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December, 1962

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THE ASSOCIATION

The *Philippine Statistician* is privileged to present in the following pages a transcription of the talks given by the members of the Ford Foundation economic development and population survey mission at the November 6 meeting of the Philippine Statistical Association. This mission was organized under the auspices of the Ford Foundation to look into the activities in the field of population as it relates to economic development planning in the countries of Asia.

Dr. Philip M. Hauser, Chairman and Professor of the University of Chicago's Department of Sociology, was appointed to head the three-man mission. An eminent demographer-sociologist-statistician, he stresses the primacy of population as a factor in economic growth. The Demographic Director of the Population Council, Inc., Dr. Dudley Kirk, defines demography and briefly traces its historical outgrowth. The third member of the team, Dr. Oscar Harkavy, Associate Director of the Ford Foundation's Economic Affairs Program, outlines the Foundation's activities and accomplishments in the 1960's.

The Editors

THE ECONOMIC DEVELOPMENT AND POPULATION SURVEY MISSION

i. THE FORD FOUNDATION

OSCAR HARKAVY

I think one of the nicest things that has been said is to refer to us as missioners, as distinct from missionary, and I think this is very good. It may be of interest to you to know what the Ford Foundation is all about, how it operates overseas, and finally a few words as to what we are trying to accomplish.

The Ford Foundation was established in 1936 by Edsel Ford with a grant of $25,000. While being interviewed by the Detroit Free Press, he stated that the purpose of the Ford Foundation was "to take care of certain philantrophic activities around Detroit that my family and I will not have time to do personally. And it will never be a large organization." Subsequently, Edsel and his father, Henry I, contributed most of the non-voting stock of the Ford Motor Company to the Ford Foundation and it later developed a value of 2 or 3 billion dollars. Despite the fact a billion and a half has been given away to date the value of the enterprise is still somewhere between 2 and 3 billion.

Recently, we underwent a ten-year review for though the Foundation was established in 1936 it was not until 1951 that the Foundation became established as a major national institution. We looked over the past and made some resolves of what is to be done in the future. I happen to have a copy of a statement on the Ford Foundation in the 1960's but I will not read the whole thing because of things that are irrelevant. If anybody wishes to get copies of this, just write to Ford Foundation, 477 Madison Avenue, New York.

The Foundation operates in a variety of fields, in educational affairs, in public and economic affairs, in international

affairs, overseas development, and in the arts and sciences. I will now refer mainly to the operations in overseas development. In Southeast Asia the person with principal responsibility for actual project development is Walter Rudlin, our representative in southeast Asia at a newly-established office in Kuala Lumpur.

We are one of a number of preliminary survey missions who will be going about, talking with the leaders of the countries in Southeast Asia on a variety of topics. Our particular interest is population as it relates to economic development. There will be at least another mission on law and public administration and another one on economic planning. We will then make some preliminary recommendations to our office in Kuala Lumpur as well as to the New York headquarters of the Foundation. We realize that we will not be able to size up all the needs of the country in nine days and move on. This is ridiculous. The way we operate is for specialists in various areas to spend a considerable time in particular areas, working closely with the educational leaders, the government leaders, the business leaders, and determine what the countries' own priorities are for their development process, and within relatively limited budgets determine how the Ford Foundation might be of assistance.

Let me just for a minute indicate some of the general ideas of interest that have been laid out for the Ford Foundation under overseas development in the 1960's. Under education, the Ford Foundation will continue its efforts in helping to raise the present standards of living, and increase educational opportunities in less developed countries. It will continue to assist efforts of these countries to establish or improve their educational institutions, programs, and practices as a means of producing the trained leaders, skilled persons and enlightened citizens essential to their national development. Under governmental operations, aid will be given to less developed countries for their programs to increase the effectiveness of central and local government operations and to train public administrators. Under industrial and business development,

the Foundation will assist less developed countries in improving their managerial competence and industrial and business enterprise for research and training programs in economics, business administration, and labor relations. Under rural and urban development, support will be given to institutions and programs to increase agricultural production, improve rural life, and raise nutritional levels. Similarly, the Foundation will support selected programs dealing with a wide range of economic, social, and governmental problems arising from rapidly increasing populations. Thank you.

ii. *THE MEANINGS OF DEMOGRAPHY*

DUDLEY KIRK

Dr. Hauser and I are not only missioners but we are demographic missioners, and people always want to make this into Democrats. By accident I happen to have been the first person in the United States government to be officially called a Demographer. My job description started off as Demographer which led to some confusion. Fortunately, this was during a Democratic administration, and when I was called a Democrat I did not mind.

