Review Article

Population Size, Growth and Age Distribution: Fourth Release from the 1961 Census of Pakistan

by

KAROL J. KROTKI*

This review of the fourth census publication[1] emanating from the latest census of Pakistan is third in a series[2] of review articles on census publications by members of the Demographic Section of the Institute of Development Economics, Karachi. In the meantime, a fifth[3] publication has appeared on the all-important subjects of literacy and education. Its review is being prepared. There is, however, this big difference between the reviews. The first review squeezed probably all possible information out of the first bulletin. The second review utilized quite a sizeable proportion of the information contained in the second and third release, but of necessity left the bulk unanalysed. This review has no chance to do more than to skirt on the fringes of the information provided and to indicate possible lines of further enquiry. The publication under review will provide meat for researchers for many years to come. Their appetite will be further whetted by the promise that the main census reports will have nine tables devoted to age-and-sex distributions and marital status. Nevertheless, the information released is so fascinating and of such an importance for the country that even a preliminary discussion is justified.

The publication reviewed is a massive document of some four hundred and fifty pages. It appeared for sale in June 1962, sixteen months after the

---

*Dr. Krotki is Research Adviser to the Institute of Development Economics, Karachi. He is grateful for comments received on an earlier draft from Dr. John F. Kantner, Professor of Demography, Social Sciences Research Centre, Lahore and Dr. Sultan S. Hashmi, Senior Research Demographer, Institute of Development Economics, Karachi.

[1]Office of the Census Commissioner, Ministry of Home and Kashmir Affairs, Home Affairs Division, Population Census of Pakistan, 1961, *Age, Sex and Marital Status. Census Bulletin No.* 3. (Karachi: Manager of Publications, May 1962. Pp. xxvi + 419).

[2]The first two were:

K. J. Krotki, "First Release from the Second Population Census of Pakistan, 1961", *Pakistan Development Review*, Vol. I, No. 2, Autumn 1961, pp. 67-77, and

M. Sanaullah, "Second and Third Release from the Second Population Census of Pakistan, 1961", *Pakistan Development Review*, Vol. II, No. 1, Spring 1962, pp. 106-113.

[3]Office of the Census Commissioner, Ministry of Home and Kashmir Affairs, Home Affairs Division, Population Census of Pakistan, 1961, *Literacy and Education. Census Bulletin No. 4.* (Karachi: Manager of Publications, September 1962. Pp. xxiv + 334).

enumeration in the field; this is another creditable reflection on the efficiency of the census organization. The report presents four main statistical tables. The principal ones (Tables 1 and 2) give the age-and-sex distributions in five-year age groups. The first age group is split into those aged 0 and aged 1-4. All those aged sixty and over are lumped together in one group. Persons aged ten and more are further shown by marital status (never married, married, widowed, divorced). The third and fourth tables are really subsidiary to the main ones: Table 3 splits further those aged less than ten into single years of age, while those under one are shown in single months of age, sexes being kept separately all the time. Table 4 splits those aged sixty and over into ten-year age groups, those aged one hundred and over being one group. Sexes are separate, but the marital-status information is not given.

Each of the three types of information on age is presented for the following areas:

i) The whole country and each province, with "all areas" being shown separately from "rural areas" in each case; any sex, age or marital status group for urban areas can be obtained by subtraction of the relevant group in "rural areas" from its counterpart in "all areas".

ii) All administrative divisions, all districts and all subdivisions in East Pakistan with the same "all areas"—"rural areas" arrangement as explained above.

iii) All administrative divisions and all districts in West Pakistan again with the same "all-rural" arrangement[4].

iv) Nine towns in East Pakistan, of which the smallest one had just over 53,000 people (Mymensingh).

v) Twenty two towns in West Pakistan, of which the smallest one was just short of 53,000 inhabitants (Jhelum).

GENERAL REMARKS

Presentation

Like the previous census publications, this report holds up the very high standard of presentation which one has now come to expect from the Pakistan Census Office. The clarity of the tables is quite outstanding. Full use has been made of different types of print, of spacing and column delineation to enhance the ease of reading the statistical material. This is most gratifying

[4]The reason why the Census Commissioner stopped short of subdivisions in West Pakistan is that districts in West Pakistan, even though the third administrative layer, are more akin to subdivisions, the fourth administrative layer in East Pakistan. There were at the time of the census sixty subdivisions in East Pakistan with an average population of some 850,000 as against forty five districts in West Pakistan with some 950,000 people each.

to students of methods of presentation and readers of bulky volumes with tabular information.

It is, therefore, with some regret that one must notice the difficulty of finding one's way about the volume. The list of contents devotes *fifty eight lines* to the listing of the contents of the *twenty four pages* of the introduction. There are *nine lines* showing the contents of *the four hundred and sixteen pages* of the tabular material. It is troublesome to find any one area, the arrangement being neither alphabetical nor logical in any other easily discernible way.

Mode of Collecting Age Data and the Results

The enumerators were instructed to record the number of years completed by a person on 31st of January, 1962 irrespective of the date of the actual enumeration which started some three weeks earlier. For infants under one year of age, the number of completed months from zero to eleven months was to be recorded. To meet the expected vagueness in age assessment the instruction said: "If age is not known, try to ascertain the age as accurately as possible by reference to any past event which may be remembered. The estimation of age is of great importance and calls for intelligence and diligence on the part of the enumerator. It will generally help in the estimation of ages to enumerate the children in a household starting from the youngest child"[5]. It will be noted that, except for the specific suggestion in the last sentence, the other instructions do not go beyond exhortation to do one's best.

The Census Commissioner in his introduction to the publication under review reports that in spite of the fact that the patience and tact of the interviewers were "in a number of cases" rewarded with "remarkable success" in age estimation, the data on the whole did not merit publication in age groups smaller than five years, except for children under ten. In fact, the data was not originally sorted on single years of age and only later grouped for publication in fives. The sorting plan prejudged the issue by sorting above age ten in groups of five only. It is perhaps a pity that no sorting has been done on single years. Nobody expects the single years to be correct, nobody does even the five-year age groups. Nevertheless, the information can be put to great analytical use. It need be made available only for the bigger areas. The recommendations of technical bodies in this respect are unanimous[6].

[5] *Census Bulletin No. 3, op. cit.*, p. iii.

also:

Office of the Census Commissionor, Ministry of the Interior, Government of Pakistan, Census of Pakistan, *Enumerator's Booklet.* (Karachi: Manager of Publications), p. 5.

[6] *E.g.*, Union internationale pour l'étude scientifique de la population, *Problems in African Demography. A Colloquium.* 20-27 August 1959. (Paris: 1960) p. 27.

Statistical Notes, Statements and Figures

The notes endeavour to draw attention to the main findings of the census in the field of age distribution and marital status. They point out the extreme youth of the population of Pakistan. The 13-per-cent drop since 1951 in the size of the 10-19 age group is confused by the statement that the age group 10-24 decreased by 6 per cent (page vii). The drop in age 10-19 is a fact of considerable importance, both analytically and substantively for the future of Pakistan, and it is a disservice to belittle this dramatic reduction.

It is not very illuminating to draw attention to the slight drop in the proportion of males aged 25-44 relatively to that of females (page vii). Almost two million more males *were reported* than females, though there was in comparison with 1951 some evening out between sexes. It is a very big jump to suggest that this was caused by improved female mortality. Improvements in mortality do typically work faster in the case of women, but, as will be suggested later, the slight increase in the proportion of females might have been produced by the coverage of females having been better in 1961 than in 1951.

It is not immediately apparent as to what is the analytical usefulness of the many proportionate distributions with each sex separately equal to one hundred per cent. The notes make no use of these elaborate calculations either.

In the age pyramids, the ten-year age groups have been drawn with the same width as five-year age groups. Consequently, they stretch twice as long as they would if drawn correctly and suggest optically that age reporting was even worse than it actually was. Age pyramids given in this article show that even elderly people report their ages reasonably well.

