest:

1. An almost unanimous upward trend. Children's schooling has increased over time for all categories of paternal education save 13+ for 'D. K. Dads'.
2. A persistent gap between the paternal levels. As late as the birth cohort of 1950, children of 0-11 year fathers had poorer educational prospects than children from high school graduate homes at the turn of the century
3. 'D. K. Dads' children have especially low levels of education. In every single comparison they do worse than the 0-11 dads, the 12's and 13+s. In the clear majority of points, they do worse than 'orphans' - those not living with a male household head at age 16.
4. 'Inapplicables', the 'orphans' with no male head of household when the were 16, do worse than the children from 12 and 13+ households, but not conspicuously worse than the 0-l1's.

In sum, the children of 'D.K. Dads' are not only unrepresentative on educational attainment, the category 'D.K.' appears to operate as if it were a paternal level of education below the 0 - 11 group.

The result could be produced by many causes. Social desirability effects may inhibit reporting low values to interviewers, attainments at the bottom levels (e.g., a few years in a one-room school) may be more ambiguous, poorly educated fathers may not find schooling to be a comfortable topic of conservation, poorly educated fathers may have strained emotional relations with their children, etc., etc. The point is that 'D. K. Dad' behaves as if it were 'very low' in education. Thus, we would bias the data by following the traditional convention of 'excluding the dk.'s' Instead, I will treat fathers less educated if they score 0-I I on the combined education questions *or* if they are 'don't know'. Figure 4 shows the results under both definitions.

Treating D. K. Dads as 0-11 years lowers the estimates by one or two points in later birth cohorts and three or four points in the earlier groups.

Obviously the theme is impressive increase. Among Americans born at the turn of the century only 10 to 15 percent grew up in highly educated families; among baby boom Americans born in 1955, slightly more than half did.

How shall we describe the trend? Figure 5 tries a weighted least squares line (Taylor, 1980; Davis, 1978b) where each cohort is weighted inversely to its estimated sampling variance for the proportion highly educated fathers.

The equation A= 0.086 + 0.0075*(Year-1900) gives a decent fit, e.g., an r^2 of 0.830. But the Chi Square tests in Table B.2 show significant departures from fit and 10 of the 14 data points are significantly different from their predicated values. A glance at Figure 5 shows why. Since the residuals are above the line at the extremes and below the line in the middle, the relationship is curvilinear and could probably be described by fitting a parabola approximating the hand drawn curve in Figure 5. Figure 6, however, gives a simpler solution.

If we fit two straight lines, one for birth cohorts from 1890 through 1929 and one for birth cohorts

from 1930 to 1955, fit improves considerably (eta^2 is 0.978 compared with the r2 of 0.830 in Figure 5). Table B.2 shows both lines are significantly better than a constant and neither has significant residual fluctuation.

In other words:

> For Americans born 1890 to 1930, paternal educational levels increased steadily at the rate of 0.0026 per year (2.6 percentage points per decade).
> For Americans born 1930 to 1955, paternal educational levels increased steadily at the rate of O.0151 peryear(l5.1 percentage points per decade).

Later I will compare these rates with those of other variables in the model (that is one of the main benefits of modeling) but for now merely note that the post 1930 equation is extraordinary. We sometimes think of the period from 1930 to 1950 as one of the retarded social progress because of The Great Depression and World War II, but for educational levels these were years of almost visible acceleration. Among children born in 1930 about 21 percent (fitted estimate grew up in high school level homes; among those born in 1955 - just 25 years later - the fitted estimate is 59 percent.

2. Checking the Educational Results

Since respondent's reports on long-gone phenomena tinged with social desirability are midly suspect, it is a good idea to check the results against other data. There is no officially correct data set on paternal education, but we will try several checks using convenient criterion data.

First, we can compare GSS paternal data with GSS respondent data. Stickling with the rule of thumb that fathers average thirty years older than their sons, we expect good agreement between the education level of our 'father data' and that of GSS men 30 years older than the respondent. Any systematic discrepancy would suggest inflation (or deflation) in estimates of paternal education. Before making the comparison, however, the paternal data must be corrected for fertility. As explained above, the sample of 'fathers' overweights highly fertile men since their children have a greater chance of being drawn by NORC, Since fertility and education are associated, I expected and observed that paternal educational levels are biased downwards. Appendix Table B.3 gives the mean number of children (actually the respondent's report of his/her total siblings +1) for fathers High and Low in education by respondent's birth cohort. Figure 7 gives the results, using median of three smoothing.

Both lines show the inverted-u shape one would expect from the long-term secular decline in fertility through the Great Depression and the upward blip of the 'baby boom' (GSS repsondents are too young to show the subsequent 'birth death'). The substantial and constant gap between the curves is the famous secioeconomic difference in fertility. More on this later; for now, the point is the gap is large enough to merit adjustment in the data, as shown in Figure 8.

The two curves in Figure 8 show a persistent gap with a median of about six percentage points. Thus, if we treat fathers as estimates of the educational attainments of adult men, we will underestimate the educational level in all cohorts. Since the modal does not seek such an estimate,

as explained above, the bias is no danger, but for comparisons with other data sets, the fertility weighted results are preferable, although they may over-correct a bit since some siblings are dead and some may not be in the NORC sampling frame. Figure 9 (Appendix Table B.4) compares the fertility weighted paternal with four other estimates:

a. Educational attainment of male respondents in the 1972-1978 CSS, with 30 added to their years of birth.
b. Current Population Survey results for men 25-34, 1947 to 1977.
c. Decennial Census results for men 25 - 34,1940 to 1970.
d. Ferris's (1969) time series on high school degrees per year divided by number of 17 year old men and women.

I see the following patterns in Figure 9:

a. The two CSS estimates are very close in the 1920 - 1955 period where they overlap. Assuming the 30 year lag to be correct, this implies no systematic bias in estimates of paternal education versus self-reports on one's own education.
b. All three 'survey' reports (CSS, CPS, and Census) are much higher than the Ferris long-run series based on degrees and total 17 year olds - but the curves are parallel. The Ferris data show the same acceleration that led us to estimate two segments.
c. The CPS figures are a bit higher than the census figures, lower than the GSS results among older men, and similar among younger men.
d. Census figures are the lowest of the 'survey results' but higher than the Ferris series.
e. The check data suggest the 1930-and-after trend continued beyond our series.

In sum, the shape of the trend estimated for our model agrees closely with the other four data sets, reporting for an older person does not appear to introduce systematic bias, and the level (intercept value) is consistent with CPS figures, albeit higher than those from decennial censuses. My eyeball recommendation would be to subtract eight points from the intercept when using the model to estimate Census educational levels.