The subject of demography goes back very far. This year, the British World Academy is celebrating the 300th Aniversary of John Graunt, whose *Bills of Mortality* were the beginnings of demography. A couple of years from now, they are going to celebrate the 200th Aniversary of the birth of Malthus, who was in this tradition. Quite recently, the American Statistical Association celebrated its 100th Aniversary. The founding of the American Statistical Association was by a man who today would be called a demographer, Lemuel Shaddock, whose first interest was the field of vital statistics and the accuracy thereof. It is a long tradition but the subject has not been known as demography, at least in the English language, until quite recently. We borrowed the word **demography** from the French.

About a generation ago, there was established in the United States the Population Association of America. It is interesting that the impetus for the establishment of this Association consisting largely of demographers, quite contrary to present interests, was the slow rate of population growth in the United States and the possibility of a declining population in that country. This was the reason for the modern interest in demography in the United States. The Population Association has now grown to about 600 people and is much more concerned with the very rapid rate of population growth in the United States and in other parts of the world. I think that sometimes our people confuse demographers with just this problem of population explosion as it is called and I would like to spend a very few minutes running through quickly what we think of as the field of demography and how, in a very few ways, this might relate to the Philippines.

Firstly, Demography is a body of subject matter and as expected, most of you think of demographers as concerned with census and vital statistics and this is quite true. However, it is a little wider than that — it is population in its measurable aspect. We start from the premise that in the final analysis the only resource that any country has are the numbers and qualities of its people and especially the qualities of its people. The census is the inventory of these qualities. This is a measure of not only the people who create, the creators of production, but the objects of production. Production exists only for people. And sometimes we are rather distressed when we come to some countries [not the Philippines] where we find for example, that pigs and livestock are better enumerated than the people. We are trying to encourage better enumeration, more knowledge of facts about the people in each country, in our own country, in your country, and in many other countries.

Secondly, and this relates more to your interests perhaps as statisticians, demography is a group of methods or a discipline. I will not attempt to enumerate this in detail but take for example, life tables. The whole life-table approach which

has entered into quality control, and much more conspicuously in the insurance business, started in this field of demography. Sampling and sampling surveys first grew out of problems of surveying and enumerating populations.

Thirdly, demography is a body of theory and analysis. Many of you have heard of the so-called **demographic transition** theory, which is an interpretation in a very broad way of the population changes occuring in the modern world. First, the decline in the death rate leading to rapid expansion in the rate of population growth, followed in some countries or at least in every country which has achieved a high level of living, by a lower birth rate and some reduction in the rate of population growth. Most importantly, there has been the development of a whole series of analyses based on primary census and vital statistic materials. We call them census monographs. In our country we have a series of census monographs that deal with the great social trends that are occurring in our metropolitan areas, the trends that are occurring in our rural areas. There will be a monograph on the Negro population of the United States, on migration, on labor force. These studies use the census materials more than just in terms of a great volume of tables but attempt to put these in terms of very basic economic and social trends. India, Pakistan and several other countries have such a program. It is possible that you in time might wish to consider such a program.

Finally, as a fourth interest of demographers, we get disturbed when we find that economists, sometimes others, think of populalation changes as something quite exogenous, to use the favorite word now, to the economic system. We do not feel this is true. I am not going to tell you, I am not going to persuade you, because this is essentially the subject Dr. Hauser is going to speak on. Thank you.

