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A NEW APPROACH FOR THE ESTIMATION OF BIRTHS UNDER REGISTRATION EGYPT: 1920-1970

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1. Introduction

Egyptian legislation promoting the registration of births and deaths can be traced to as early as the nineteenth century. Around 1846, an order was issued by Mohammed Ali to organize the registration of these events. The first proper legislation in that direction was promulgated in 1891, followed by another two acts issued in 1898 and 1912, aiming at organizing the establishment of vital registration systems.

In these early years, the annual publication of registration returns was mainly for administrative reasons. However, since 1900, the total number of births can be compiled for the whole of Egypt as well as for governorates and chief cities. This figure has also been available since 1923 for localities with health bureaus, where medical officers are responsible for the preparation of weekly reports concerning the registration of vital events.

Besides administrative purposes, and valid registration of births is essential in studying the levels of fertility in different societies. For such detailed studies, it is necessary to have

complete information about births and their distribution according to demographic characteristics and socio-economic factors. With regard to Egypt, the total number of births has only been registered according to sex since 1977. The age of mother at birth began to be taken into consideration from 1930, while birth order was recognized in 1940.

Although the previous data reveal a long historical experience, the reliability and the completeness of these birth statistics is questionable. Accordingly, the objective of this paper is to examine the published series of birth statistics for the period 1920-1970 in order to estimate the size of under-registration and the pattern of mis-reporting other related factors such as age of mother at birth.

2. Previous Evaluation of Birth Statistics

In almost all developing countries birth statistics are known to suffer from a number of deficiencies that can be grouped into the following categories:

- 1) Problems of definition.
- 2) Completeness of registration (with regard to coverage and the failure to register).

- 3) Proper registration according to place and time of birth.
- 4) Accurate classification according to demographic and socio-economic characteristics.

As member of this group of developing countries, Egypt is no exception. In addition, a preliminary examination of its statistics has shown another type of problem related to the method adopted for compiling birth statistics. According to the Egyptian Statistical Authority, the method of compilation used up to 1961 was to apply the percentage distribution of births according to age of mother, in health bureau localities, to the reported total number of births for the whole country. Since 1966, a different approach has been adopted: complete registration coverage as the basis of the reported birth distribution according to age of mother at birth (C.A.P.M.S., 1973). The effect of this change can hardly be evaluated, since no overlapping was carried out. Generally, it can be supposed that the reported total number of births was not affected, however its classification according to demographic and socio-economic factors would be affected.

A careful estimate of the completeness of this long series of birth statistics could have been carried out by conducting national

tests on the basis of match studies. Such a major study was carried out recently, in 1974/1975, but on a sample basis. Its results, although not yet available, will present the first direct measure to evaluate the size of the incompleteness of the Egyptian vital registration system. It will also allow an opportunity to evaluate the size of under-registration reflected by different indirect methods aiming at examining the registration of births.

The results of different studies have confirmed the incompleteness of birth statistics; they only differ in the estimation of its magnitude and the method used for that purpose. Farrag(1957) compared the returns of the vital registration system to relevant figures extracted from rectified (natural increase) or reported censuses and he estimated an under-registration ratio, for the period 1917-1937, of about 2% and 15% for male and female births respectively. El-Bardy (1965) concluded that the annual ratio of under-registration of births was about 5% during the period 1934-1959. His estimates were based on assuming that the crude birth rates of rural areas without health bureaus are equal to those areas with health bureaus. A lower estimate for the under-reporting

births during the period 1959-1961- was given by the Egyptian Statistical Authority (C.A.P.M.S.), 1967. By assuming that for each governorate, the ratio of infant deaths during the first 13 days of life to the total number of infant deaths is similar in rural and urban areas, the average annual ratio of under-registration was estimated to be only 0.6%. For almost the same years, the size of under-registration was estimated in another study to be about 5% annually. Zachariah (1970), based his estimate on a comparison between the observed age distribution and different model stable age distributions with different levels of fertility. The latest study was carried out by Hollingworth (1972). According to his sex-ratio model, the percentage under-registration of births was around 10.7% in 1960.

From this presentation, about the findings of different direct methods, it can be noticed that:

- 1) Under-registration at births is a common characteristic of birth statistics. Its magnitude in recent years has been between 5 and 11%.
- 2) Most of the previous estimates were based on a comparison with the observed age structure or by assuming a similarity between urban and rural areas, and the level of fertility was not taken into consideration.

- 3) The corrected number of births is estimated for the country as a whole. Its distribution according to age of mother at birth is another problem that should be dealt with.