Since the checks tend to corroborate the estimates, we can now give the first equation in the model: Proportion growing up in high school level homes

= 0.127+0.0026*(Year-1900)(if born before 1930) (Eq. 1a)
= -0.240 + 0.0151 *(Year- 1900) (if born 1930 and after) (Eq.1b)

In English:

Conclusion I

The educational level of American parents increased at an accerlerating rate from 1890 to 1955. Up to 1930 the proportion of high school homes increased at the reate of about 0.2 percent per year (2.6 percent per decade), from 1930 to 1955 the rate was about 1.51 percent per year (15.1 percent per decade).

Supplementary data suggest the 1.51 percent rate continued at least until the early 1970s.

3. Farmer Fathers and Metropolitican Milieus

In 1820 about 85 percent of the U.S. work force was employed in agriculture (Historical Statistics, 1976, p. 138). In 1978, the figure was about 3 percent (Statistical Abstract, 1978, p. 418). The overwhelming trend in American occupations is not the proletarianization of journeymen but the shift from rural to urban. (Since American sociology is shaped by European theorist, European theorists focused on trends in Britain, and Britain had already dropped to 23 percent in agriculture by 1841 (Farrag, 1964, p. l 11), most of the current Marxist-non Marxist debate about changing occupational structures has little relevance for the U.S. For a useful summary of the data since 1900, see Singlemann, 1978.)

Figure 10 shows the decline in farm fathers, by Father's Educational level, for birth cohorts from 1890 to 1955.

The top line - for less educated fathers - drops from 52 percent for 1890 to 11 percent for 1955. Line 7 in Table B.2 says we can fit the data well with the linear equation P= 0.461 - 0.0064*(Year-1900). Thus, among less educated families the proportion farm has declined in a straight line fashion since 1890 at a rate of 0.6 percent per year or 6.4 percent per decade.

The bottom line in Figure 10 shows a similar decline among the better educated, although the very small *N*'s produce wide scatter around the line in the earlier years, a classic example of heteroscedasticity in regression. But the two lines are not parallel. Row 8 of Table B.2. says there is a statisticaly significant trend in the *difference* between the two educational groups which can be described by the equation Diff = - 0.224 + 0.0025 (Year - 1900). Heteroscedasticity makes the r^2 low, but the chi square tests clearly a support the linear change model.

Which gives two more equations for the model:

```
Proportion Farm Father Among
                              = 0.461 - 0.0064* Year-1900 (Eq. 2a)
Father's education = 0-11
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Difference in Proportion Farm
                              = 0.224 + 0.0025* Year-1900 (Eq. 2b)
  Father, Father's Education
  = 12v.0-ll

From which:
Proportion Farm Fathers among
                              = 0.237 - 0.0025*(Year - 1900) (Eq.
2c)
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In English:

> *Conclusion II*
>
> The proportion of Americans growing up in farm homes declined steadily in both educational levels. However, the proportion among the less educated started higher and declined faster, so the educational difference in occupation (the greater the education the less likely the farmer) declined from -0.249 for the 1890 birth cohort to -0.086 for the birth cohort of 1955. In other words, during this period the less educated men began to catch up with the better educated in agricultural disinclination.

Turning to size of place, I divided the answers to '...type of place you were living in when you were 16 years old' into *Metro* (city 50000 to 250000, suburb near a large city, large city over 250000) versus *Other* (open country, on a farm, in a small city or town under 50000). For the 1972 - 1978 cumulative GSS, 36 percent are coded Metro, 64 percent Other. Inevitably, Father's Occupation and Size of Place overlap. In the cumlative GSS, of 2132 respondents with farmer fathers, just 61 (2.9 percent) were scored Metro. Therefore, I collapsed Father's Occupation and Size of Place into a single, trichotomous, typological variable '*Milieu*'. The three categories are: (a) Farmer father ('FARM'), (b) Nonfarm father, Other ('TOWN') and (c) nonfarm father, Metro ('METRO'). For the 1972 - 1978 GSS we get 23.2 percent Farm, 42.6 percent Town and 34.1 percent Metro.

Since the category 'Metro' is logically close to the definition of SMSA, we can compare our 34.1 percent Metro with the 68 percent now living in SMSAs for the 1972 - 1980 GSS. While two-thirds of American adults are living in a Metro, only one-third grew up in one.

Figure 11 shows the trend toward metropolitan residence in both educational levels. Rows nine and ten in Table B.2 provide statistical justification for claiming (1) a linear increase in Metropolitan residence among less educated families and (2) a stable difference of 0.180 (+ 0.037) between educational levels.

In English:

Conclusion III

The proportion of Americans growing up in cities of 50000 or larger . increased steadily from 1890 to 1955 at a rate of about 0.2 percent per year or 2.4 percent per decade. The trend was essentially the same in both educational levels so the educational advantage of Metropolitan families was just as large in 1955 as in 1890.

In equations:

Proportion Parental Family
Metropolitan among = 0.206 + 0.0024*(Year-1900) (Eq. 3a)
Father's Education = 0 - 11

Difference in Proportion
Metropolitan, Father's = + 0.180 (Eq.3b)
Education = 12 v.0 - 11

Equations (la, lb, 2a, 2b, 3a), and (3b) generate a linear flow graph (Davis, 1975, 1978b) which summarizes the model so far. Figure 12 gives the graph.

The flow graph organizes the main results in pictographic form: Father's education increased at different rates in different periods, less educated families (who provide the intercept values since in a 0-11 system they have scores of zero) have shown a trend away from farms and a trend about as _ third as large toward large cities; better educated families show a parallel metropolitan trend and are uniformly more metropolitan; better educated - families show a declining deficit in farm.

A flow graph may be viewed as a network of premises as well as a tapestry of empirical estimates. Assuming the numbers to be correct, one may use the well-known principles of flow graph manipulation to work out various deriva-~ lions. I will begin with the overall change in the milieu categories, FARM, TOWN, and METRO. The flow graph tells us about the trends within educa-O tional levels, but we have to work out the overall levels, using two simple principles: (a) the value of an arrow equals its coefficient times the value at its tail and (b) the value of a point (node, category) is the sum of its incoming arrow values. Applying both principles:
METRO (prior to 1939)

= (1)*(0.206+0.0024*Yr-1900)+(0.180*0.127+0.0026*Yr-1900)
= 0.229 + 0.0029*(Yr-1900) (Eq. 3c)

METRO (1930 and after)

= (1)*(0.206 +0.0024*Yr- 1900)+(0.180*-0.24*0.0151*Yr- 1900)
= 0.163 + 0.0051 *(Yr-1900) (Eq.3d)

Conclusion IV

Metropolitan families increased at the rate of 0.29 percent per year (2.9 percent per decade) between 1890 and 1929, and at the higher rate of 0.51 percent per year (5.1 percent per decade) from 1930 on. The acceleration in parental education sometime around 1930 stepped up the trend toward Metropolitanization because better educated families are more likely to live in big cities.

Figure 13 shows the trend pictorially.

Turning to FARM:
FARM (prior to 1930)

= (1)*(0.461 - 0.0064*Yr - 1900) + (-0.224 + 0.0025*Yr - 1900)*
(0.127 + 0.0026*Yr - 1900)
+0.433 - 0.0067*(Yr-1900)+0.0000065*(Yr-1900)^2 (Eq. 2d)

FARM (1930 and after)

= (1)*(0.461 - 0.0064*Yr - 1900) + (-0.224 + 0.0025*Yr - 1900)*
(-0.24 + 0.0151*Yr-1900)
=0.515 - 0.0104*(Yr-1900)+ 0.0000378*(Yr - 1900)^2 (Eq.2e).

The equations for FARM families are more complicated and yet, paradox). cally, the result is similar. Observe Equations (2d) and (2e), each having three remms (a) constants or estimates of the proportion farm families in 1900, only the result in (2d), 0.433, to be taken seriously, (b) slope coefficients, -0.0067 prior to 1930 and -0.0104 from 1930 on (working alone they would produce an acceleration in the anti-farming trend from 0.67 percent per year before 1930 to 1.04 percent per year from 1930 on), and (c) two small coefficients to tee applied to the square of the (Year-1900) value (e.g., 1950-1900 = 50). It may be instructive to see exactly where these numbers came from. First, the actual algebra, dropping the -1900 from Year to avoid clutter:

```
FARM  = (0.461 -0.0064*Yr)  + [(-0.224+0.0025*Yr)*
                               (0.127 + 0.0026*Yr)
                                      or
                             (-0.24 + 0.0151 *Yr)  (Eq.2f)

     = (Intercept           + [(coefficient) *(value  of source
                                                 variable)]
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Now, if all families were always headed by a less educated father (i.e., the proportion 12+ were zero), Farm families would have decreased at the intercept value of O.461 - 0.0064*Yr.

But some fathers are better eduated and better educated men are less likely to go into farming. Thus the equation

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FARM=0.461 - 0.0064*Yr
```

would give us too many farmers. Assume, for purposes of argument only, that among better educated fathers the proportion farmer is always-0.224 less. If so, we need to reduce the estimate of farming by 0.224 among that proprotion who are 12+ on schooling, i.e.,multiply (-0.224) by (0.127 + 0.0026*Yr) or (-0.24 + O.O 151&Yr). This turns out to be (-0.028448 - 0.0005824) and (0.05376 - 0.0033824*Yr). Adding these corrections to the intercept values, we get:
FARM (assuming constant coefficient of -0.224)

```
Before 1930       = 0.433 - 0.0070*Yr = (0.461 - 0.0064*Yr)+
                    (0.028448 - O 0005824*Yr) (Eq. 2g)

1930 and after    = 0.515 - 0.0098*Yr = (0.461 - 0.0064*Yr) +
                    (0.05376 - 0.0033824*Yr) (Eq. 2h)
```

If there had been a constant educational difference of -0.224, farm families would have declined at the rate of -0.0070 per year prior to 1930 and -0.0098 from 1930 on, compared with the 0.0064 rate for a purely 00-11 population. The disinclination of better educated men to enter farming and the accelerated growth in education tend to augment the decline in farming.

But the assumed difference of -0.224 is correct in only one year, 1900, because the education difference in farming was declining at the rate of 0.0025 per year (Eq. 2c). In later years the educational difference was 0.0025*Yr smaller so after 1900 Equations (2g) and (2h) over-correct. To compensate we multiple the change in coefficient, 0.0025*Yr, by the estimate of father's education to get:

```
Before 1930:            0.0003175*Yr = 0.0000065*Yr²   (Eq. 3i)
1930 and after:         -0.0006*Yr = 0.0000378*yr²      (Eq. 2j)
```

Equations (2i) and (2j) tell us how much to correct Equations (2g) and (2H) for decline in the coefficient. In 1900, (Yr - 1900) would be zero, so one correction would be made. In 1901, we would add 0.003175*1 + 0.0000065*1^2 or 0.0031815, in 1902 we would add 0.0003175*2 + 0.0000065*2^2 or 0.000661, etc.

And, of course, Equations (2g) = (2i) = (2d) and (2h) = (2j) = (2e).

More generally, since 'Year' appears in the linear change for a prior variable and also in linear change for the coefficient, whenever coefficients change in a linear fashion, the expression for

ottal change in the dependent variable will contain a 'Year Squared' term. Consequently total change in the dependent variable will not be a straight line even though all parameters in the model may be linear.

But inspection of the plot for Farm in Figure 11 suggests a straight line, lacking even the 'elbow' observed for Metro. Why? First, in the range considered here the Year Squared term in Equations (2d) and (2e) is not large enough to produce a visible curving. Actually, the decline from 1930 to 1940 is -0.077, from 1940 to 1950 is -0.070, and from 1950 to 1960 -0.062, but this slowing up of the change is not large enough to catch the eye. Second, the correction term does explain why there is no elbow for Farm. Whitout the Year Squared term the slope would have increased considerably after 1930 but the correction brings the trend back to what appears to be a continuation of the pre-1930 trajectory.

Conclusion V

Farm families decreased at a rate of approximately 0.67 percent per year (6.7 percent per decade) up to 1930. After that the acceleration in Education tended to boost the decline, while shrinkage in the association between Education and Farming tended to slow it so, overall, Farm families declined at a fairly constant rate from 1890 to 1955.

Since Farm, Metro, and Town add up to 100 percent, the total change in is found by subtracting Equations (2d) + (3c) and (2e) + (3d) from 1.000:

```
TOWN (prior to 1930)

   0.338 + (0.0038*Yr) - (0.0000065*Yr2)                (Eq.4a)

TOWN (1930 and after)