It is unhelpful to draw attention to the fact that the number of children under ten grew faster in West Pakistan than in East Pakistan. This may seem to be consistent with the *reportedly* faster overall growth between the census dates in West Pakistan. In fact, to talk about the somewhat uncertain and in any case not very significant difference in the increase under ten (52.1 per cent in the East as against 54.9 in the West—statement 4 on page xi) is to draw away attention from the central feature which is that East Pakistan has a much broader population base, *i.e.*, more young people and, therefore, must at least potentially—a much higher growth rate.

It is begging the question to suggest that the population under ten will continue being large "*if* (author's italics) the present rate of natural increase is maintained" (page x). As the small age groups 10-19 spread more

into active reproduction, even if *their* fertility is the same as that of their predecessors, the number of their progeny will be smaller. In fact, this wave or dip may repeat itself for several generations. In the meantime it will provide, at least in the next few years, some of the breathing space which Pakistan needs so badly in the race between national product and population.

It is necessary and correct to point out that urban areas have a higher proportion of their population in the working ages 25-44, but it is important to underline that this is so only in the case of males. Women do not take part in the process of urbanization with anything like the same speed as males. In fact they lag behind. They prefer to stay in villages; or are made to.

The discussion of the marital status is less satisfactory. To begin with, it suffers from a number of formal disadvantages: the identical titles of tabular statements 7 and 8, the identical titles of their different columns, the mistake in the top left part of figure 4 (the wrongly drawn "single" line), figure 4 based on statement 8 precedes figure 5 based on statement 7, the 1961 totals for East Pakistan in the statements are different from those in the tables (*e.g.*, compare page xxii and first row of page 5), the differences between the number of married males and married females in 1951 and reported in 1951 are different from those reported for 1951 in 1961, the excess of married males over married females in East Pakistan is 52,000 on page 5 and 108,000 on page xxii. The standard reasons why there are fewer widowers than widows *in any* situation are described as an explanation of the widening of this difference between 1951 *and* 1961. More generally, no significant points are brought out.

The unusual (for population censuses) excess of half a million married males in West Pakistan in 1951 over married females was turned into an excess of 7,000 married females, still small, but more consistent with census results elsewhere[7]. This could have been mentioned even if not as a proof, at least as an indication of probably improved coverage along with the lowered masculinity ratio, though the latter still remains at an improbably high level. It would be more convincing than the blunt and undocumented statement on page 1: "Analysis has indicated that the reporting of age and marital status has considerably improved as compared to 1951".

[7]In Table 6 of the *United Nations Demographic Yearbook for 1958* from among countries and censuses with at least half a million married males there are over fifty areas with more married females, as against hardly more than ten with more married males. Excluding from the latter those where the differences are small one is left with the Bantu population of South Africa, Burma, Ceylon, Malaya, India and Pakistan, all populations in respect of which there were persistent anthropological reports about tendencies to underenumerate women.

"Population Account"

An analysis of the 1951 and 1961 population censuses of Pakistan suffers from the disadvantage of a multitude of totals. Some are the product of apparent mistakes. Some have still to be explained, like the discrepancy in the 1951 married totals shown on page xxii of the publication reviewed and on page 2 of part II of the *1951 Census Bulletin No. 5*[8]. Some others are the results of the different basis adopted by the census authorities. To cut a long story short, the various alternatives are repeated below in tabular form in the belief that this may save somebody else's time. This reviewer, for one, could not even begin until he did some tidying-up.

		1961		*1951*
		East Pakistan		
Grand total		50,853,721		42,062,610
Non-Pakistanis		13,486		130,281
Age distribution population		50,840,235		41,932,329
		West Pakistan		
Grand total		42,987,261		33,816,555
Non-Pakistanis	97,883		76,388	
Gwadar acquisition since 1951			13,000	
Omissions in 1951			24,000	
Enumerated in Frontier Regions	1,283,028[a]		887,226	
Estimated in Frontier Regions	2,154,911		1,755,162	
	3,535,822	3,535,822	2,755,766	2,755,766
Age distribution population		39,442,439		31,060,789

[a] The population of the Frontier Regions in 1961 which was not estimated was enumerated through the use of three different types of questionnaires:

standard	28,055
tribal	1,076,707
family	178,266
	1,283,028

The four totals shown above as "Age distribution population" are comparable, except insofar as the 1951 West Pakistan figure is short of the two omissions of 13,000 and 24,000. There may also be other omissions in the 1951 figures made good in 1961 (*e.g.*, in Mardan district some 35,000 people and the Oghi *tehsil* in Hazara district with 52,760). The production of a

[8] The totals of married on page 2 of part II of the *1951 Census Bulletin No. 5* agree with the totals of married on pp. 4-5 of Volume 1 of the 1951 census reports.

comprehensive list of such omissions awaits an area-by-area study, more detailed than the present ones. However, these are not likely to become significant until one goes down to the district level or even below. Caution is also necessary in the use of some of the 1951 data[9], inasmuch as the population "enumerated in Frontier Regions" (887,226) must be first subtracted or at least not added before the 1951 totals are compared with the 1961 totals.

AGE STRUCTURE OF PAKISTAN

Graph 1: *Age Pyramid in 1951 & 1961—Pakistan*, shows the age-and-sex distribution of Pakistan as reported in the 1951 and 1961 censuses. Once the ten-year age groups have been treated correctly, the anomaly above age 59 arising in the Census Commissioner's figures 2 and 3, and also in figure 1 on the front cover of *Census Bulletin No. 3*, disappears[10] and the pyramid assumes a remarkably smooth and symmetrical silhouette. It will be discussed for years to come. In a brief review of this kind, one can merely draw attention to some salient features, illustrative of the kind of problems, with which we are concerned. The following six areas of anomalies are immediately striking:

i) the swelling around age 50,
ii) the swelling around age 25,
iii) female gains above 19 greater than male gains,
iv) losses at ages 10-19,
v) age group 5-9 shows first pronounced sex imbalance,
vi) age group 0-4 has masculinity ratio of nearly 100, but is smaller than the next age group.

It may appear surprising that the biggest change of all, the increase of many millions in ages below 10 is not listed above among the curiosities. In fact, it was not unexpected[11] and, while of greater importance for the future of

---

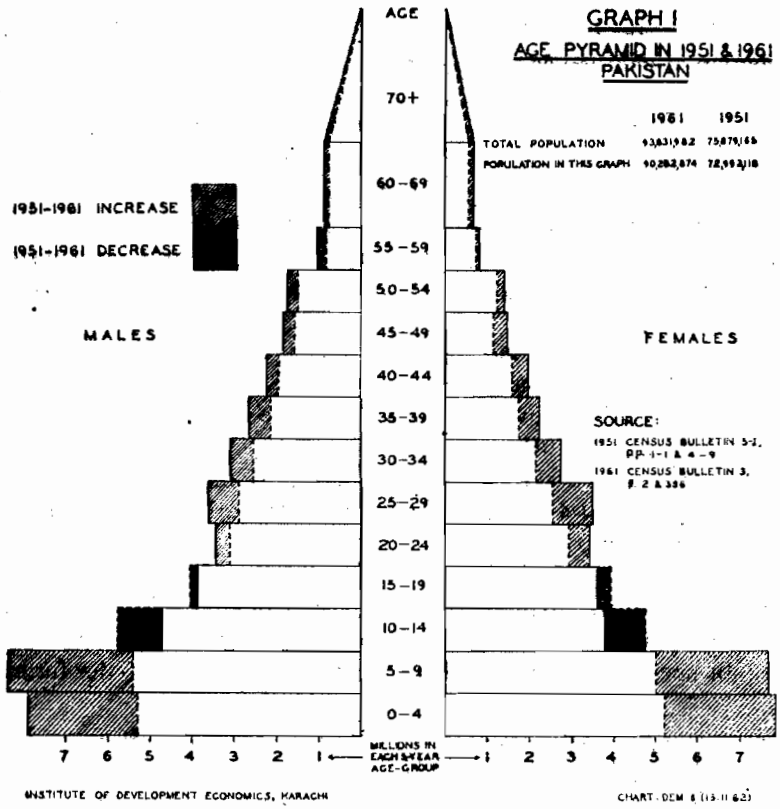
[9]Strange as it may seem, there are no West Pakistan totals for 1951, except for the economic characteristics in Volume 7 of the census reports. The only way to arrive at one is to add up figures from any given cell in all relevant tables for all the units which went in 1951 to make up present West Pakistan. In the 1951 census there were five such units: Baluchistan including States Union, the Federal Capital Area of Karachi, North-Western Frontier Province, the Punjab including Bahawalpur State, and Sind including Khairpur State; but some tables may require the adding-up of smaller units, while some information may not be available at all for West Pakistan there being no separate volume of census reports for the Federal Capital Area of Karachi. North-Western Frontier Province excludes Frontier Regions. These must *not be added* to the other units of the NWF Province or West Pakistan to make up a whole country figure. To achieve comparability with 1961 West Pakistan figures, they must be *subtracted* (along with the East Pakistan) from the 1951 whole country figures, whenever such figures exist.