These last two observations are very important and should be taken into consideration. For this purpose, a new approach based on the component method is suggested to estimate the corrected total number of births and its distribution according to mother's age.

3. Estimation of corrected Births by the Component Method

For a specified period of time (one calendar year for example), the actual birth performance for any society is a function of both the female population at risk, with specified age reference, and the relevant level of fertility for that age. This level can be represented by the specific fertility rate of that age group:

In short, the estimated number of births for a specified age can be obtained as follows:

$$B(t, x) = f(t, x) \cdot P(t, x) \quad (1)$$

$$14 \leq x \leq 49$$

and the corrected total number of births for year t is

$$B(t) = \sum_{x=14}^{49} B(t,x) \quad (2)$$

here :

$f(t,x)$ is the age-specific fertility rate for age x in year t .

$P(t,x)$ is the female population at risk of year t at age x .

$B(t,x)$ is the estimated number of births born to mothers of age x in year t .

Accordingly, the actual number of births can be obtained by providing corrected data for these two components, which will be presented in the following pages.

3.1) The Female Population at Risk

In order to apply the previous approach in terms of single years of mother's age at birth for successive years between 1920-1970, it is required to have the relevant female distribution at risk.

Our starting point is the returns of the previous censuses taken between 1907 and 1960, and the population estimates prepared

by C.A.P.M.S. for 1970. An investigation of these censuses confirms the inaccuracy of the reported age distribution and the continuation of age mis-statement through all the above mentioned censuses. The preliminary step, however, is to consider the total counts of these censuses, The result of this process can be summarized as follows⁽¹⁾:

- 1) Censuses carried out in 1907 and 1927 were taken as correct.
- 2) The total count of the 1947 census was examined. A model fitting was made for the pattern of population increase in Egypt during the period 1937-1966. The hyperbolic function was shown to give the best fit; its results showed a limited ratio of under-reporting of about 0.2%, but when the sex ratio pattern was taken into account this ratio was raised to about 0.8%.
- 3) The total counts of 1937, 1960 and the estimates of 1970 were corrected on the basis of the sex-ratio of 1947, which is about 99.66%. This correction yields a very limited difference from the reported totals.

(1) For details see : Sayed (1976), chapter two.

The next step is to construct a smooth age-sex structure following the normal pattern. To this end, the proportional cumulative age distribution (ogive), for each sex, was examined for each count between 1937 and 1970 alone, in order to evaluate their consistency. For censuses between 1907 and 1927, the percentage age-distribution of the 1937 census was used to estimate the age-structure. This can be justified on the basis of the obvious stability of the growth rate during the period 1907-1937. Minor rectification was carried out to insure the adherence of this age-sex structure to the normal pattern of sex-ratio.

The intercensal male and female mid-year populations, in terms of five-year age groups up to age 70+ were estimated by applying a geometric model to the corrected age-sex structure. These yearly age-group populations were interpolated by using Beers' six term modified formula in order to construct the yearly populations by single years of ages between 14 and 49. The final results of the female populations (14-49) are given in Table (1) for single years between 1907-1970.

Table (2) presents the re-constructed female populations by five-year age groups from (10-49). Together with the single years of age population estimates, they represent the first

component related to the female population at risk.

(3.2) Fertility Levels by Single Years of Age

Besides the incompleteness of birth statistics and the change in the method of compiling these data, two other problems should be taken into consideration when examining the fertility performance (level) at different ages of mother at birth. These problems are the mis-reporting of mother's age at birth and the inavailability of birth statistics by single years of age.

To cope with these deficiencies, the Egyptian fertility experience can be simulated through the application of suitable models aiming mainly at correcting these problems according to certain assumptions and using various studies (Sayed, 1976) showed that the Gompertz model was found suitable in that respect. This model is based on three parameters with demographic meanings; namely, K , the ultimate total or completed fertility rate; G , the proportion of completed fertility achieved at the origin and B , which is a parameter determining the shape of the curve.

The original form of this model is

$$Y(x) = K G^{B^x} \quad (3)$$

where

$Y(x)$ is the expected cumulative fertility (mean family size) at age of mother (x)

K, G and B are the parameters previously mentioned, which can be estimated by using the value of the cumulative fertility experience at three equi-distant points.

The application of this Gompertz model under certain assumptions produced a smoothed series of ASFR that may have reduced the effect of mother's age mis-reporting. The effect of other problems such as changing the method used in compiling the data since 1966, and the under-registration of births (reducing fertility level) is, so far, still shown by the results of this process, especially if we compare the fertility pattern (represented by B) for the period 1930-1965 and the years after 1966⁽¹⁾.