   0.322  + (0.0053*Yr) - (0.0000378*Yr2)               (Eq.4b)
```

Figure 11 shows the result - a steady upward trend in the proportion of Americans growing up in towns of 50000 or less. Before 1930 however, the rate of increase was higher for Town than Metro, while after 1930, METRO accelerated and TOWN slowed down. But as late as 1960 about as many Americans grew up in non-farm homes in icites under 50000 as in cities of 50000 or more.

Conclusion VI

Town families, i.e., nonfarm families living in cities under 50000, their subarbs or in rural areas, increased throughout the period, but faster before 1930 than afterwards. While Town families outnumbered Metro families by 3 or 2 in 1890, in 1955 the two groups were close to equal.

Equations (3c, 3d, 2d, 2e, 2f, 2h, 2i, 2j, 4a), and (4b) are inferences about entire variables, but the model may also be used to draw inferences about combinations of thier categories. Just as the cross-tabulations allow us to estimate the parameters of the model, the paramenters enable us to generate modeled cross-tabs for Father's Edcuation by Milieu in various years (see Table III).

TABLE III
Father's education and milieu, 1890-1960: Model estimates

Birth Cohort	Father = 0-11			Father = 12+			Total Farm	0-11 nonfarm	12+ nonfarm
	Farm	Town	Metro	Farm	Town	Metro			
1890	(0.471)	0.264	0.164	0.028	0.037	0.036	0.499	0.428	0.073
1900	(0.402)	0.291	0.180	0.030	0.048	0.049	0.432	0.471	0.097
1910	(0.336)	0.316	0.195	0.030	0.060	0.063	0.366	0.511	0.123
1920	0.273	(0.339)	0.208	0.028	0.073	0.078	0.301	0.547	0.151
1930	0.214	(0.361)	0.221	0.025	0.086	0.094	0.239	0.582	0.180
1940	0.130	(0.314)	0.192	0.029	0.159	0.175	0.159	0.506	0.334
1950	0.068	0.258	0.158	0.022	0.233	(0.261)	0.090	0.416	0.494
1960	0.026	0.191	0.117	0.002	0.311	(0.353)	0.028	0.308	0.664

Note: Parentheses indicate row mode

Since both education and milieu have changed steaddily, the combinations show striking shifts. the orw modes tell the story: for birth cohorts 1890 to 1910 the modal family was headed by a farmer father with less than 12 years schooling, from 1920 to 1940 the model was a less educated father living in a city under 50000 (Sinclair Lewis's *Main Street* would be protypical), for birth cohorts 1950 and later, the typical father was a high school graduate living in a Metropolitan area. Collapsing the data a bit, the right-hand panel says: in 1890 about half the children grew up on farms; from 1900 to 1940 about half the childen grew up in better educated urban homes.

4. Checking the Occupational Data

Since standard Census reports give Occupation by Age by Sex for 1920, 1930, 1940, 1950, and 1960 and Occupation by Age by Sex by Education for 1940, 1950, 1960, it is possible to check the estimates - under the assumption that (1) fathers are 30 years older than their children on the average, (2) fathers have the same occupations as men in general. Since the proportion in agriculture is proportional to age in cross-section, assumption (1) is non-tivial, but as noted above it seems plausible. Table IV compares Census figures on men 25-34 with results from the model, raw and fertility corrected.[1]

TABLE IV
Census and model estimates of farmers

Year	Education	Proportion farm		Difference
		Census males 25-34	Model father[a]	
1920	All	0.255[b]	0.257	+0.002
1930	All	0.188	0.201	+0.013
1940	All	0.182	0.148	-0.034
	0-11	0.244	0.175	-0.069
	12+	0.074	0.069	-0.005
1950	All	0.110	0.071	-0.039
	0-11	0.157	0.119	-0.038
	12+	0.061	0.036	-0.025
1960	All	0.056	0.020	-0.036
	0-11	0 0.078	0.064	-0.014
	12+	0.038	0.003	-0.035

[a]Weighted inversely to fertility
[b]25-44 only age categories available

Agreement is not perfect (the median discrepancy is -0.039) and the model estimate is generally lower (in 9 out of 11 comparisons the Census gives more famers age 24-34 than the model gives Father Farmers) but the agreement is still good. The least squared equation, Census = 0.918*Model = 0.034 gives an R^2 of 0.96, and both estimates agree that the education difference in Farming declines over time.

5. Momsrole

Of the 6957 GSS respondents providing data on every variable in the model, 47 percent reported their mother worked for a year or more after marriage and 50 percent reported four or more

siblings. The causal order for these two variables being ambiguous, I treat them as a four category typology (Davis, 1975).

4 + Yes = 4 or more siblings, mother worked; 0.177 of the total.
0-3 Yes = 0-3 siblings, mother worked; 0.295 of the total.
0-3 No = 0-3 siblings, mother didn't work; 0.209 of the total.
4 + No = 3 or more siblings, mother didn't work; 0.319 of the total.

Since the statistical results will be a bit intricate, it may be helpful to label each group, even at the risk of caricature.

4 + Yes = *01d Fashioned*.
This is the traditional family where the mother had many children and never worked *for pay*.

0 - 3 Yes = *Avant Garde*.
This is the opposite, modern, maternal role where the mother works for pay after marriage and the number of children is small.

0 - 3 No = *Lady of Leisure*.
Relatively speaking, at least, mothers who never worked and who have smaller families fit this quaint label.

4 + Yes = *Supermother*.
Granted she may have ceased work before any of her children where born, relatively speaking, the demands of work and child rearing are so large, this contemporary stereotype may serve as a label.

Table V shows the overall trends in the typology, using modeled data based on the equations to be explained in this section.

TABLE V
Maternal types, 1890 and 1955 birth cohorts,
(Modeled data.)

Birth cohort	Type				Total	
	4 + No Old fashioned	0 - 3 No Ladies of leisure	4 + Yes Supermother	0 - 3 Yes Avant garde	Yes	0 - 3
1895	0.695	0.238	0.042	0.025	0.067	0.263
1955	0.074	0.158	0.261	0.507	0.768	0.665

Change	-0.621	-0.080	+0.303	+0.482	+0.701	+0.402

Table V reveals a substantial shift in maternal roles in the 'two generations' from 1890 to 1955. Old Fashioned mothers drop -0.621, Ladies of Leisure decline -0.080, Superwomen increase +0.303, and Avant Garde mothers go up +0.482. In 1895 about two-thirds of the mothers were old fashioned (69.5 percent) and virtually none (2.5 percent) were Avant Garde; for Americans born in 1955, the figure had almost reversed; half (50.7 percent) of the mothers were Avant Garde and 7.4 percent Old Fashioned.

The statistical analysis begins by describing these trends with regression equations for the 'middle American' reference group - those growing up who differed from them in Milieu (Farm or Metro) or paternal Education (12+) were consistently more modern, less modern, or changed at different rates.