iii. RELATIONSHIPS BETWEEN POPULATION AND ECONOMIC DEVELOPMENT

PHILIP M. HAUSER

Thank you Mr. President, fellow statisticians. I should like to introduce my few remarks wearing different hats. First, as Chairman of the mission, I would like to take this opportunity to thank all of you and many others who are not here, for the extreme cordiality and excellent hospitality which we are enjoying as usual in Manila. It is always a pleasure to come back here, and it is always a matter of regret that I cannot stay much longer. The second, as President of the American Statistical Association this year, I should like to extend to you warm greetings from the membership of that Association to the membership of the Philippine Statistical Association. I look forward to the time when we can build up much more in the way of interrelations between our two associations, because I think in this profession, as in other professions, national boundaries have relatively little meaning. It is in this profession that we have an opportunity to be of great service to many of governmental and private activities and much in a way of common disciplines, techniques, and general professional developments to cooperate about. I would like to spend the few moments I have now in discussing the relation of population to economic development, with special reference to some of the statistical problems that may be involved. This might round out the picture we have been presenting on the purposes of our mission, the economic development and population survey mission.

What is the relation of population and economic development? Well this in itself is a subject that is treated in numbers of courses in curricula of universities. In the United States, demography has been largely taken over by the Departments of Sociology, partly because the economists were less interested until the postwar situation when this great emphasis on economic development in less developed areas brought popu-

lations to the forefront of the attention of the economists. And those who are doing the most in economic change, economic growth, economic development, find that they **cannot** ignore population, either in the long run or the short run.

Now the four ways, among the many, which I would like to direct your attention, in pointing to the significance in considering population as a factor in economic growth, or more specifically, in economic development in the less developed areas. The first relates to the relation between rates of population growth and rates of economic growth. Let me, to paint the picture very quickly, draw your attention to the fact that if you utilize the United Nations information on the population of the world and its regions in 1950, and deal for the same period on income per capita, which is a good measure of economic level, and with changes in the national income per capita as a measure of economic growth, and relate these things, these conclusions emerge. There is an inverse relationship between the present and projected rates of population increase in various regions of the world, and economic level at the present time. The lower the income per capita is among the various continental regions of the globe, the greater is the present and projected rate of population increase for the remainder of the century. The significance of this perhaps becomes apparent out of consideration of just two types which I will take the time to mention. For example, if you take Asia as a continent and utilize the so-called medium projections of the United Nations for population growth in Asia between 1950 and the year 2000, and then ask this question: By what kind of a factor would total income (total value of goods and all services produced) in Asia have to increase in order for Asia per capita income to match that of Europe in 1950, assuming there was no further increase in the per capita income in Europe in 1950? Well, the answer is that to achieve this objective it would be necessary for Asia to increase her gross product by a factor of 31. That is, between the years 1950 and 2000, gross product would have to increase thirty-one fold, because in 1950 the per capita income in Asia was at about $50 [using the United Nations figures] while in Europe it was at a level of about $350.

At the present and anticipated rate of population increase, you would come out with this kind of an economic objective.

If you raise the additional question: By what factor would it be necessary for Asia to increase her gross product to match the per capita income of let us say, America north of the Rio Grande, as it was in 1950, assuming no further increase? Then it is necessary for Asia during the 50 year period from 1950 to increase her gross product **62-fold**, 62 times. This means an increase each year greater than the total gross product of Asia as it was in 1950. Or, if we convert this to a geometric rate of increase, this will mean an increase in gross product of Asia at 8 per cent per year for every year of the 50 years during the remainder of the century. This is one way of directing attention to the fact that rapid population increase necessarily imposes tremendous burdens on economic growth. In fact there is no nation in the history of the world up to this point that has been able to maintain an 8 per cent rate of economic growth for 50 years, which would be necessary to match the income of North America in 1950. On the other hand, a decrease in the rates of increase in something like 3 per cent per year to say, half of 1 per cent per year, which was what the world averaged in the last half of the 19th century, would decrease the burden of economic growth by a factor of something like 60 per cent. In this way there is one picture of the interrelationship between population growth and economic growth.

Consider another aspect, the relation of population growth to investment, which is as you realize a very important factor in economic development. Drawing on what studies there are on the empirical relationship between the per capita income ratio, it is clear that it takes something like 3 units of capital to produce an increment of one unit in income. If you assume that the Philippines is increasing at 3 per cent per year, then this means that you must have a 9 per cent savings and investment each year merely to maintain your present per capita income. Now I do not know what the exact figures on savings out of national income in the Phililppines are or may be at

the moment, and I daresay no one else does either. Although to be sure, there are approximations and estimates. But usually, it is exceedingly difficult for an economy with a per capita income of the type that you enjoy, or should I say more appropriately do not enyoy, to set aside as much as 9 per cent or 10 per cent for savings out of national income for investment purposes. And yet this tremendous burden is necessary merely to maintain your present level of living, if you are increasing at 3 per cent per year. Obviously, if this were cut to 1 per cent per annum increase, then a 9 per cent saving would result in an appreciable increase in per capita income of the type that is not possible when you have a 3 per cent per annum growth.