Accordingly, an iteration-translation process was devised to take these problems into consideration and finally to construct adjusted age-specific fertility rates. This process was based on certain assumptions such as:

(1) For details see Sayed (1976), Chapter five.

- 1) The method used compiling vital data after 1966 is more acceptable in representing the real shape of the Egyptian fertility.
- 2) The effect of mother's age mis-reporting is less obvious in the first year of the reproduction span.
- 3) The final level of fertility for a specified year can be successfully projected using the Gompertz model, which can be mostly dependent on the less deficient part of the fertility curve, i.e. ages at the first half of the child bearing span.
- 4) A multiple graduation process will be adopted by translating the smoothed period rates to a cohort-type series, then projected and re-translated again to period type data, and so on.
- 5) The iteration-translation process will be continued until divergence is noticed between the estimates of the index parameter "B" for successive iterations.

Through the application of this process, it was possible to construct a new series of ASFR, either by single years of mother's age at birth (table 3) or by five-year age groups (Table 4) for the years between 1920 and 1970. This series is free from the

effect of various data problems and hence can be used to estimate the corrected distribution of births according to mother's age.

(3.3) Adjusted Distribution of Births

Estimates of births by single years of mother's age at birth were obtained by applying equation (1), i.e. multiplying together the new level of fertility at each age (Table 3) and the relevant group of women at risk presented in Table (1). The results are given in Table (5), and cover the period 1920-1970. Accumulating these birth estimates over the entire reproduction span gives the corrected annual total number of births.

The same process was carried out for the ASFR and the relevant distribution of women at risk by five-year age groups. In this case, estimated births by age groups were controlled by the previously estimated total births. Absolute differences were pro-rated according to the corrected distribution. The final results are given in Table (6) .

The Size of Under-Registration and its Pattern

A comparison between reported and adjusted total number of births, for the period 1920-1970, is given in Table (7). It shows

that under-registration of births fluctuated between 1% and 34% of the reported births during these years. The size of under-registration was very high between 1920-1928, where its value in most of these years, was around 25%. Starting from 1930, the ratio of the under-registration, although fluctuating, shows a tendency to decline. Its minimum level of about 1% was seen in 1961.

Generally, it was noticed that a higher degree of birth incompleteness could be the results of certain abnormal conditions, which may produce a relaxation in the efficiency of the registratio system.

Some examples are :

- 1) An increasing ratio of under-registration during the Second World War period. Its value was around 9.6% in 1939 and increased to about 18.1% in 1942, then gradually decreased. By 1945, the ratio of under-registration was only about 5.1%.
- 2) High ratios of under-registration were observed during the periods between 1948 to 1949 and 1953 to 1956. These periods were characterized by military tension and socio-political changes. The size of under-registration was between 7 and 16%.

A substantial increase in the ratio of under-registration coincides with the two wars of 1956 (21% in 1957) and 1967 (8.5% in 1967). During both wars the population of the Suez Canal Zone emigrated and the efficiency of the vital registration is in question. For example, the reported number of births in the Suez Governorate was only 11 in 1957 compared with about 4300 births in 1956.

If the effect of these exceptional conditions is taken into account, we can conclude that the efficiency of the registration system is gradually improving. At the same time, the new ratios of incompleteness are substantially different from those cited earlier. Generally, our findings show a fluctuating ratio of under-registration which is well above the 5% estimated for past years.

To examine the type of errors in the reporting of mother's age, a comparison between the percentage distribution, of reported and adjusted births was carried out. It shows that the adjusted ratio of births attributed to mothers in age groups between 15-39 years was less than the reported percentage. The real difference between the two percentage series is, however, the substantial increase in the share of births attributed to mothers aged between

40 and 49. For 1930, for example, the ratio of adjusted births attributed to these age groups was around 10.6% compared with only 5.1% according to the reported data. This pattern of preferential reporting of age of mother at birth was observed up to 1965. It meant a general tendency to report lower ages of the mother, which is a common characteristic of developing countries. When the new system of compiling birth data was adopted it was noticed that this type of error was removed; however, there was a continuous tendency to report mother's age at birth in ages during the first half of the childbearing span. The percentage of births attributed to mothers aged 15-24 was about 23.2% according to the reported data of 1970 and dropped to about 19.3% for the adjusted data of the same year.