[10]There is no particular virtue in the treatment of the ages above 69 in Graphs 1, 3 and 5. The triangles are approximately proportionate to the population above age 69.

[11]K. J. Krotki, "A First Glance at Pakistan Age Distribution", *Pakistan Development Review*, Vol. I, No. 1, Summer 1961, pp. 64-75.

Pakistan than any other single circumstance, it is not analytically puzzling and is, therefore, uninteresting.

The swelling around age 50 is in all likelihood the result of the usual preference for this age. It seems to have lessened since 1951. In any case it has no effect on the general estimation of the rate of growth, which is the main interest of this article and of everybody concerned with the development problems of Pakistan.



For the swelling around 25 it is possible to provide two explanations. The preference for the number is one of them. The reemergence in the statistics of those who disappeared while aged 15-24 — due to their unusual mobility and unsettled marital status and occupational conditions—is another one. If the second explanation is more important, then the increasing rate of recoveries, especially when compared with the constant or decreased respondents' preference for age 25, overestimates the true rate of intercensal growth.

The female gains greater at all ages above 19 than those of males could be partly the result of improved female mortality, but are more likely, though impressionistically at this stage of the analysis, due to the better coverage of women in the 1961 enumeration. This influence would overestimate the rate of growth.

The remaining three peculiarities can be more conveniently discussed separately for East and West Pakistan, except for three general statements. The marked fall in the age group 10-19 suggests that the smallness of this cohort when it was aged 0-9 in 1951 was more real and less the product of underenumeration in 1951 than one was justified in thinking before the results of the 1961 census became available. The losses, both in infant and childhood mortality on the one hand and restrained fertility on the other, as a result of the 1947 holocaust and its aftermath must have been heavy indeed.

Secondly, the sex imbalance, such a feature of Pakistan demography, appears again in age-group 5-9 and with age group 0-4 repeats almost the identical pattern when the two censuses are compared. Either contrary to the experience of the whole world, little Pakistanis girls experience worse mortality than their little brothers or the underenumeration begins at this tender age. If the latter, up to three quarters of a million girls[12] have been missed in this age group alone. There is no doubt that they were born judging by the 0-4 group both in the 1951 and 1961 pyramids.

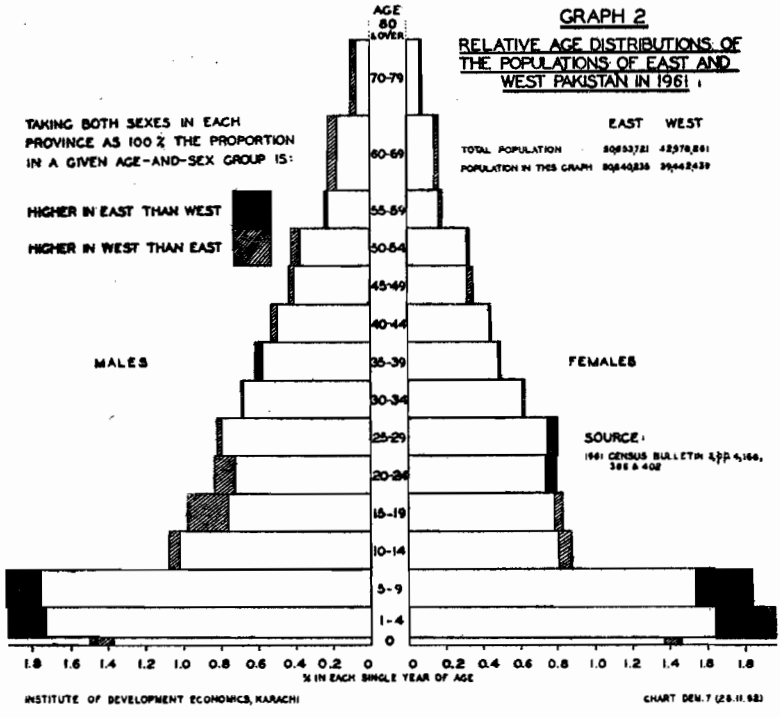
Finally, unless a marked drop in fertility took place in the last five[13] years prior to 1961 (and assuming that age group 5-9 is not overenumerated) over a million, perhaps more than two, have been missed from the lowest age group on both sides of the pyramid together. These are strong assertions and it will take more than the rest of this article to justify them.

Before separate discussions of East and West Pakistan are undertaken, their age distributions can be compared with benefit on Graph 2: *Relative Age Distributions of the Populations of East and West Pakistan in 1961.*

The outstanding feature of this comparison is the much wider base in East Pakistan than in West. Demographic theory shows that a population which has 5 *pro mille* points more children than another one (as is the case in East Pakistan) has at high levels of fertility a birth rate higher by somewhat

[12] The actual corrections suggested *at the moment* in subsequent sections of this article are 150,000 for East Pakistan and 450,000 for West; 600,000 altogether. What the final figure is likely to be cannot yet be said; indeed it may be a belt of figures within which the true figure is likely to lie.

[13] If we look at Graph 7 instead of Graph 1, we will see that fertility need have dropped during the last two years only.



more than this order of magnitude. Such a preponderance at young ages ensures lower proportions at older ages. Unfortunately for the smoothness of our argument, there are among older age groups three female groups and two male groups which are greater relatively (and absolutely, but this is not immediately relevant) in East than in West Pakistan. In the two more prominent cases (females 20-24 and 25-29) one could advance the not improbable suggestion that the underenumeration of women in West Pakistan is greater than in East Pakistan, the social taboos being stronger. The differences in the other three groups are too small to merit much attention. More disconcerting is East Pakistan's shortfall at age 0. Was the work in East Pakistan done less thoroughly, contrary to expectations?[14]

The preceding discussion, and much of what is to follow rests on the belief that a population like that of Pakistan must show considerable regularity in its age distribution. This belief has its theoretical formulation in the stable population theory, and its quasi-stable variant, which were already once presented to the readers of this journal[15] and will not be described

[14]K. J. Krotki and S. S. Hashmi, "Report on A Census Enumeration", *Pakistan Development Review*, Vol. II, No. 3, Autumn 1962, p. 395.

[15]"A First Glance at Pakistan Age Distribution", *op. cit.*

again this time. The essence of this approach is the proven fact that an age distribution is shaped primarily by fertility. Mortality by and large is not age selective. Therefore, when there is a departure from regularity, as there is below ages 25 in West Pakistan, we look to changes in fertility (and infant mortality, which analytically can be treated like minus fertility), assuming no changes in coverage. It is almost a truism to say that, other things being given equal, a given age distribution could be produced only by a given birth rate in the past. If from the level of the intercensal change, views can be formed about the natural increase, we obtain the other missing figure, the death rate, as a residual.