Figure 14 shows the trends for these maternal categories, among respondents who grew up in Towns and whose fathers had 0 - 11 years of education.

The statistics in Table B2, lines 11-12-13 reveal the trends for 4-Yes, 0-3 Yes, and 0-3 No can be described nicely by straight lines:

Proportion 4 + Yes among Dad = 0 - 11, Town = 0.088+0.0041*(Year-1900) (Eq. 5a)

Proportion 0 - 3 Yes among Dad = 0 - 11, Town = 0.072+0.0058*(Year-1900) (Eq. 6a)

Proportion 0 - 3 No among Dad = 0 - 11, Town = 0.280 - 0.0029*(Year-1900) (Eq. 7a)

And since the four categories must some to 1.000:

Proportion 4 + No among Dad = 0 - 11, Town = 0.560 - 0.0071*(Year-1900) (Eq. 8a)

The proportion Avant Garde and Supermother increased steadily while the proportions Old Fashioned and Lady of Leisure declined steadily in birth cohorts from 1890 to 1955 - among the 'middle Americans' whose fathers had 0-11 years of schooling and who grew up in towns less than 50000.

Adding Equations (5a), and (6a), gives is the trend for 'Yes' - the proportion whose mother worked.

Proportion Yes among Dad = 0-11, Town = 0.160 + 0.0100 (Yr-1900) (Eq.9a)

In this baseline group the proportion with working mothers increased at a steady rate of one percent per year from 1890 to 1955. Similarly, summing Equations 6 and 7 gives the trend for 0 - 3:

Proportion 0-3 among Dad = 0-11, Town = 0352 + 0.0030 (Yr - 1900) (Eq. 10a)

The trend toward smaller families is positive (+0.003 per year) but smaller because it combines a waxing type, Avant Carde, and a waning one, Lady of Leisure.

Now, we consider whether milieu Metro or Farm and higher paternal education (12+) make a difference. Sociological common sense suggests that Metro families will be more modern, Farm families less modern, and better educated families more modern.

Figure 15 shows the only significant effect of Metro. Compared with Town families, mothers in cities of 50000 or more are consistently (+0.049 + 0.034) more Avant Carde (See Table B2, lines 14 - 17, for statistical tests) but the differences in Supermother and Lady of Leisure are trivial and statistically insignificant. So:

Difference in Proportion 0-3 Yes,
Metro v. Town = Diff Yes = Diff 0-3 = +0.049 (Eq.6b)

The next figure, Figure 16 shows the differences between Farm and Town. They are recomplicated. Let's start with the linear decrease in 0-3 Yes (Avant Garde), *d* = -0.036 - 0.0040* (Yr-1900). In 1890 its value is 0.004, i.e., zip, but by the 1955 birth cohort the difference reached -0.256. In 1890 Farm and Town families had about the same (low) proportion of Avant Garde mothers, but as time went on farm families modernized more slowly, so, by 1955, a substantial gap had appeared. This is not to say there was no change in Farm families. According to the model they were 1.7 percent Avant Carde in 1895 and 19.9 percent in 1955, but for Town families the percentages are 1.3 percent and 50.5 percent.

The trend for difference in Lady of Leisure (0-3No) is opposite. As time ~goes on the difference increases according to the equation:

Difference in Proportion 0-3 no, Farm v. Town = -0.117 + 0.0036*(Year - 1900) (Eq.7b)

But, since Lady of Leisure is a declining role, the inference is the same: Farmer families were modernizing more slowly than Town or Metro Families. In point of fact the proportion Lady of Leisure increased from 0.156 to 0.201 among Farm families from 1890 to 1955,while it dropped from 0.309 to 0.121 in Town and Metro. Putting the same idea another way, the data suggest that Farm families showed a decline in fertility before they showed an increase in mother's employment.

Combining Equations (6c) and (7b):

Difference in Proportion 0-3,
Farm v. Town = -0.153 - 0.00040*(Year - 19OO) (Eq.)

Since as late as 1955 the (Year - 1900) term is only -0.022, for all practical purposes the model shows a constant Farm v. Town fertility gap because the Farm increase in Lady of Leisure just

about cancels out its lag in Avant Garde families.

Conclusion VII

Metropolitan families were consistently more modern (fewer children, more wives working) than Town families and modernizing at about the same rate, which produced a constant gap between the two urban categories.

Farm families were slower in experiencing the trend toward working wives compared with Town or Metropolitan families. In terms of fertility the Farrn and urban trends are about the same, producing an essentially constant fertility difference.

For parental education three statistical patterns emerge as shown in Figure 17. In better educated families:

...wives are consistently more likely to be Ladies of Leisure

Difference in Proportion 0-3 No,
Father's Education 12+v. 0-11 = +0.057 (Eq. 7c)

...wives are consistently less likely to be superwomen

Difference in Proportion 4 + Yes
Father's Education 12v.0-11 = -0.088 (Eq. 5b)

...a tendency for wives to becoem Avant Garde appears over time

Difference in Proportion 0-3 Yes
Father's Education 12v. 0-11 = +0.031 + 0.0031*(Yr - 1900) (Eq. 6d)

Table VI will help interpret these equations.

TABLE VI
Effects of parental education on momsrole, 1890 and 1955 birth cohort.
(Modeled data.)

Siblings		Total
4+	0-3	

1890				
		Supermother	Avant garde	Mother worked
Mother Worked	Yes	-0.088	0.000	-0.088
		Old fashioned	Lady of leisure	
	No	+0.032	+0.057	+0.088
Total 0-3		-0.057	+0.057	

1955				
		Supermother	Avant Garde	Mother worked
Mother Worked	Yes	-0.088	+0.202	+0.114
		Old Fashioned	Lady of leisure	
	No	-0.171	+0.057	-0.114
Total 0-3		-0.259	+0.259	

Note: Cell entry = Education Difference, Father 0-11 vs 12+.

The entry in each cell is an educational difference, for better Educated families were -0.088 lower than 0-l1's in proportion Supermother. Since the categories add up, the row and column totals give us the effects for Working and Fertility, e.g., in 1890 better educated families were +0.088 higher on Didn't Work. Since the four cell differences must sum to zero, the education effect for Old Fashioned is found by subtraction. I read the patterns as follows:

In 1890 there was a negative correlation between social class (Education) and wives' employment. Better educated mothers were more likely to be Ladies of Leisure (+0.057) or Old Fashioned (+0.031) giving an overall no work difference of +0.088. Similarly there was an overall negative correlation between Education and Fertility of +0.057. Combining the two relationships, better educated women were more likely to be Ladies of Leisure (+0.057) and less likely to be Supermothers (- 0.088).

After 1890, both relationships changed but in opposite direction as better educated women outpaced the less educated in adopting the 'Avant Garde' role. This *increased* the fertility difference (Avant Carde mothers have smaller families) so by 1955 it was +0.259 rather than the