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TABLE (1)
Female Population by Single Mid-Year
(In Thousands)

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TABLE (1) continued

[illegible]

TABLE (2)

Female Population by Five-Year
Age groups Summation of Table(1)(In Thousands)

YEAR	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49
1907	598.8	537.0	486.2	438.3	394.5	349.8	305.1	259.4
1908	592.8	531.0	480.2	432.3	388.5	343.8	300.1	253.4
1909	586.8	525.0	474.2	426.3	382.5	337.8	294.1	247.4
1910	580.8	519.0	468.2	420.3	376.5	331.8	288.1	241.4
1911	574.8	513.0	462.2	414.3	370.5	325.8	282.1	235.4
1912	568.8	507.0	456.2	408.3	364.5	319.8	276.1	229.4
1913	562.8	501.0	450.2	402.3	358.5	313.8	270.1	223.4
1914	556.8	495.0	444.2	396.3	352.5	307.8	264.1	217.4
1915	550.8	489.0	438.2	390.3	346.5	301.8	258.1	211.4
1916	544.8	483.0	432.2	384.3	340.5	295.8	252.1	205.4
1917	538.8	477.0	426.2	378.3	334.5	289.8	246.1	199.4
1918	532.8	471.0	420.2	372.3	328.5	283.8	240.1	193.4
1919	526.8	465.0	414.2	366.3	322.5	277.8	234.1	187.4
1920	520.8	459.0	408.2	360.3	316.5	271.8	228.1	181.4
1921	514.8	453.0	402.2	354.3	310.5	265.8	222.1	175.4
1922	508.8	447.0	396.2	348.3	304.5	259.8	216.1	169.4
1923	502.8	441.0	390.2	342.3	298.5	253.8	210.1	163.4
1924	496.8	435.0	384.2	336.3	292.5	247.8	204.1	157.4
1925	490.8	429.0	378.2	330.3	286.5	241.8	198.1	151.4
1926	484.8	423.0	372.2	324.3	280.5	235.8	192.1	145.4
1927	478.8	417.0	366.2	318.3	274.5	229.8	186.1	139.4
1928	472.8	411.0	360.2	312.3	268.5	223.8	180.1	133.4
1929	466.8	405.0	354.2	306.3	262.5	217.8	174.1	127.4
1930	460.8	399.0	348.2	300.3	256.5	211.8	168.1	121.4
1931	454.8	393.0	342.2	294.3	250.5	205.8	162.1	115.4
1932	448.8	387.0	336.2	288.3	244.5	199.8	156.1	109.4
1933	442.8	381.0	330.2	282.3	238.5	193.8	150.1	103.4
1934	436.8	375.0	324.2	276.3	232.5	187.8	144.1	97.4
1935	430.8	369.0	318.2	270.3	226.5	181.8	138.1	91.4
1936	424.8	363.0	312.2	264.3	220.5	175.8	132.1	85.4
1937	418.8	357.0	306.2	258.3	214.5	169.8	126.1	79.4
1938	412.8	351.0	300.2	252.3	208.5	163.8	120.1	73.4
1939	406.8	345.0	294.2	246.3	202.5	157.8	114.1	67.4
1940	400.8	339.0	288.2	240.3	196.5	151.8	108.1	61.4
1941	394.8	333.0	282.2	234.3	190.5	145.8	102.1	55.4
1942	388.8	327.0	276.2	228.3	184.5	139.8	96.1	49.4
1943	382.8	321.0	270.2	222.3	178.5	133.8	90.1	43.4
1944	376.8	315.0	264.2	216.3	172.5	127.8	84.1	37.4
1945	370.8	309.0	258.2	210.3	166.5	121.8	78.1	31.4
1946	364.8	303.0	252.2	204.3	160.5	115.8	72.1	25.4
1947	358.8	297.0	246.2	198.3	154.5	109.8	66.1	19.4
1948	352.8	291.0	240.2	192.3	148.5	103.8	60.1	13.4
1949	346.8	285.0	234.2	186.3	142.5	97.8	54.1	7.4
1950	340.8	279.0	228.2	180.3	136.5	91.8	48.1	1.4
1951	334.8	273.0	222.2	174.3	130.5	85.8	42.1	-5.4
1952	328.8	267.0	216.2	168.3	124.5	79.8	36.1	-11.4
1953	322.8	261.0	210.2	162.3	118.5	73.8	30.1	-17.4
1954	316.8	255.0	204.2	156.3	112.5	67.8	24.1	-23.4
1955	310.8	249.0	198.2	150.3	106.5	61.8	18.1	-29.4
1956	304.8	243.0	192.2	144.3	100.5	55.8	12.1	-35.4
1957	298.8	237.0	186.2	138.3	94.5	49.8	6.1	-41.4
1958	292.8	231.0	180.2	132.3	88.5	43.8	0.1	-47.4
1959	286.8	225.0	174.2	126.3	82.5	37.8	-6.1	-53.4
1960	280.8	219.0	168.2	120.3	76.5	31.8	-12.1	-59.4
1961	274.8	213.0	162.2	114.3	70.5	25.8	-18.1	-65.4
1962	268.8	207.0	156.2	108.3	64.5	19.8	-24.1	-71.4
1963	262.8	201.0	150.2	102.3	58.5	13.8	-30.1	-77.4
1964	256.8	195.0	144.2	96.3	52.5	7.8	-36.1	-83.4
1965	250.8	189.0	138.2	90.3	46.5	1.8	-42.1	-89.4
1966	244.8	183.0	132.2	84.3	40.5	-4.2	-48.1	-95.4
1967	238.8	177.0	126.2	78.3	34.5	-10.2	-54.1	-101.4
1968	232.8	171.0	120.2	72.3	28.5	-16.2	-60.1	-107.4
1969	226.8	165.0	114.2	66.3	22.5	-22.2	-66.1	-113.4
1970	220.8	159.0	108.2	60.3	16.5	-28.2	-72.1	-119.4