The deliberations, particularly at this stage, may not be very precise, but one thing is certain. The population of Pakistan is very young—the pyramids are very flat. It must, therefore, have a high birth rate. This means either high growth with low death rates or slower growth with higher death rates. Most of what follows is an attempt to form views about the true width of the bottom of the age pyramid with a brief attempt to choose between low death rates (rapid growth) or high death rates (slow growth).

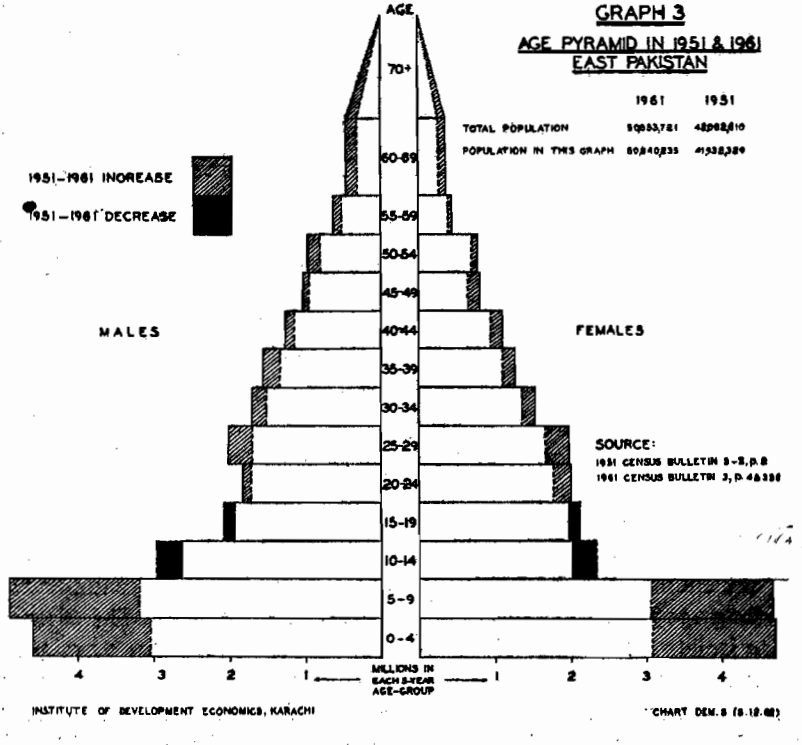
Only one more, somewhat formal, reservation need be made before the main discussion can start. In the comparison of the 1951 age groups with age groups ten years older in 1961 (in demographic parlance: a cohort comparison) the phenomena of recoveries of 1951 omissions and of omissions of 1951 enumerated population are discussed. To avoid tedious repetitious the possibility that at least some of those "recovered/omitted" were not altogether "nonenumerated in 1951/1961", but may have been misenumerated in the wrong age groups is not repeated at every relevant point. The discussion tries to isolate losses by deaths and to a lesser extent changes by migration. It does not attempt and it does not need to separate genuine "recoveries/omissions" from "misenumerated" ones. *E.g.*, if boys aged 10-14 were misenumerated as aged 15-19, any positive adjustment for ages 10-14 will be somewhat greater, and that for ages 15-19 correspondingly smaller. In one case, there will be a negative adjustment (boys aged 5-9 in East Pakistan) and a correspondingly larger adjustment in the originally losing age group.

AGE DISTRIBUTION IN EAST PAKISTAN

This is summarized in Graph 3: *Age Pyramid in 1951 and 1961—East Pakistan.* It will be noted that apart from the swelling around 50, the pyramid above 24 is symmetrical and smooth.

The trouble—and fun of the investigation—is limited to ages below 25. Immediately below we note a shortage of women aged 20-24, but an even greater shortage of men aged 20-24. They were there ten years ago, if we look at the 1951 size of age group 10-14 on this graph, or better still at Graph

4, but since then 15 per cent of the women and 30 per cent of the men died. Why should have men fared so very much worse? Were they overenumerated in 1951? (There is a strong suggestion that this was the case in West Pakistan.) Or did women benefit from the recoveries of girls aged 10-14 omitted in 1951? Only a detailed enquiry into the geographic, migratory and religious aspects of this change could perhaps provide an answer.



If we assume that female recoveries in this age group were no greater than elsewhere and that male mortality experience was no worse than that of women—the latter being not an unreasonable assumption in this age group subject to maternal mortality—then we miss some 600,000 young men in age group 20-24. Are they such an unstable element in the population that the census system was not equal to catching them? Or are they young Hindu men lured by the lights of Calcutta? (East Pakistan *has* the highest price of black-market gold in the world.) Anticipating the next review in this series, it may not be irrelevant to mention here the very substantial decrease in the number of graduates (32 per cent) and post-graduates (12 per cent) and the almost constant number of matriculates in East Pakistan when compared with the more than doubling in West Pakistan[16]. Could the missing numbers be

[16] *1961 Census Bulletin No. 4, op. cit.*, p. xx.

members of the Hindu migration out of East Pakistan or are they made up of East Pakistanis who came to run the Central Government agencies situated in West Pakistan? The tentative suggestions thrown out in this paragraph can provide only partial explanations for reasons which must be left to another occasion. To enable the argument to proceed it has been assumed arbitrarily that of the 600,000 missing, 200,000 are emigrants and 400,000 omissions. The latter suggestion implies a proportionate underenumeration of young men aged 20-24 greater than in the case of boys aged 0-4, which is demographically unorthodox, to say the least. Let this remain for the time being part of the fascination of this problem.

In the age groups one layer lower—15-19 in 1961—we have a sex-balanced situation. Starting in 1951 with just over 3 million, each loses by 1961 well over a million (males: 40 per cent, females: 35 per cent). These are high losses, but not impossible[17] on the condition that those of the group still below are typically heavier. In fact, they are not[18]. Those of females are conveniently heavy: 34 per cent, but males in this most vulnerable age from 0-4 to 10-14 lost only 14 per cent. Obviously, boys omitted in 1951 while aged 0-4 were recovered ten years later as aged 10-14. Their sisters were not, or rather not to the same extent, because having ceased being children, they became women.

This underenumeration of children (equal between sexes until they are five) repeats itself in 1961, as much as the female-selective underenumeration,

[17]The equivalent of such losses by the age group which was in 1951 aged 5-9 in terms of the life table notation 1000 q_x is 5.07 for males and 4.38 for females. In the UN model life tables such losses experienced by age group 5-9 suggest general mortality conditions which can be described by a life expectation of about 31 years for males and 35 years (death rate = 29) for females. Losses at the same rate experienced by the age group which was in 1951 aged 10-14 indicate life expectation of 22 years for males and 28 years (death rate=35) of females. *See*: Population Studies No. 25. Manuals on Methods of Estimating Population. *Manual III: Methods for Population Projections by Sex and Age*. (New York: United Nations, Department of Economic and Social Affairs, 1956), p. 72. Taking the female death rate more seriously than the male parallel we obtain from the two death rates of 29 and 35 an approximate 32. Why 32 and why there are two such divergent rates cannot be explained now, but the reason for choosing the females, rather than the males, as an indicator is simple: females whether aged 5-9 or 15-19 seem to be subject to the same tendency—directionally at least—of male enumerators to underenumerate them, while boys 5-9 are enumerated fully or even slightly overenumerated as will be shown later in the case of East Pakistan, but young men 15-19 are underenumerated, hence their "mortality" is deceptively high.

[18]One wonders whether—at least in the case of men—the *reported* losses of those aged 0-4 by the time they reach 10-14, need be heavier than those aged 5-9 before they reach 15-19. We often argue in this paper that males aged 5-9 are subject to no underenumeration, while the young men of 15-19 may be, because they probably begin to take part in the migratory and other movements, which produce the persistent troughs in the age distribution curve after age twenty. On the other hand, men aged 10-14 may have recovered the 0-4 omissions. It is recoveries which provide the important part of the explanation of the male "mortality" between ages 0-4 and 10-14 being lower than that between 5-9 and 15-19.

which begins with the tender age of 5-9[19]. The other logical alternative of higher female mortality at these ages is in East Pakistan—according to all the Bengali friends of this writer—quite unrealistic[20]. The argument of this article like that in the case of West Pakistan, assumes that there is no *under*-enumeration of boys aged 5-9. The realism of this is discussed in section on the birth rate. If anything, the possibility of some *over*-enumeration of this age group in East Pakistan is admitted in the same section and that is the origin of the negative figure in the following summary.