Let me turn to a second type of relationship beween population and economic development, the first being essentially a consideration of the simple rate of growth itself, and pointing out that there are significant interrelationships between rate of population growth, rate of economic growth, rate of capital investment and as a matter of fact, other factors in growth we are trying to pursue. The second factor I wish to refer to is the age factor of population, a favorite subject of demographers. It is clear that in any area with a high fertility rate, a birth rate approximating 40 per thousand per year or higher, the forty per cent rule obtains. The 40 per cent rule of the demographer means that such an area with a high birth rate has 40 per cent of its population under 15 years operating to depress or obstruct efforts of economic development in at least two ways: First, a very large disproportionate part of the population being below working age means that those people of working age have a much greater dependency burden. All other things being equal, the greater the proportion of persons of the population below working age, the lower will be the per capita income, even if there is a relatively high per labor force personal income. The larger the proportion of the population that is of working age, *ceteris paribus*, the greater is per capita income. So a high fertility population with a large proportion of population under 15 necessarily creates a basic barrier to increasing per capita income. Another way of saying this is

mouths are growing faster than hands. Second, age structure operates to obstruct economic development efforts in relation to investment. In any less economically developed area, a tremendously scarce factor is obviously savings, capital. When you have a large proportion of population under 15 years of age, there is this tremendous burden and I am sure it is a great burden on your political leaders to make the decision of how much of limited scarce capital resources are to be allocated to social investment and how much to capital or productive investment. That is, if you must spend a large part of savings to simply educate the young, rear the young, and among other things, to provide adequate shelter for the young, housing and water supply, public health, etc., then a small amount remains for productive investment either in agriculture or industry to increase per capita income. In this way too then, a high birth rate area with a large proportion of its population under working age is unfavorable to economic development.

A third respect in which population is important in relation to economic development relates to the distribution of population and particularly as between urban and rural areas. I do not have the time here to elaborate upon this, but I think it is clear that most of the less developed areas of the world are **over-urbanized**, meaning an explicit thing now, not value connotations. If you compare the percentage of people living in cities in less developed areas today with the percentage living in cities at a comparable stage of economic development in the more advanced nations, then it is clear more people live in urban places in underdeveloped areas than is justified by the level of industrialization or non-agricultural activity. In this sense, a population that is disproportionately urban, before it has achieved the economies of scale and other economies that come out of urbanization so as to produce greater product per head may actually seriously hamper efforts of economic development. Let me just say that the trouble in many underdeveloped areas today is that they still need to develop an economy that will justify their present urban populations. And yet the fact is, as indicated in projections made public by the United Nations for the regional meeting in Tokyo here five-

six years ago, that Asian cities, if they should continue to increase population-wise, as is projected by the UN, and maintain a rate of growth that is observed during this century, urban populations in Asia are bound to triple in the 25 years from 1950 and 1975. These rates of expansion suggest tremendous burdens on an economy, just from the standpoint say, of infra-structure development. What you need is to create an urban plant to hold this kind of a population, again at the expense probably of productive investment and agriculture, or industry, or sectors of the economy of a more specific character with an increase of your product per head.

And finally, I want to point out that population enters into economic development in a very intimate way, in relation to that aspect of population [to which my colleague, Dr. Kirk, referred], namely, the quality of population. Now when the demographer talks about quality, he is not talking about old wives' notions about some people being inferior and some people being superior by reason of what genes have been transmitted or what have been transmitted to the genes in a biological sense. We are quite aware in demography, that the quality of a population is to a tremendous disproportionate degree a function of social, economic, and educational opportunities. The quality of a human being is almost entirely a function, by and large, of the kind of opportunity he has had as he is reared from childhood. A basic barrier to economic development in all less developed areas lies in the fact that populations have not had the opportunity for education, for training and skills, for learning of the wonders, let us say, of a post-Newtonian world, getting an outlook and a motivation and incentive to want to aspire to the kind of goals that many political leaders have but which have not yet infused the mass population. Because they tend to be inert, uneducated, and really living in a pre-Newtonian world. In this sense, a quality of a population is also an important element relating to economic development. And the fact that populations do not have adequate education, do not have adequate skills, is in many places a major barrier to important kinds of economic growth.