+0.057 of 1890. At the same time the more rapid acceptance of the Avant Garde maternal role among the better educated dampened and then *reversed* the class difference in maternal employment since Avant Carde mothers are workers. By 1955, mothers in better educated families were +0.114 higher in employment, in contrast to the opposite sign difference of -0.088 in 1890.

The figures in Table Vl are net or partial estimates controlling for the three milieu categories. Since better educated families are more Metropolitan and less Farm, Metropolitan familes are more Avant Carde, and farm families it are less Avant Carde, the net numbers will not be identical with the raw (two- variable) relationships. Flow graph principles, however, enable us to work out the values. Figures 18 and 19 give the flow graphs for the complete system. In Figure 18 the dependent variable is the Mom's role typology. Since, how- ever, one may add across the typological categories to get the proportions of Working Mothers and Small families, Figure 19 treats the same estimates as two separate dependent variables.

Applying the familiar flow graph principle that the total association between an exogenous (source) variable and dependent (sink) variable is the sum of the forward paths.

Total associations: Father's Education and 0-3 siblings:

Direct	= 0.088 + 0.031*Yr - 1900
via Metro	= 0.00882
	= (0.180*0.049)
via Farm	= 0.03427 - 0.0029*Yr - 1900 - 0.000001*Yr^2
	= (-0.224 + 0025*Yr)*(-0.153 - 0.004Yr)
Total	= 0.13109 + 0.00281*Yr - 1900 - 0.000001*Yr^2

The zero order association between parental education and small families increases steadily (the Yr^2 term is very small even in 1955). Thus, in 1890 the difference was +0.103, in 1955 it was +0.283. The result may be surprising to those who believe status differences in fertility are declining. We Should remember, however, that we are talking about very large families, five or more, not necessarily the mean number of children per mother (see Preston, 1976 for a revealing discussion of the difference). It is possible that SES differences in mean children per mother may be declining while the class difference in the proportion of children growing up in very large families is increasing.

Total association Father's Education and Mother Worked:

Direct	=-0.057 + 0.00310*Yr - 1900
via Metro	=+0.00882
	=(0.180*0.049)
via Farm	=+0.008064 + 0.000806*Yr - 1900 - 0.00001*Yr^2

	=(-0.224 + 0.0025Yr)*(-0.036 - 0.004Yr)
Total	=-0.040116 + 0.003906*Y - 1900 - 0.00001*Yr^2

The total asociatuon was indeed negative from 1895 (-0.079) up to 1910, but after 1910 it became positive, reaching a value of +0.205 by 1955. Taken literally the model says 1910 was a watershed year. Before then children with working mothers were relatively lower status, after that the correlation reversed.

Conclusion VIII

At the turn of the Century higher status mothers were more likely to have small families and less likely to work so they were disproportionately 'Ladies of Leisure'. After that the pattern changed, as better educated families rapidly accepted the 'Avant Garde' pattern of small families and employment. By the birth cohort at 1955 the education difference in family size had grown considerably while the education difference in employment had reversed.

6. Discussion

The main goal of this research has been to sort out and articulate well known social facts. These results having been reported in the section summaries, what more may be said?

First, I am struck by the extraordinary size of the changes. Figure 20 shows the total change from birth cohorts 1890 to 1955 for the four variables in the model. In a span of 65 years:

Mother's employment went from 0.068 to 0.768, a rise of 70 points or 1.08 points per year. Although contemporary popular discussions sometime assume female labor force participation is a recent phenomenon, in point of fact we are still seeing a trend that began in the late 19th century and operated continuously through the 20th. This is not to say farm wives were idle. On the contrary they worked from dawn to dusk 365 days a year and, in the era of the washboard, urban housewives were busy too. What was new was the shift to work where a non-family member was the supervisor and money changed hands.

Father's Education, the proportion high school graduates, rose from 0.101 to 0.591, a rise of 49 points or 0.75 points per year. At the turn of the century virtually 'nobody' grew up in a high- school level home, by 1955 such an educational level was as common as not.

Farm fathers dropped from 0.499 in 1895 to 0.058 in 1955, a decline of 44 points or 0.68 points per year. At the turn of the century farm homes were as common as not, by 1955 'nobody' grew up on a farm.

Large families (4 or more siblings) dropped from 74 percent in 1890 to 34 percent in 1955, a decline of 40 points or O.615 unit per year. Such large family setting reversed from a two-thirds majority to a one-third minority.

To the extent these social characteristics are important (this matter will be discussed in a subsequent paper) Americans of the baby boom are grew up in social settings which were almost totally different from those of their grandparents born in the late 19th century. To make the point statistically, I created an arbitrary modernization scale by giving zero points for Father 0- 11, Farm, Mother never worked, 4+ siblings, one point for Father = 12+ Town, Mother Worked, 0-3 siblings, and two points for Metro. Table VII gives the distributions for the 1890 and 1955 birth cohorts, from the model.

In the 1955 cohort, 79.4 percent had scores of 3 or higher; in the 1890 cohort, 87.7 percent had scores less than 3. In the 1955 cohort, half (52.9 percent) had scores of 4 or 5; in the 1890 cohort more than half, 65 percen had scores of 0 or 1.

TABLE VII
'Modernization scores' by birth cohort

Scores	1890	Cumulative	1955	Cumulative
5	0.002	0.999	0.182	0.182
4	0.024	0.997	0.347	0.529
3	0.096	0.973	0.265	0.794
2	0.226	0.877	0.127	0.921
1	0.284	0.651	0.064	0.985
0	0.367	0.367	0.015	1.000

This is not to say that the model accounts for the changes in its own dependent variables. As a measure of explanatory power we can compare total change in a variable (Figure 20) with the average change within categories of prior variables, e.g., average change in Metro for 0-11 Fathe and for 12+ Fathers, average change in Mother Yes for 0 - 11, Farm Fathers, 0-11 Town Fathers, etc. By this measure the model account for 30 percent of the total change in fertility,25 percent of the total change in Farm Father and just 9 percent of the total change in maternal employment. Conversely, for any dependent variable related to more than one of the characteristics in the model, the variables have a sufficient level of change to produce substantial trends in the items they drive.