As rather minimal guesses the shortages in the five youngest age groups can be summarized as follows (in thousands):

Age groups	*Males*	*Females*
20-24	400	250
15-19	500	500
10-14	200	800
5-9	—70	150
0-4	900	750
	1,930	2,450

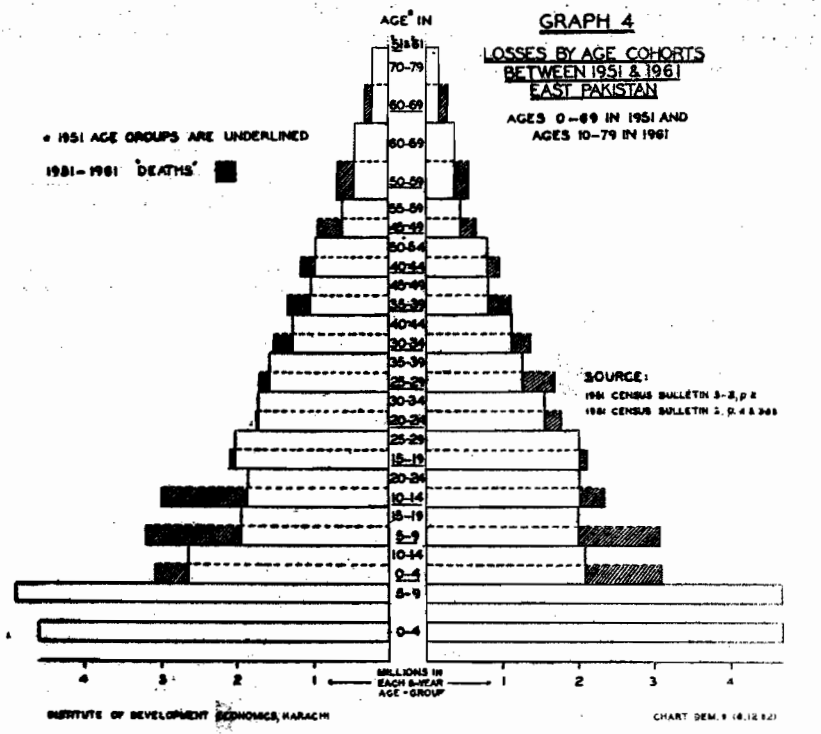
The type of reasoning leading to these figures has been explained earlier. The exact method of calculation would throw out of balance this review article. The currently used method of estimation is not designed to deal with overall omissions (or duplications), uniform between ages and sexes. If there was an underenumeration of all groups of, say, five per cent, (as there well may have been, for example, in the case of nomads of West Pakistan[21], and other mobile populations) then a different, additional and approximately uniform adjustment to all age-and-sex groups would have to be made.

The corrections suggested above would incidentally improve the masculinity ratio in East Pakistan from 108 to 105, but they would not increase by one and half (1,930 and 2,450=4,380 thousands on 8,908) the reported 1951-1961 increase. There must have been omissions in 1951.

[19]As will be seen later in discussion of Graph 7, the female-selective underenumeration (or mortality) begins in West Pakistan even earlier than in East Pakistan.

[20]Higher female mortality at young ages would also be contrary to the experience of that part of the world which has reliable statistics. This experience, however, cannot be used as a proof for East Pakistan.

[21]"First Release from the Second Population Census", *op. cit.*, p. 73.
"Report on A Census Enumeration", *op. cit.*, pp. 388 — 389.



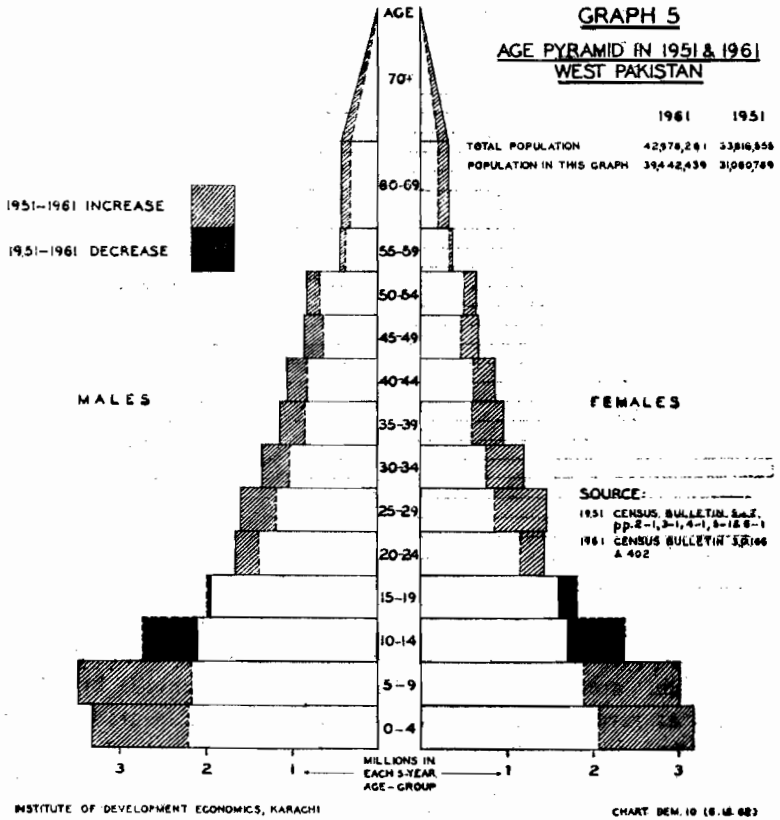
In Graph 4: *Losses by Age Cohorts between 1951 and 1961—East Pakistan*, are summarized the losses experienced by the 1951 age groups as revealed in the 1961 census. These losses are called on the graph "deaths" in quotation marks because they are the net product of losses by true mortality, digital preference in age-reporting, age-coverage differentials, change in the standard of overall age-reporting, change in overall coverage and, finally, migrational movements. Some of the shaded areas it is impossible to accept. The UN model life tables[22] would suggest a life expectation of almost 70 years for such a population—for Pakistan a clear impossibility. What we are reduced to doing in this paper, as a result, is to pick those age groups and their experience which not only require the least amount of adjusting, but which also fit a consistent set of arguments and look for excuses why we cannot accept other age groups, which would require still larger adjustments.

AGE DISTRIBUTION IN WEST PAKISTAN

At a first glance, we might be tempted to award an even bigger bouquet to the West Pakistan age distribution than we did, to begin with, in the case

[22] *Population Studies No. 25, op. cit.*, p. 73.

of the East Pakistan age distribution, at least judging by Graph 5: *Age Pyramid in 1951 and 1961—West Pakistan*. In fact, most of the familiar sins are here, only to a greater extent, plus new ones.



We start with a comforting balance between the sexes in the age group 0-4; to be sure, the age group is short of a probably minimal million and half, judging by the size of the next age group, but the shortage is almost equally divided on each side and it is proposed in the summary table below to extend the bottom of the pyramid by 700,000 boys and 800,000 girls. Assuming, as in the case of East Pakistan and without prejudice to another more comprehensive discussion, no omission of boys aged 5-9 (quite a tall order, but one cannot face spreading in a brief paper like this review article the bottom of these flat pyramids still further)[23], we are short of just under 500,000 girls in the same (5-9) age group. The argument is familiar and the adjustment

[23]Some more orderly reasons why age group 5-9 in the case of boys has been neither underenumerated nor overenumerated, with a possible and small exception in East Pakistan, are advanced in the following section on the birth rate.

suggested is not excessive inasmuch as the irregularities of the single age reporting between ages five and nine, particularly the heaping at five, is proportionately the same for both sexes. Heaping at age five greater in the case of boys would require an adjustment for girls smaller than 450,000.