It is clear that when we talk about population in relation to economic development, this is not just a phrase. We are pointing to an area that is worthy of the attention of the best minds in any country, in every country, throughout the world. Because there is probably nothing more important in the entire world today than an effort on the part of the have-not nations to achieve a position so that they are have-nations along with the present have-nations. And yet I think it is perfectly clear to the demographer, to the economist, to the sociologist, to the statistician that has attempted to deal with the magnitudes and to interrelate these variables. It is perfectly clear that efforts of raising levels of living may turn out to be a hopeless and impossible task because of the burdens imposed by explosive rates of population increases. It is with this kind of consideration in mind that our mission has been organized. One final word. I think it is perfectly appropriate to say that on the action side to get population operating on behalf of economic development, rather than as a barrier to economic development, it is necessary to dampen the rate of population increase. This always raises questions in some minds about problems of birth control, and problems of value systems, what is appropriate and inappropriate. But I want to close with this thought. It is appropriate to say that there is no religious system in the world, including the Roman Catholic faith, which is opposed to responsible parenthood and the regulation of family size. The second point is this, that the spectrum of methods available for regulating family size is broad enough. There are enough different means so that some means exist consistent with every value system, including that of the Roman Catholic faith. If the Roman Catholic faith prefers some methods to other methods, this is obviously a form of behavior which is the right of any people to follow as they wish and at their own worth. It is for this reason that I want to close with this thought, that the problem here is significant enough, important enough to the nation, to the people, to the world. So that it should not be swept under a rug, but must be faced openly and above-board and that it can be faced directly I think, without doing violence to anybody's faith, anybody's value system and anybody's sensitivities. Thank you very much for being so patient with me.

REINVESTIGATION OF BIRTH AND DEATH STATISTICS IN THE PHILIPPINES

by

ELVIRA MENDOZA-PASCUAL

Introduction

The high rate of population growth in the Philippines as revealed by the latest census in 1960 warrants a more detailed analysis of fertility, mortality and migration — the three components of population growth. In this paper, differences in fertility and mortality for each province will be analysed directly, with migration emerging as a residual of the main analyses. The major portion of this paper will be devoted to an evaluation of some striking discoveries regarding birth and death statistics arrived at through a re-examination of census data and and civil registration records.

Crude measures of fertility and mortality will be utilized in this paper for lack of other data. Although in the final analysis we shall attempt to correct the registered death rates, this paper does not suggest the infallibility of the method of correction employed.

Variations in the physical or social environment and the type of economy are expected to influence the fertility and mortality rates among parts of a nation. At any time, the fertility rate may vary considerably from place to place. Rates in the Ilocos Region may be lower than that for the Cagayan Valley. Thus, what seems to be a crude birth rate of 50 for the Philippines turns out to be simply the average of the rates for the fifty-five provinces; the crude birth rate of 40, 35, 60, etc., each being weighted relative to its contribution to the whole country.

At the time of the writing of this report, the results for some of the provinces were not available to permit a complete analysis of all the provinces comprising the archipelago.

Methods of Estimation

Two methods of estimation of crude birth rates were the bases for this report. One estimate was the result of an estimate of the registered crude birth rate by the technique of moving averages (to be known as Method I) and the other was obtained with the aid of census data and life table values using the method of "reverse survival" (hereafter referred to as Method II).

In Hongpairoch's study[1] classifying the movements of birth and death rates in the provinces of the Philippines for the period 1946-59, the technique of moving averages was employed making used of registered births and deaths. In this method, the averages were obtained for overlapping periods, thus simplifying the analysis by removing the variation of a periodic type. A 5-year moving average is a series of averages which embraces first, the initial 5 years of a series, next, the second to the sixth year and so on. Thus, the average of the first 5 years, 1946-1950 is centered on 1948, the average of the period 1947-1951 is centered on 1949, and so on. In this paper, the average of the period 1951-1955 which is centered on 1953 is utilized.