Second, in my personal opinion, the changes have been overwhelmingly beneficial. It is fashionable these days to stress-how things have gone from bad to worse in the U.S. Perhaps they have recently. But over the long Itau each of the changes documented here had benef ts that I believe outweigh thei drawbacks. One may romanticise farm life, but by all accounts its concomitents were poverty, social isolation, authoritarian family life, and intellectual narrowness,

all the more so in the era prior to paved roads and electronic media. Modern education may be diluted by 'social promotions' and curricular fads, but a nation in which the vast majority of the parents were not high school graduates simply cannot have known as much, read as much, been as skillful, or have been as cosmopolitan as modern America. Large families have their attractions but a variety of social research reports show deleterious effects from cutting the pie into smaller and smaller slices. Women's employment has its problems - mostly sex discrimination in pay- but who would dream of resuming to the era of Ladies of Leisure?

Third, I suspect that all, or almost all of these changes have now run their course. In the 1980 Current Population survey, among employed males 25-35, 3 percent were employed in agriculture. Even granting them prodigious fertility, it is clear the farming population - and hence the propotion of children growing up on farms - cannot decline much more. (Perhaps a cultural historian can nail down a crucial data in American history - the year truck drivers first outnumbered farmers and cowhands as the protagonists in country and western songs.) For women born 1945 - 1949 (ages 31 - 35 in 1980) it appears that about 3 percent of them will have 5 or more children (Teuber and Sweet, 1976, Figure 6). Granting that children per mother is not the same as average number of siblings (Preston, 1976), the prorportion of children growing up in large families has little portential for further decline. Applying the rule of thumb from not 1 to the Taeuber and Sweet chart, about 8 percent of the children from mother's nirth cohort 1945 - 1949 will grow up with 4+ siblings. I know of no check data on the current values for 'Did your mother ever work?' but the follwong argument seems plausible: assume this item is a linear function of the proportion of women in the labor force. Since that proportion has increased in a fairly linear fashion since 1955, one may assume that out item contiued to increase at its rate of about 1.08 points per year. If so, the parameter reached 1000 early in 1977. Probably not, since nothing ever reaches 100 percent in the social sciences, but the opportunites for growth are clearly trivial. This is not to say that women's pay, hours, occupations, etc., are not sunject to change; but it is to say that the notion of 'ladies of leisure' is dead as a dodo.

There remains educational attainment. Figure 9 suggests that in 1980 the proportion of father with a high school degree reached something like 0.85, almost saturation level. True enough, but there is still considerable room for growth in college attendance. The issue is highly controversial, and the consensus of experts seems to be that college attendance rates have peaked; but the point is that this trend could continue.

In sum: the trends described in the model have turned American families upside down between 1890 and 1955 - in ways which I believe to be more positive than negative. However, with the possible exception of educational attainment it is almost mathematically impossible for these trends to continue. Hence, in the 1980s and beyond we will undoubtedly experiance rapid social change, but its character will be quite different from the main social trends which shaped American society in the first half of the century.

National Opinion Research Center
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APPENDIX A: FAMILY SETTING AT AGE 16 AND BIRTH COHORT

The codebook for the cumulative GSS (1972-1980) allows one to classify respondents in terms of their answers to 'Were you living with both your own mother and father around the time you were 16?' as a two-variable table (see Table A.l).

TABLE A1
Father and mother at age 16

		Mother or Substitute			
		None Substitute		Own Mother	Total
	Own Father	A=0.024	B=0.018	C=0.758	0.800
Father or	Substitute	D=0.004	E=0.029	F=0.038	0.071
Substitute	None	G=0.016	H=0.012	I=0.101	0.129
	Total	0.044	0.059	0.897	1.000

N	10644
Not applicable	8
Total	10652

Overall, 0.897 of the respondents were living with their own mother 0.800 were living with their own father, and 0.758 were living with both; of those not living with both parents, 0.417 (0.101 of the grand total) were living with their own mother and no father or father substitute.

The GSS questions used in this analysis allowed answers on paternal education for substitute fathers, but limited materna questions (employment and fertility) to own mother. Consequently, this report is limited to persons in celss C and F in Table A.1, 0.796 of the total. The most important group excluded are those in cell I, those living with their mothers only. There are almost a thousand of them in the cumulative file, and they deserve further analysis, but that is a different research problem.

Figure A.1 plots selected parental situations against birth cohort.

Using the fitting techniques in Taylor (1980) I attempted to describe cohort differences in family setting by straight lines. Appendix Table B.3 gives the details, but the main conclusions are these:

Contrary to popular opinion, the proportion living with their own mother has increased in a straight line fashion at the rate of +0.0017 per year with a range from 0.830 to 0.940 for the extreme birth cohorts of 1890 and 1955. See Bane (1976) for a detailed discussion.

The proportion lving with a male head (father or father substitute) seems to be a constant 0.873.

The combination lving with own mother and a father or father substitute, i.e., the group covered by research here, has grown in a linear fashion at the rate 0.0012 per year. At the extremes, the results reported here generalize to 0.735 of the birth cohort of 1890 and 0.813 for the birth cohort of 1955.

APPENDIX B: DETAILED TABLES

TABLE B1
Birth cohort, father's education, and respondent's education - GSS 1972-1978

Birth Cohort	Father's Education			In-	Don't	No	Total
	0-11	12	13+	applicable	Know	Answer	
1888-1892 = 1890							