TABLE (3)
Final Distribution of Period Fertility Rates Per 1000 Women
Egypt : 1920-1970

AGE	IN	COMPLETE	YEARS
14	14	14	14
15	15	15	15
16	16	16	16
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TABLE (3) Continued
Final Distribution of Period Fertility Rates Per 1000 Women
Egypt : 1920-1970

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TABLE (4)

Final Distribution of Fertility Rates by Age Groups

Period Data

Egypt

YEAR	15-19	20-24	25-29	466 30-34	35-39	40-44	45-49
1920	34.237	101.402	353.957	353.157	253.215	152.933	54.575
1921	35.312	195.246	362.302	355.005	271.132	167.717	94.952
1922	34.439	138.973	367.121	377.115	230.359	170.247	101.070
1923	40.172	202.303	365.244	371.115	270.417	173.062	99.313
1924	40.329	205.310	365.244	371.115	277.710	173.062	101.574
1925	40.330	204.391	362.303	362.303	267.125	167.570	96.485
1926	40.333	213.362	362.303	362.303	351.113	162.345	93.350
1927	40.333	214.024	362.303	362.303	353.517	155.933	88.972
1928	40.333	211.601	362.303	362.303	246.023	145.933	84.345
1929	40.333	222.303	362.303	362.303	233.497	145.250	79.954
1930	40.333	227.109	363.303	363.303	223.533	131.443	73.954
1931	41.375	227.331	363.303	363.303	224.507	131.111	71.753
1932	41.375	225.134	362.303	362.303	221.023	127.703	63.307
1933	41.375	223.303	362.303	362.303	213.394	125.494	66.312
1934	41.375	220.509	362.303	362.303	217.145	124.459	65.069
1935	41.375	216.634	354.303	354.303	214.692	122.781	64.584
1936	41.375	212.303	349.303	349.303	212.795	121.740	64.173
1937	41.375	208.164	344.303	344.303	211.186	121.054	64.154
1938	41.375	205.264	340.445	340.445	208.967	119.903	63.317
1939	41.375	202.584	335.831	335.831	206.027	115.750	63.111
1940	41.375	200.832	332.124	332.124	204.595	117.701	62.034
1941	41.375	200.116	329.596	329.596	202.678	110.651	62.088
1942	41.375	200.615	329.574	329.574	200.875	115.409	61.387
1943	42.354	203.445	329.739	329.739	198.175	113.155	59.867
1944	42.354	203.927	331.509	331.509	196.880	111.931	58.988
1945	42.354	203.127	334.756	334.756	196.230	110.922	58.184
1946	42.354	212.723	339.277	339.277	196.177	110.177	57.460
1947	42.354	216.324	344.303	344.303	195.751	109.673	56.778
1948	42.354	219.632	351.407	351.407	197.903	109.406	56.203
1949	42.354	222.242	355.035	355.035	199.656	109.511	55.736
1950	42.354	223.742	355.035	355.035	201.959	109.931	55.535
1951	42.354	223.921	371.215	371.215	204.804	110.501	55.630
1952	42.354	222.465	376.393	376.393	209.190	112.122	56.021
1953	42.354	213.469	380.043	380.043	212.012	113.073	56.697
1954	42.354	214.980	381.892	381.892	216.140	116.145	57.762
1955	42.354	209.594	381.838	381.838	220.346	118.786	59.173
1956	42.354	203.461	379.945	379.945	224.522	121.693	60.326
1957	42.354	197.745	376.448	376.448	228.218	124.750	62.765
1958	42.354	192.243	371.779	371.779	231.503	127.789	64.833
1959	42.354	186.711	366.730	366.730	234.483	130.688	66.853
1960	42.354	184.199	360.786	360.786	236.362	133.594	69.224
1961	42.354	185.761	354.817	354.817	237.031	136.448	71.990
1962	42.354	179.977	351.083	351.083	238.910	138.004	72.937
1963	42.354	174.735	347.444	347.444	239.248	139.431	74.435
1964	42.354	178.592	344.398	344.398	239.361	140.416	75.372
1965	42.354	176.485	341.144	341.144	239.288	140.948	75.947
1966	42.354	188.210	341.209	341.209	237.052	141.687	77.718
1967	42.354	180.666	335.220	335.220	236.686	141.726	77.757
1968	42.354	166.953	325.178	325.178	236.378	141.647	77.535
1969	42.354	153.072	316.067	316.067	235.053	141.759	77.933
1970	42.354	155.547	304.783	304.783	231.902	142.305	79.571