Studies conducted by the United Nations on the population of the Philippines support the conclusion that our population has approximated a stable age structure.[2] This provided the groundwork for the use of the "reverse survival"[3] method in the estimation of births from census data.

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[1] Nawarat Hongpairoch, "A Study of Birth and Death Rates by Provinces in the Philippines, 1946-59," a Project submitted in partial fulfillment of the requirements for the Certificate in Statistics, April 1962, Statistical Center, University of the Philippines (Unpublished).

[2] Edith Adams, "Notes on the UN's Population Projections for the Philippines", on file at the Office of Statistical Coordination and Standards, National Economic Council.

[3] United Nations, *Methods of Population Projections by Age and Sex*, Population Studies, No. 5 (New York: United Nations Publications, 1956), p. 45.

By stable population is meant the population resulting from a constant schedule of mortality and fertility prevailing for a long period of time. Such a population attains a fixed rate of growth and age structure. Constant fertility seems a resonable assumption to make since no great change in the cultural, religious or social factors has occurred to alter attitudes toward child-bearing. However, the assumption of constant mortality would hold here as evidenced by Table I.

TABLE I

REGISTERED DEATH RATES FOR THE PHILIPPINES

Year	Rate (per 1,000)
1903	43
1918	35
1940	17
1958	8
1961	7

Source: *Statistical Handbook of the Philippines, 1903-1953*, Manila, 1954, pp. 10-13, and *Philippine Health Statistics, 1961* Disease Intelligence Center, Department of Health, Manila, p. 12.

However, Coale[4] found that for practical applications of stable population analysis, variations in mortality are relatively unimportant provided fertility remains constant. In this light, therefore, the use of the method seems justified. Nevertheless, application of the same stable model for each of the

[4] Ansley Coale, "The Effects of Declines on Mortality on Age Distribution", in *Trends and Differentials in Mortality* (New York: Milbank Memorial Fund, 1956), pp. 125 ff.

provinces poses some difficulties. Undoubtedly, regional differences will reduce the applicability of the stable population model, hence any conclusions drawn from these results are tentative in nature.

In the "reverse survival" method, the number of children enumerated in the 1960 Census is divided by the appropriate survival ratio to obtain the cohort of births of which these children are the survivals. The number of children enumerated in the age group 5-9 years is divided by the product of the survival ratio at birth, P_b (the probability of surviving from the birth to age 0-4 years) and the survival ratio at age group 0-4, P_{0-4} (the probability of surviving from 0-4 years to age 5-9 years) separately for each sex. The resulting number represents the number of children of each sex born during the period 5-10 years preceding the census year. Adding the male and female births, we arrive at the total number of births for the 5-year interval. The values of P_b and P_{0-4} are taken from the United Nations Model Life Table representing different mortality levels. The model selected represents a mortality level of 55 with an average expectation of life at birth of 47.5 years for both sexes combined.[5] This level conforms to those utilized by the United Nations.[6]

The resulting estimated number of births is divided by five times the population at the mid-year of the 5-year interval (assuming an arithmetical rate of growth) thus yielding the estimated crude birth rate.

Both sets of estimates are subject to certain limitations. The birth rates relate to the population irrespective of age and

[5] United Nations, *Methods of Population Projections by Age and Sex*, Population Studies, No. 5 (New York: United Nations Publications, 1956), p. 19.

[6] Edith Adams, "New Population Estimate for the Philippines, 1948-1962", *The Philippine Statistician* (September, 1958), pp.134-166.
United Nations, *The Population of Asia and the Far East, 1958-60*, Population Studies, No. 31 (New York: United Nations Publications, 1956), p. 58.

sex. The population estimates utilized in the estimation of said rates assumed an arithmetical rate of growth. No attempt was made to correct the number of children aged 5-9 years enumerated in the census for any possible under-enumeration nor of registered births for under-registration.