Boys, as will be seen from Graph 6: *Losses by Age Cohorts between 1951 & 1961—West Pakistan*, in the next age group (10-14) experienced a very small loss (4 per cent) during the intercensal period. However high may have been the losses by true mortality, they were almost made good by recoveries of 1951 omissions when the nonenumerated boys were aged 0-4. Girls' deaths were 18 per cent. Their true mortality may have been slightly higher than that of boys because of socio-cultural reasons and because of the maternal mortality of very young mothers, but it was unlikely to have been very different from that of boys. The main explanation of the difference is that the effects of the female mortality were not counterbalanced by recoveries of 1951 omissions.

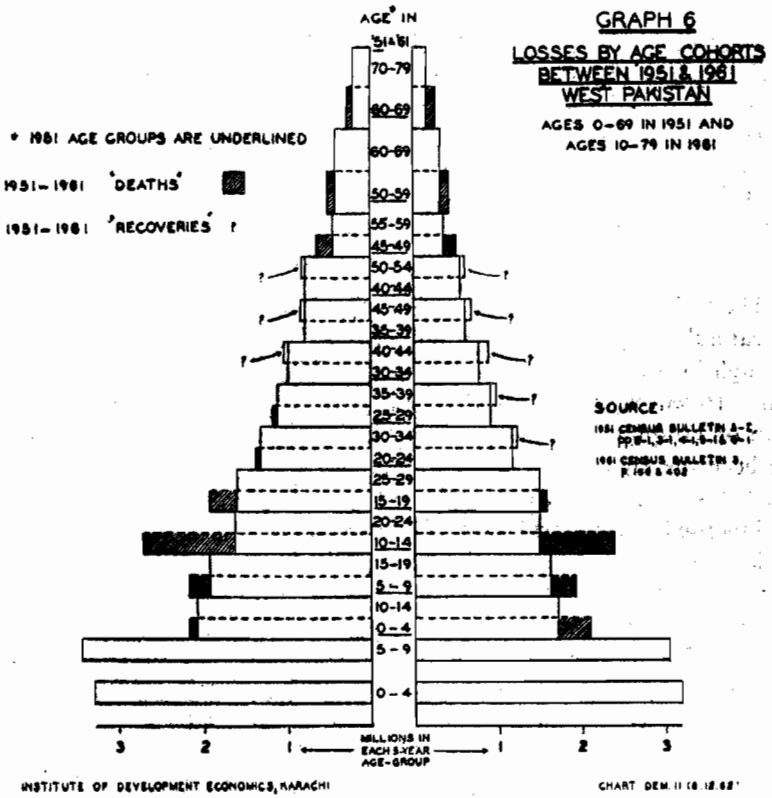
The fourth age group (15-19) shows again only small losses, especially when compared with East Pakistan. It must have been another group experiencing large recoveries of omissions ten years earlier. Judging by the sex imbalance there were some 500,000 females omitted in this age group, but this is a process which begins as already indicated at the tender age of 5-9 and as such does not show up in a marked way ten years later when the comparison is made within the sex with neighbouring age groups.

The fifth age group (20-24 in 1961) produces a bombshell. It preserves very carefully its inherited sex imbalance by suggesting almost equal and very high losses of 40 and 39 per cent since 1951, this healthiest of all age groups. However, it is likely that only a small proportion of the "deaths" shown on Graph 6 were true losses by mortality. A sizeable proportion must have been the unsettled young people. The aspect of the matter different in West Pakistan in comparison with East Pakistan is that females, preserving their inherited, sociological imbalance with males, were apparently subject in addition to the same—probably migrational—underenumeration as men. Alternatively, there may have been a further intensification of the sociological underenumeration of women by men. The first explanation, if true, could be taken as a sign of the increasing participation of West Pakistan women in the life of their males. The second would suggest that the more active men become the more secluded is the fair half of the population.

As minimal guesses the shortages in the five youngest age groups in West Pakistan again on the assumption that there was no other, overall underenumeration (or duplications) can be summarized as follows (in thousands):

Age groups	*Males*	*Femles*
20-24	400	500
15-19	150	450
10-14	—	400
5-9	—	450
0-4	750	850
	1,300	2,650

These corrections would in themselves improve the masculinity ratio in West Pakistan from 116 to 107, but as in the case of East Pakistan they would not, and for the same reason, increase the reported growth of 8,381 thousands by another 3,950 (=1,300+2,650).



However, all these considerations are overshadowed by a phenomen on arithmetically absent in the case of East Pakistan. As will be noticed from

Graph 6, five of the five-year female age groups and three male age groups show actual increases over the intercensal period instead of the expected losses. If true, this could have been produced only by immigration. An informed guess suggested for West Pakistan a net gain by immigration since 1951 of a quarter million persons[24]. It further thought that their age distribution was not abnormal, but in any case, quarter of a million even if concentrated in the eight age groups concerned, could not produce more people than there were in 1951. The correctness of the informed guess has been confirmed in general terms more recently by the results of a survey in Karachi[25].

Secondly, with a *series* of "recoveries" one cannot claim that the increase in any one age group is due to digit preference at the expense of other age groups, especially as the neighbouring groups hardly show sufficiently large losses to explain their own mortality. We are left with the suggestion that there was a general improvement in coverage in West Pakistan, a suggestion which did not force itself on us in the case of East Pakistan. This improvement in coverage in West Pakistan is consistent with and cannot be distinguished from the level of mortality lower than in East Pakistan.

As indicated earlier, demographic theory shows us how, for certain types of population, to form views about the birth rate from the width of the bottom of the age pyramid. Knowing the intercensal change, we then obtain the death rate by subtraction. If, however, part of the intercensal change is improved coverage, then we can only make a guess as to the proportion to be allotted between natural increase and improved coverage.

THE BIRTH RATE

Birth rate determines age distribution. The age distributions of East and West Pakistan being as different as described earlier, it would be almost as unreasonable to suggest one birth rate for both wings as to suggest one density figure[26].

The problem, however, in determining the birth rates for the two wings is the same: how large are the omissions of children under five; and conse-

[24]W. P. Mauldin and S. S. Hashmi, "Illustrative Estimates and Projections of the Population of Pakistan, 1951 to 1961", in M. L. Qureshi (*ed.*), *Population Growth and Economic Development with special reference to Pakistan.* (Karachi: The Institute of Development Economics, 1960), p. 72.

[25]*The People of Karachi: Statistical Report* and other monographs from the same survey by members of the Demographic Section of the Institute of Development Economics in Karachi (in draft).

[26]The 103 persons per sq. km for the whole country in 1961 conceal the extreme of 356 persons in East Pakistan and the more normal figure of 52 persons in West Pakistan. To obtain figures for sq. miles, the figures given should be multiplied by 2.588.