TABLE (5)
Estimated Annual Births by Single Years of Age
Egypt : Period 1920-1970
(in 1000's)

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TABLE (5) Continued
Estimated Annual Births by Single Years of Age
Egypt : Period 1920-1970
(In 1000's)

[illegible]

TABLE (6)

Estimated Total Births by Age of Mothers
Egypt : Period 1920-1970
(In 1000's)

| YEAR | AGE OF MOTHERS | | | | | | | TOTAL |
|------|----------------|--------|--------|--------|--------|--------|-------|---------|
| | 15-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-49 | |
| 1920 | 21.00 | 110.10 | 183.80 | 165.20 | 104.90 | 55.30 | 26.00 | 667.10 |
| 1921 | 23.40 | 113.60 | 190.40 | 174.60 | 113.70 | 61.30 | 29.50 | 706.50 |
| 1922 | 25.00 | 117.20 | 195.20 | 180.60 | 119.10 | 65.20 | 31.80 | 733.90 |
| 1923 | 27.00 | 120.30 | 196.50 | 180.30 | 118.60 | 64.90 | 31.70 | 739.30 |
| 1924 | 29.00 | 123.70 | 199.20 | 182.50 | 120.50 | 66.50 | 32.70 | 754.10 |
| 1925 | 31.20 | 127.60 | 199.80 | 179.80 | 117.30 | 64.10 | 31.40 | 751.20 |
| 1926 | 33.10 | 131.50 | 202.00 | 179.40 | 116.00 | 63.00 | 30.70 | 755.70 |
| 1927 | 34.80 | 135.50 | 204.30 | 178.50 | 113.90 | 61.30 | 29.60 | 757.90 |
| 1928 | 36.10 | 139.30 | 206.80 | 177.80 | 111.80 | 59.40 | 28.40 | 759.60 |
| 1929 | 36.90 | 142.70 | 209.50 | 177.20 | 109.60 | 57.40 | 27.10 | 760.40 |
| 1930 | 37.20 | 146.20 | 212.00 | 176.00 | 106.80 | 54.90 | 25.50 | 758.40 |
| 1931 | 37.00 | 147.80 | 214.30 | 176.30 | 105.70 | 53.70 | 24.70 | 759.50 |
| 1932 | 36.40 | 148.80 | 216.30 | 176.90 | 105.10 | 52.90 | 24.10 | 760.50 |
| 1933 | 35.60 | 148.90 | 217.70 | 177.60 | 105.10 | 52.60 | 23.80 | 761.30 |
| 1934 | 34.70 | 148.40 | 218.80 | 178.90 | 105.70 | 52.80 | 23.80 | 763.10 |
| 1935 | 33.80 | 147.40 | 218.90 | 179.10 | 105.70 | 52.70 | 23.70 | 761.30 |
| 1936 | 33.10 | 146.20 | 218.50 | 179.30 | 106.00 | 52.80 | 23.80 | 759.70 |
| 1937 | 32.60 | 144.90 | 217.90 | 179.60 | 106.40 | 53.10 | 24.00 | 758.50 |
| 1938 | 32.50 | 145.20 | 218.40 | 180.20 | 106.90 | 53.40 | 24.10 | 760.80 |
| 1939 | 32.90 | 145.60 | 218.80 | 180.80 | 107.40 | 53.80 | 24.30 | 763.60 |
| 1940 | 33.50 | 146.70 | 219.80 | 181.70 | 108.00 | 54.10 | 24.50 | 768.30 |
| 1941 | 34.20 | 148.50 | 221.50 | 182.80 | 108.60 | 54.50 | 24.70 | 774.80 |