Crude Birth Rate

From the estimated birth rates listed in Table II, it is seen that there are wide differences between the two estimates among the provinces studied. In all these provinces, the estimates based on the moving average of registered birth rates (Method I) are always lower than the estimated birth rates by reverse survival (Method II). Only in Manila is estimate I higher than estimate II probably because of: (i) inclusion of births to transients and/or (ii) actual decline in fertility. Varying degrees of under-registration between provinces doubtless account for some of the observed differences between the two methods of computation. Differences in completeness of the enumeration of children aged 5-9 years will also influence the results.

It is interesting to note that all provinces listed under Southwestern Mindanao, as well as Agusan and Bukidnon had very high crude birth rates as evidenced by estimate II. However, looking at estimate I, Sulu is found to have a crude birth rate of 4 per thousand which suggests a high degree of under-registration. Using estimate II, the provinces of Southern Luzon and Islands were found to have crude birth rates above the national average except for the provinces of Batangas and Cavite. For estimate I, only Cavite and Palawan had crude birth rates below the average. The very low rate in Palawan is probably due to its geographic isolation. The non-registration of some births that occurred in Manila to Cavite residents may have accounted for Cavite's low birth rate. This is substantiated by the resulting increase noted in estimate II. Among all the regions the prevalence of under-registration in Western Visayas seems to stand out as disclosed by the wide gap between the two estimates.

TABLE II

ESTIMATED CRUDE BIRTH RATE, 1950-55 REGISTERED CRUDE BIRTH RATE BASED ON MOVING AVERAGES, 1953

Province	Estimated Crude Birth Rates (per 1,000)	
	Method I	Method II
PHILIPPINES	32	50
MANILA	41	36
ILOCOS & MOUNTAIN PROVINCE		
Ilocos Norte	35	39
Ilocos Sur	32	41
La Union	40	45
Mountain Province	21	51
CAGAYAN VALLEY & BATANES		
Cagayan	50	51
Isabela	50	57
Nueva Vizcaya		
CENTRAL LUZON		
Bataan	48	57
Bulacan	25	47
Nueva Ecija	32	48
Pampanga	40	52
Tarlac	45	48
Zambales	37	52
SOUTHERN LUZON & ISLANDS		
Batangas	43	48
Cavite	29	48
Marinduque	45	52
Oriental Mindoro	43	61
Palawan	12	50
Quezon	46	55
Rizal	38	55

TABLE II (Continued)

Province	Estimated Crude Birth Rates (per 1,000)	
	Method I	Method II
BICOL		
Camarines Sur	29	54
Albay	42	49
Camarines Norte	55	61
Catanduanes	35	49
Masbate	25	59
Sorsogon	27	48
WESTERN VISAYAS		
Antique	20	40
Iloilo	25	44
Negros Occidental	17	51
Negros Oriental	22	51
Romblon	28	50
Capiz	26	52
EASTERN VISAYAS		
Bohol	34	39
Cebu	37	44
SOUTHWESTERN MINDANAO & SULU		
Davao	49	70
Zamboanga del Norte	30	59
Sulu	4	52
NORTHEASTERN MINDANAO		
Agusan	30	68
Bukidnon	33	76
Misamis Occidental	39	46
Misamis Oriental	22	46
Surigao	21	48

The above observations tend to be supported by the masculinity ratio at ages 15-44 (males per 1,000 population), proportion of females "ever married" at ages 15-44, and the replacement ratio (children aged 5-9 years per 1,000 females aged 15 44 years) by provinces for 1948 and 1960 presented in Table III.

In general, the provinces with high crude birth rates were observed to have high masculinity ratios, high proportions of females married and high replacement ratios. Thus, estimated crude birth rates by Method II were compatible with the values of these three ratios. The province of Palawan however, deviated from the general trend. This Island had a birth rate of about average, a replacement ratio of a little below average in 1948 and a little above average in 1960, and yet had a masculinity ratio and proportion of married females that were very high. This led us to suspect that the level of mortality was understated for Palawan resulting in a lower computed crude birth rate. For the same reason of high childhood mortality, the replacement ratio will be lower and hence would not be indicative of the true fertility.

In Manila in 1948, the masculinity ratio was very high but the proportion of females married and the replacement ratio were very low. By 1960, the masculinity ratio decreased from 501 to 454 and the proportion of females married decline further. These declines point to the occurrence of selective migration in favor of the females after 1948. A sample survey conducted in 1957 reported that 47% of the female residents were born outside of Manila while the corresponding proportion for males was 42%.[7] A possible explanation is the presence of light industries and small commercial establishments employing women.