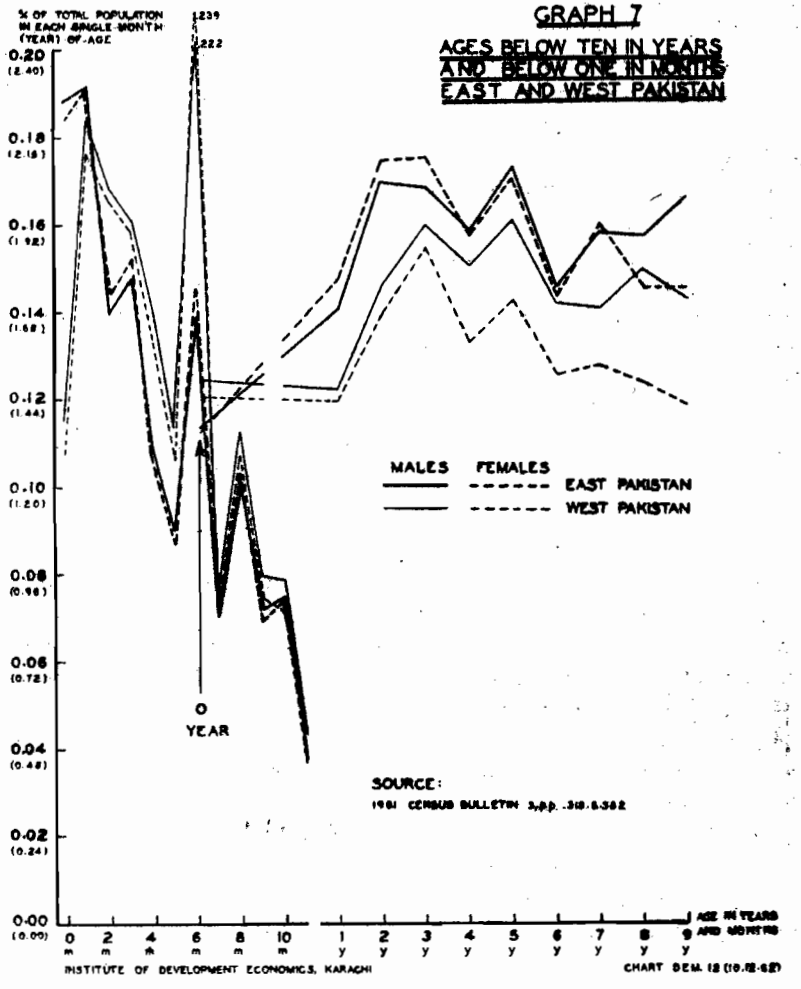
quently, how wide is the true basis of the age pyramid, as distinct from the reported one. We assumed earlier that there were no omissions among boys aged 5-9, partly because there must be one firm point to start with, partly because to contemplate omissions in this sex-and-age group would send our resulting birth rates into regions even higher than those we will arrive at, and partly because one could advance arguments that this is not an unreasonable thing to do. (They are no longer the typically forgotton and omitted infants and little children. They *are* boys one is proud of, whose existence there are no reasons to conceal.)

On the contrary, we will ask ourselves again whether this group is not too large, whether for some reasons those aged less than five or more than nine were not included in this group. After all, this group does contain those aged exactly five, a convenient figure to report to the census enumerator. We will see in Graph 7: *Ages Below Ten in Years and Below One in Months—East and West Pakistan*, that there is a peak in both provinces and for both sexes at age five. It is just big enough to fill in the troughs at ages *four* (*i.e.*, outside age group 5-9) and six. At the other end of age group 5-9, a concentration of *true* ages ten and over at *reported* ages nine, eight and possibly seven, was expected[27], due to the enumeration requirement of completing the second page of the questionnaire for all those aged ten and above. There is some concentration at age nine in the case of East Pakistan boys. The other three curves show a downward tendency, not a heaping of persons aged ten or more at reported ages nine and eight[28]. These were the origins of the only negative figure (—70,000) in the "guestimates" of age group omissions. We will take account of this possibility in determining the East Pakistan birth rate.

It is the suggestion of this paper that girls in the same age group have been underenumerated. Looking at Graphs 3 and 5 we note that there are 150,000 and 450,000 fewer girls than boys in East and West Pakistan respectively, even after we chopped off a few boys (70,000) aged nine in the Eastern wing having assumed that they are really aged ten. Informed demographic opinion cannot accept as correct the reports from this subcontinent of a pronounced male bias in the proportions at birth, whatever their persistency. In any case, Pakistan is not short of girls in the youngest age groups. The imbalance occurs only later. A perusal of Graph 7 discloses the interesting fact that boys and girls follow each other pretty closely up to age seven in East Pakistan, and age three

[27] "Report on A Census Enumeration", *op. cit.*, pp. 390-391.

[28] Perhaps the lively enumerators in the East displayed their otherwise admirable Bengali "smartness" in pushing a small number of boys ten and over under the limit of ten in order to lessen their own labours.



in West Pakistan. It is only after those ages that girls seem to be experiencing more severe mortality or are concealed and underreported, the tendency in West Pakistan arising not only earlier, but also being stronger, the resulting shortage of women in West Pakistan relatively to men being greater. The question, therefore, is: were the girls lost by mortality, though everywhere else they are stronger than boys, at least at those ages, or were they not enumerated, concealed? We are prepared to accept in this paper that Pakistani girls, at least up to the age of ten, are not exposed by their parents to markedly worse mortality conditions than their brothers.

We have, thus, extended the female bar at ages 5-9 on the age pyramids to almost, but not quite, the length of the male bar. The East Pakistan bar was

extended slightly less on account of the curving-up of the male line at age nine in Graph 7. We can now proceed to the consideration of the youngest age group. Graph 7 shows that the real deficits occur at the first two years, so-called ages zero and one. Could these deficits be real? Were there underenumerations? Why should, in the last two years before the census, there be such a fall in births? It is a fact that women aged 15-19 were being replaced recently by a somewhat smaller number, but the proportion of married (and, therefore, mothers in conditions of uncontrolled fertility) among them increased. Detailed calculations involving age specific fertility and proportions married (not presented in this review article) suggest that there might have been a (temporary) fall in the crude rate of births, but not in the total number. The lowest bars on Graphs 3 and 5 cannot, therefore, be smaller than the bars just above. How much longer they should be is more conjectural than the fact that they should be longer. Figures for omissions suggested earlier are probably modest approximations. We conclude, and with no hesitancy, that the resulting age groups must have been produced by rather high birth rates.

The difficulty lies in determining what is the bias in the peculiar distribution of ages by single months in the first year of life on Graph 7. The very steep fall in the line of distribution, if an overall view is taken, can have three causes: seasonality, the reporting of older infants as aged "one", and omissions of older infants. Seasonality would have to be more extreme than any known and documented elsewhere. As for the second alternative, instead of an undue swelling at age "one" there is a deficit in comparison with later ages. We are left with omissions, though peculiarly age-selective. Apparently, when the event is fresh in mind the baby has still a chance of being reported. As time goes on it is forgotten. If this reasoning is correct the true age distribution at the younger ages, particularly during the latter part of the last ten years, could have been produced by the following birth rates (per thousand population):

	Low estimate	*High estimate*
East Pakistan	53	60
West Pakistan	47	54

These rates are consistent with the earlier estimates of age specific underenumeration, but there is no space in a review article to show how this consistency has been assured.

If we could be now certain that the reported average annual rate of increase during the intercensal period is a good approximation to the natural

increase rate, the death rate would be a mere residual[29]. The comparison of the "age distribution populations" in 1951 and 1961 has shown the following annual increases and, if true and in the absence of net international and interwing migrations, the following death rates (per thousand population):

	Annual increase[a]	*Death rate*
East Pakistan	19.4, say 19	34-41
West Pakistan	24.1, say 24	23-30

a) These figures are the arithmetic results of comparisons of the summaries arrived at in the earlier subsection "Population Account".

If allowances were to be made for the less significant migrational movements in West Pakistan and improvements in coverage, more significant in the Western than in the Eastern Wing, the above figures, would still change in the following way (per thousand population):

	Natural annual increase	*Death rate*
East Pakistan	21	32-39
West Pakistan	21	26-33

It will be appreciated that the above death rates are residuals obtained by subtracting adjusted rates of natural increase from the birth rates determined by age distribution analysis. These residual death rates can claim a measure of support from death rates deduced from a direct study of mortality of age groups between 1951 and 1961. They compare with each other as follows (per thousand population):

	DEATH RATES	
	From study of age distribution and intercensal change	*From study of age groups in 1951 and in 1961*
East Pakistan	32-39	32
West Pakistan	26-33	25

Some of the reasons which led to the selection of the death rate 32 for East Pakistan (about halfway between the contemplated 29 and 35) have been indicated in section AGE DISTRIBUTION IN EAST PAKISTAN. They

[29]We need to be either equally certain about both censuses or equally uncertain. If one could be sure that the 1961 omissions were on the 1951 scale, then the resulting rate of natural increase would be still correct. Unfortunately, and as has been argued in earlier pages there seems to have been an improvement in coverage in 1961 and the compound rate of natural increase as calculated is an overindication of the true increase.

are very much conjectural and will require a lot of proving before they are more generally accepted. In the process they may be slightly adjusted. Those for West Pakistan are even more conjectural and the reason for their selection must be left over to another occasion. The procedure was similar to the one employed in the case of East Pakistan, but the assumptions used and adjustments applied were stronger, because changes in coverage seem to have been greater while the influence of migration, even though smaller, was still present.