| 1942 | 35.10 | 151.20 | 224.30 | 184.50 | 109.40 | 54.80 | 24.80 | 784.10 |
| 1943 | 36.60 | 155.80 | 228.50 | 186.20 | 109.60 | 54.50 | 24.50 | 795.70 |
| 1944 | 37.90 | 160.30 | 233.30 | 189.00 | 110.60 | 54.80 | 24.60 | 810.50 |
| 1945 | 39.10 | 165.40 | 239.20 | 192.50 | 111.90 | 55.20 | 24.60 | 827.90 |
| 1946 | 40.20 | 170.90 | 246.20 | 196.80 | 113.70 | 55.70 | 24.70 | 848.20 |
| 1947 | 41.00 | 176.60 | 254.20 | 202.10 | 115.80 | 56.30 | 24.80 | 870.80 |
| 1948 | 41.70 | 183.30 | 264.00 | 208.40 | 118.40 | 57.00 | 24.90 | 897.40 |
| 1949 | 41.80 | 189.10 | 274.50 | 215.40 | 121.50 | 58.00 | 25.20 | 925.50 |
| 1950 | 41.40 | 194.40 | 285.20 | 223.00 | 124.90 | 59.20 | 25.50 | 953.60 |
| 1951 | 40.40 | 198.70 | 295.70 | 231.10 | 128.80 | 60.60 | 25.90 | 981.20 |
| 1952 | 39.00 | 201.50 | 305.70 | 239.40 | 133.10 | 62.30 | 26.50 | 1007.50 |
| 1953 | 37.40 | 202.90 | 314.70 | 247.90 | 137.80 | 64.30 | 27.30 | 1032.30 |
| 1954 | 35.60 | 203.20 | 322.40 | 256.10 | 142.80 | 66.60 | 28.30 | 1054.80 |
| 1955 | 33.90 | 202.20 | 328.60 | 263.90 | 148.00 | 69.20 | 29.40 | 1075.00 |
| 1956 | 32.30 | 200.20 | 333.40 | 271.10 | 153.30 | 72.00 | 30.80 | 1093.10 |
| 1957 | 31.40 | 198.60 | 336.70 | 277.20 | 158.40 | 75.00 | 32.30 | 1109.60 |
| 1958 | 30.90 | 197.10 | 339.00 | 282.60 | 163.30 | 78.00 | 33.90 | 1124.80 |
| 1959 | 30.30 | 195.40 | 340.80 | 287.60 | 168.10 | 81.00 | 35.50 | 1138.70 |
| 1960 | 31.70 | 196.70 | 341.80 | 290.80 | 172.20 | 84.10 | 37.30 | 1154.60 |
| 1961 | 35.90 | 203.20 | 343.40 | 293.10 | 176.30 | 87.70 | 39.60 | 1179.20 |
| 1962 | 34.40 | 201.60 | 347.20 | 299.60 | 181.40 | 90.60 | 41.00 | 1195.80 |
| 1963 | 36.60 | 206.20 | 351.10 | 303.90 | 185.40 | 93.80 | 42.60 | 1219.30 |
| 1964 | 38.00 | 209.80 | 355.50 | 308.60 | 189.30 | 96.10 | 44.00 | 1241.30 |
| 1965 | 38.60 | 212.30 | 359.80 | 313.50 | 193.20 | 98.40 | 45.30 | 1261.10 |
| 1966 | 49.60 | 231.80 | 367.70 | 315.00 | 195.30 | 101.00 | 47.30 | 1307.70 |
| 1967 | 46.80 | 227.90 | 369.00 | 319.50 | 199.00 | 103.20 | 48.20 | 1313.60 |
| 1968 | 48.10 | 215.50 | 365.70 | 323.30 | 202.90 | 105.30 | 49.10 | 1301.90 |
| 1969 | 38.20 | 210.20 | 363.20 | 325.20 | 208.90 | 107.50 | 50.30 | 1300.50 |
| 1970 | 40.80 | 210.60 | 367.80 | 322.30 | 207.30 | 110.20 | 52.40 | 1301.60 |