N.....	(62)	(9)	(1)	(10)	(22)	(1)	(105)
12+[a].....	.306	.556	1.000	.200	.227		.305
13+[a].....	.210	.333	.000	.200	.136		.200
1893-1897 = 1895							
N.....	(111)	(12)	(6)	(28)	(54)	(2)	(2130
12+.....	.288	.500	.667	.179	.241		.282
13+.....	.126	.333	.333	.143	.148		.150
1898-1902 = 1900							
N.....	(217)	(39)	(15)	(53)	(80)	(5)	(409)
12+.....	.276	.795	.867	.189	.262		.330
13+.....	.166	.462	.800	.094	.150		.203
1903-1907 = 1905							
N.....	(322)	(51)	(17)	(73)	(103)	(3)	(569
12+.....	.286	.765	.529	.274	.103		.330
13+.....	.155	.412	.529	.137	.049		.170
1908-1912 = 1910							
N.....	(412)	(65)	(14)	(68)	(90)	(5)	(654)
12+.....	.396	.877	1.000	.353	.367		.448
13+.....	.148	.415	.929	.132	.144		.188
1913-1917 = 1915							
N.....	(496)	(103)	(23)	(69)	(104)	(4)	(776)
12+.....	.468	.825	.957	.449	.413		.510
13+	.159	.438	.739	.203	.144		.207
1918-1922 = 1920							

N.....	(536)	(113)	(31)	(99)	(71)	(0)	(850)
12+.....	.536	.814	.968	.525	.352		.589
13+.....	.207	.451	.871	.212	.141		.259

Birth Cohort	Father's Education 0-11	12	13+	In-applicable	Don't Know	No Answer	Total
1923-1927 = 1925							
N.....	(531)	(119)	(35)	(112)	(93)	(2)	(892)
12+.....	.531	.874	.971	.518	.409		.599
13+.....	.202	.546	.857	.250	.097		.268
1928-1932 = 1930							
N.....	(462)	(137)	(35)	(98)	(69)	(1)	(802)
12+	.604	.949	1.000	.520	.493		.660
13+.....	.221	.496	.769	.276	.145		.296
1933-1937 = 1935							
N.....	(507)	(144)	(47)	(124)	(63)	(1)	(886)
12+.....	.673	.903	.979	.604	.476		.702
13+.....	.276	.507	.872	.242	.175		.333
1938-1942 = 1940							
N.....	(510)	(217)	(64)	(128)	(47)	(0)	(966)
12+.....	.722	.912	.938	.695	.532		.766
13+.....	.253	.502	.891	.328	.064		.352
1943-1947 = 1945							
N.....	(543)	(374)	(118)	(140)	(42)	(0)	(1,217)
12+.....	.722	.939	.983	.736	.619		.812
13+.....	.267	.570	.898	.386	.119		.430
1948-1952 = 1950							
N.....	(519)	(441)	(142)	(151)	(45)	(6)	(1,304)
12+.....	.798	.923	.958	.689	.578		.836
13+.....	.322	.610	.887	.364	.111		.479
1953-1957 = 1955							
N.....	(278)	(302)	(85)	(118)	(32)	(3)	(818)
12+.....	.701	.848	.894	.593	.594		.754
13+.....	.194	.341	.600	.195	.094		.291
Total..... (10,461)	.....				.....		

[a]12+ = Respondent completed 12 or more years of schooling, proportion

13+ = Respondent completed 13 or more years of schooling, proportion

TABLE B2. Statistical tests for trends discusses in the text[a]

Trend	Homogeneity			Linear Trend					
	P/d	Chi Square	Probability	Improvement	Probability	Fit	Probability	r^2	Equation
Table A1									
With own mother	.904	50.8	.001*	45.1	.001*	5.6	.933	.88	.847 + .0017 Yr.
Male head	.873	10.7	.635	0.2	.637	10.5	.573	--	--
Mother & Male head	.799	19.0	.123	12.3	.001*	6.7	.876	.70	.760 + .0012 Yr.
Figure 5	.256	551.3	.001*	456.1	.001*	95.2	.001*	.83	.086 + .0075 Yr.
Figure 6									
1890-1925	.155	13.2	.067	10.1	.022*	3.2	.790	.81	.127 + .0026 Yr.
1930-1955	.391	177.7	.001*	167.5	.001*	10.3	.035*	.95	-.244 + .0151 Yr.
Figure 8									
Dad = 0-11	.262	161.3	.001*	152.7	.001*	8.7	.733	.95	.461 - .0064 Yr.
Difference (0-11 vs. 12 +)	-.139	30.5	.004*	15.9	.001*	14.7	.258	.05	-.224 + .0025 Yr.
Figure 9									
Dad = 0-11	.264	28.5	.008*	21.0	.001*	7.6	.820	.72	.206 + .0024 Yr.
Difference (0-11 vs. 12 +)	.180	4.7	.982	1.0	.679	3.7	.988	--	--
Figure 12									

4+ Yes	.175	43.8	.001*	36.1	.001*	7.7	.810	.79	.088 + .0041 Yr.
0-3 Yes	.198	87.0	.001*	76.5	.001*	10.5	.572	.87	.072 + .0059 Yr.
0-3 No	.182	23.7	.034*	15.1	.001*	8.6	.736	.71	.280 - .0029 Yr.
Figure 13									
4+ Yes	-.003	6.8	.913	0.2	.655	6.6	.884	--	--
0-3 Yes	.049	4.4	.986	0.1	.807	4.3	.976	--	--
0-3 No	.019	4.5	.985	1.2	.277	3.3	.993	--	--
Figure 14									
4+ Yes	-.014	5.8	.954	-0.1	1.000	5.8	.924	--	--
0-3 Yes	-.112	30.6	.004*	21.7	.001*	8.9	.709	.71	-.036 + .0040 Yr.
0-3 No	-.030	14.5	.337	10.9	.001*	3.7	.998	.74	-.117 + .0036 Yr.
Figure 15									
4+ Yes	-.088	8.2	.829	2.5	.111	5.7	.928	--	--
0-3 Yes	.107	22.1	.053	13.4	.001*	8.8	.725	.49	.031 + .0031 Yr.
0-3 No	.057	12.0	.526	1.1	.292	10.9	.537	--	--

[a]Estimated sampling variances were doubled to compensate for multi-stage sampling. Se text and Taylor (1980) or Davis (1978b) for explanation

TABLE B3
Cohort, father's education and fertility - GSS 1972-1978

Birth cohort	Father= 0-11, Don't Know		Father = 12+		Proportion of Fathers, 12+	
	Kids[a]	N	Kids[a]	N	Raw	Weighted[b]
1890	6.62	(88)	6.90	(10)	0.102	0.098
1895	6.60	(167)	4.80	(20)	0.107	0.141
1900	6.61	(296)	5.11	(54)	0.154	0.191

1905	6.86	(429)	5.50	(68)	0.137	0.165
1910	6.19	(501)	4.43	(79)	0.136	0.181
1915	6.12	(600)	4.22	(104)	0.148	0.201
1920	5.82	(607)	4.03	144	0.192	0.255
1925	5.77	(624)	3.81	(154)	0.198	0.272
1930	5.56	(531)	3.49	(173)	0.246	0.342
1935	5.45	(572)	3.66	(191)	0.250	0.332
1940	5.23	(558)	3.68	(281)	0.335	0.417
1945	5.29	(585)	3.75	(492)	0.457	0.543
1950	5.53	(525)	3.97	(617)	0.540	0.621
1955	5.64	(310)	4.42	(387)	0.555	0.614

[a]Kids = mean of (total siblings =1).
[b]To obtain weighted values, I divided each N by its mean on Kids and then calculated the proportion 12+ using the two weighted Ns.

TABLE B4
Estimates of proportion of U.S. males age 25-34 with 12 or more years of schooling

Year	GSS Dads[a]	GSS Men[b]	N	Census[c]	CPS[d]	Degrees[e]
1883						0.020
1890	0.098					
1895	0.114					
1897						0.025
1900	0.191					
1905						
1907						0.035
1910	0.181					
1915	0.201					
1917						0.064
1920	0.255	0.294	(34)			0.066
1925	0.272	0.175	(97)			0.074
1930	0.342	0.302	(192)			0.108
1935	0.332	0.335	(260)			0.151
1940	0.417	0.455	(310)	0.336		0.178
1945	0.543	0.498	(349)			0.262
1947					0.473	

1950	0.621	0.603	(388)	0.486		0.374
1955	0.614	0.584	(411)			0.456
1957					0.563	
1960		0.647	(371)	0.567		0.468
1965		0.682	(403)			
1967					0.708	
1970		0.777	(421)	0.721		0.593
1975		0.851	(542)			
1977					0.847	
1980		0.848	(613)			0.705

[a]Fertility-weighted figures from Table B3
[b]Years of school completed for males, 1972-1978 GSS. Year = date of brith + 30.
[c]1940 to 1960 calculated Ferris (1969), 99. 402-403, 405-406; 1970 from *Historical Statistics of the United States*.
[d]1947 to 1967 calculated from Ferris (1969), pp. 402-403, 405-406; 1977 from *Current Population Report*.
[e]From Ferris (1969), series A-18, pp. 378-379.

NOTES

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[1]Fertility correction was as follows. On the basis of the complete model - not yet fully explained - I found the sibling proportion for the categories. Since, over all respondents, those in the 0-3 sib group came from families averaging 2.757 children and those in the 4+ category averaged 7.744, the reciprocals of those averages were applied as weights to raw category estimates.

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