There is considerable clamour for current vital rates. Users insist that they do not want bands of uncertainty, but single figures. If such single figures only must be given, the following are suggested (per thousand population) for the time being and on the distinct understanding that they will be revised:

	Birth rate	*Death rate*	*Natural increase*
East Pakistan	58	32	26
West Pakistan	51	25	26

According to those suggestions both provinces have the same rate of natural increase but the potentialities of East Pakistan are, of course, much greater. They will become effective once the very high death rate starts coming down. Those who believe that the actual death rate in East Pakistan is lower than our estimate (but are with us on the fertility side) must conclude that the natural increase is already higher there than in West Pakistan. Not that there is very much room for disagreement. There are strong reasons why mortality in East Pakistan should still be higher than in the western province: lower standard of living, greater humidity, higher morbidity, slower progress of various health campaigns, fewer public health measures.

Part of the explanation of the apparent contradictions between the two ways of arriving at our tentative conclusions and the balancing-up to make the results the same, lies hopefully in the fact that the suggested birth rate is the product of the age distribution from the 1961 census and is strongly influenced by the then prevailing true birth rate. The death rate and the intercensal change on the other hand refer to the whole ten-year period. By and large, the death rate was constant. The birth rate has been rising with the settlement of the post-1947 conditions to the level suggested for 1961.

It may appear a slavish following of the "established" opinion[30] and contrary to most recent evidence, to give a higher birth rate to East Pakistan

[30]Population Studies No. 31, *Future Population Estimates by Sex and Age, Report IV: The Population of Asia, and the Far East, 1950-1960.* (New York: United Nations, Department of Economic and Social Affairs, 1959), p. 54.

Also: "Illustrative Estimates and Projections of Population of Pakistan", *op. cit.*, p. 70.

when there are such strong reasons for thinking the contrary[31]. Be that as it may, to suggest any rate *now* is unhelpful for the next few years. The dramatic drop in the ages 10-19 appears to be true, as argued earlier, and a smaller number of potential mothers will be joining the reproductive ages now and the next few years. Even if *their* fertility is the same as that of their older sisters, they will produce fewer children in total. In this way, Pakistan may be provided with some breathing space in its development struggle. However, this opportunity is not too great because males aged 20-29 finding a smaller number of marriageable women forthcoming marry a higher proportion of them. Nor will this opportunity last for a long time, because when the 1961 ages 0-9 start joining the reproductive age (in 1966 the oldest of them will be 15) a flood of children will be produced bigger than anything this subcontinent has ever seen before.

SUMMARY

The bases of the age pyramid for each province are very wide. Such high proportions of children could have been produced only by high birth rates. The base of the East Pakistan proportionate age pyramid is even wider than that of West Pakistan.

The death rate is the difference between the birth rate and the rate of natural increase. Unfortunately, the intercensal rates of growth in the two provinces cannot be taken as very close approximations of natural increase. Part of the intercensal increase in West Pakistan seems to have been due to *im*migration and improved coverage, while the intercensal increase in East Pakistan seems to have been counterbalanced to a certain extent by *im*migration. There is also less apparent evidence of improved coverage. Coverage in East Pakistan seems to have been already higher in 1951 than in West Pakistan.

We come out with the conclusion that on balance the natural increase in both provinces was about the same at the time of the census. A study of age groups reported in 1951 and their size in 1961 led to an estimate of death rates sufficiently higher in East Pakistan to wipe out the effect of the higher birth rates. The point is made more than once that the death-rate estimates are less reliable than the birth rates. Particularly, let it be admitted, the estimate of the death rate in East Pakistan may have been increased by the sub-

[31]The most able and most recent advocacy of this view has been presented in A.S. Mohiuddin Ahmed, *The Population of Pakistan: Past and Present*, an unpublished doctoral thesis accepted by the Duke University, U.S.A. and summarized in "The Pakistan Observer", Dacca, Friday, November 2, 1962; but for a contrary view *see also*: "Second and Third Release from Second Population Census", *op. cit.*, p. 109. Demographers at the United Nations support Sanaullah's view rather than Ahmed's. *See*: United Nations, *The Population of Asia and the Far East, 1950-80: Report IV, Population Studies No. 31.* (New York: Department of Economic and Social Affairs, 1959), p. 54.

conscious desire to show a natural increase for East Pakistan if not lower than in West Pakistan, at least not higher, as that would be contrary to the reported intercensal growth. If this was wrong then the *natural* growth in East Pakistan was around 1961 already higher than in West Pakistan, and may still increase further, should the death rate be brought down to the West Pakistan level.

This analysis produced ideas about the three rates, which have been quantified in terms of belts of uncertainty around certain central values. While thinking in fixed single values should be discouraged, the demand for them continues unabated and they are given (per thousand population) with all the reservations:

	Birth rate	*Death rate*	*Natural increase*
East Pakistan	58	32	26
West Pakistan	51	25	26

In the process of describing vital rates more closely, estimates have been made about population under- and overenumeration. The new population estimates can be summarized for 1961 as follows (in thousands):

	East Pakistan	*West Pakistan*
Age distribution population	50,840[a]	39,442[a]
Suggested net corrections	4,380	3,950
	55,220	43,392
Nonage distribution population	14[a]	3,536[a]
	55,234	46,928

a) Census figures

According to this summary, the population of Pakistan as a whole was at the end of January 1961 equal to 102.2 million as against the reported 93.8 million. This underenumeration of 8.2 per cent (high in the West and lower in the East) is arrived at solely through a study of the age distribution below ages 25 of the "age distribution" population. It says nothing about other age groups, other groups of populations like nomads in Western Wing, fishermen in East Pakistan, groups of strangers, *e.g.*, Parsees, where different and additional corrections may be required. Any wholesale omissions of whole villages or areas or households with ordinary age distributions cannot be discovered by the methods employed. The methods are also unsuitable to distinguish

between female-selective underenumeration and female-selective mortality unless sufficiently long runs of census results are available. It may be that too large an allowance has been made for female-selective underenumeration. If this view is taken then it must be accepted that socio-cultural influences are being correspondingly harsher to females in Pakistan, and that their mortality is even higher than that assumed for the purposes of this review which follows the UN model life table applicable to very high levels of general mortality.

Finally, it may be helpful to recapitulate briefly some of the more outstanding anomalies in our material: the massive recoveries of people above age 30, particularly females, in West Pakistan; the gradual disappearance of a proportion of females beginning with the age of five in East Pakistan and even earlier in West Pakistan; the scattered evidence of improved coverage, including the better sex balance of persons married and the generally lower masculinity ratio; the mysterious disappearance of a large proportion of males aged 20-24 (10-14 in 1951 in East Pakistan); the great shortage of children aged 0 and 1 in comparison with those aged 2, 3 and more; the great shortage of infants aged 8 to 11 months (not made up at age 1) in comparison with those aged 0 to 2 months; the very limited possibility of allocating children aged 5-9 to the age group 10-14 in view of the sensible distribution within ages 5-9 by single years. It was the making good of these anomalies, some repetitive with 1951, which has led to the suggested adjustments of the 1961 population age groups and to the vital rates consistent with them.