TABLE (7)

Reported, Corrected Births and the Ratio
of Under-Registered Births to Corrected
and Reported Births
Egypt : Period 1920-1970

| Year | Reported
Births
(1) | Corrected
Births
(2) | (2)-(1) | (2)-(1) |
|------|---------------------------|----------------------------|----------|----------|
| | | | (2)
% | (1)
% |
| 1920 | 558.609 | 667.132 | 16.27 | 19.43 |
| 21 | 558.898 | 706.433 | 20.88 | 26.40 |
| 22 | 582.662 | 733.848 | 20.60 | 25.95 |
| 23 | 588.855 | 739.259 | 20.35 | 25.54 |
| 24 | 604.568 | 753.972 | 19.82 | 24.71 |
| 25 | 607.564 | 751.145 | 19.12 | 23.63 |
| 26 | 623.825 | 755.680 | 17.45 | 21.14 |
| 27 | 627.583 | 757.921 | 17.20 | 20.77 |
| 28 | 629.433 | 759.710 | 17.15 | 20.70 |
| 29 | 645.217 | 760.370 | 15.14 | 17.85 |
| 1930 | 670.817 | 758.448 | 11.55 | 13.06 |
| 31 | 664.631 | 759.604 | 12.50 | 14.29 |
| 32 | 642.595 | 760.456 | 15.50 | 18.34 |
| 33 | 668.467 | 761.326 | 12.20 | 13.89 |
| 34 | 651.663 | 763.011 | 14.59 | 17.09 |
| 35 | 645.760 | 761.251 | 15.17 | 17.88 |
| 36 | 698.186 | 759.713 | 8.10 | 8.81 |
| 37 | 694.086 | 758.442 | 8.49 | 9.27 |
| 38 | 704.376 | 760.982 | 7.44 | 8.04 |
| 39 | 696.746 | 763.603 | 8.76 | 9.60 |
| 1940 | 697.700 | 768.151 | 9.17 | 10.10 |
| 41 | 695.016 | 774.848 | 10.30 | 11.49 |
| 42 | 658.324 | 784.044 | 16.03 | 19.10 |
| 43 | 689.771 | 795.876 | 13.33 | 15.38 |
| 44 | 722.166 | 810.354 | 10.88 | 12.21 |
| 45 | 787.502 | 827.942 | 4.88 | 5.14 |
| 1946 | 774.152 | 848.228 | 8.73 | 9.57 |
| 47 | 834.557 | 870.745 | 4.16 | 4.34 |
| 48 | 832.728 | 897.548 | 7.22 | 7.78 |
| 49 | 831.310 | 925.415 | 10.17 | 11.32 |
| 1950 | 904.941 | 953.520 | 5.09 | 5.37 |
| 51 | 934.584 | 981.226 | 4.75 | 4.99 |
| 52 | 969.443 | 1007.592 | 3.79 | 3.94 |
| 53 | 934.830 | 1032.230 | 9.44 | 10.42 |
| 54 | 957.158 | 1054.736 | 9.25 | 10.19 |
| 55 | 926.500 | 1075.000 | 13.81 | 16.03 |
| 56 | 958.880 | 1093.042 | 12.27 | 13.99 |
| 57 | 914.494 | 1109.450 | 17.57 | 21.32 |
| 58 | 1013.743 | 1124.733 | 9.87 | 10.95 |
| 59 | 1078.947 | 1138.761 | 5.25 | 5.54 |
| 1960 | 1113.888 | 1154.661 | 3.55 | 3.66 |
| 61 | 1166.620 | 1179.276 | 1.07 | 1.08 |
| 62 | 1125.798 | 1195.816 | 5.94 | 6.22 |
| 63 | 1196.388 | 1219.172 | 1.87 | 1.90 |
| 64 | 1205.785 | 1241.260 | 2.86 | 2.94 |
| 65 | 1220.658 | 1260.981 | 3.20 | 3.30 |
| 66 | 1234.976 | 1307.670 | 5.56 | 5.89 |
| 67 | 1210.214 | 1313.583 | 7.87 | 8.54 |
| 68 | 1206.585 | 1301.834 | 7.31 | 7.89 |
| 69 | 1197.245 | 1300.534 | 7.94 | 8.63 |
| 1970 | 1161.539 | 1301.603 | 10.76 | 12.06 |