Crude Death Rate

The rate of growth is a function of fertility, mortality and migration. If international migration in the Philippines is

[7] Bureau of the Census and Statistics, *The Philippine Statistical Survey of Household Bulletin*, No. 6 (June 1960), p. 13.

TABLE III

MASCULINITY RATIO AT AGES 15-44 YEARS; REPLACEMENT RATIO, AND PROPORTION OF FEMALES EVER MARRIED AT AGES 15-44 BY PROVINCES, 1948 AND 1960

Province	1948			1960		
	Masculinity Ratio	Replacement Ratio	Proportion of Ever Married Females	Masculinity Ratio	Replacement Ratio	Proportion of Ever Married Females
PHILIPPINES	487	689	628	490	758	619
MANILA	501	377	504	454	465	445
ILOCOS & MOUNTAIN PROVINCE						
Ilocos Norte	452	650	579	490	684	572
Ilocos Sur	442	607	536	484	691	572
La Union	463	617	565	486	785	608
Mountain Province	478	642	739	490	690	702
CAGAYAN VALLEY & BATANES						
Cagayan Valley	486	629	638	499	797	687
Isabela	497	680	704	506	839	724
Nueva Vizcaya	483	647	710	499	866	712
CENTRAL LUZON						
Bataan	502	478	653	498	913	697
Bulacan	478	610	582	483	714	558
Nueva Ecija	478	710	641	492	777	621
Pampanga	495	662	610	488	806	594
Tarlac	483	707	655	491	803	629
Zambales	496	645	664	478	742	628
SOUTHERN LUZON & ISLANDS						
Batangas	477	624	615	478	761	607
Cavite	475	586	652	480	711	596
Marinduque	490	741	656	498	861	671
Oriental Mindoro	503	725	573	504	847	733
Palawan	506	668	711	543	760	748
Quezon	503	678	715	504	836	696
Rizal	493	569	586	464	569	521

TABLE III (Continued)

Province	1948			1960		
	Masculinity Ratio	Replacement Ratio	Proportion of Ever Married Females	Masculinity Ratio	Replacement Ratio	Proportion of Ever Married Females
BICOL	492	766	662	498	384	621
Camarines Sur	491	772	635	493	826	622
Albay	506	824	714	508	884	687
Camarines Norte	491	847	575	500	781	545
Catanduanes	494	938	649	490	875	700
Masbate	493	868	669	500	887	646
Sorsogon	478	700	550	473	714	573
WESTERN VISAYAS						
Antique	473	658	577	475	713	548
Iloilo	505	789	642	498	821	609
Negros Occidental	484	838	574	493	807	625
Romblon	463	849	629	477	845	648
Capiz	470	800	611	480	846	639
EASTERN VISAYAS						
Bohol	472	733	586	476	709	582
Cebu	474	654	580	473	715	570
SOUTHWESTERN MINDANAO & SULU						
Davao	541	780	737	526	856	693
Zamboanga del Norte	502	858	681	499	836	667
Sulu	470	746	717	487	743	682
NORTHEASTERN MINDANAO						
Agusan	517	757	687	517	806	698
Bukidnon	519	726	760	522	865	748
Misamis Occidental	497	793	623	491	758	594
Misamis Oriental	499	748	626	504	833	632
Surigao	488	784	658	489	730	644

negligible, the rate of natural increase (crude birth rate minus crude death rate) equals the rate of growth. That is:

Natural increase = Crude Birth Rate - Crude Death Rate = Rate of Growth.

Using this relationship we estimate the Philippine crude death rate at 18 per thousand (50 - 32 = 18).

For each province, we can get a fairly reliable estimate of the crude death rate by taking the difference between the rate of growth and the crude birth rate (estimate II) provided migration does not play an important part in the growth of population. However, if migration occurs to a certain degree, we can deduce the direction of movement from such results.

Barring significant migration, we should not get a figure lower than the estimated registered rates by moving averages; registered deaths in all probability subject to under-registration. The fact that our provincial totals for the 1948 and 1960 censuses may be inaccurate or our estimated crude birth rate (estimate II) may be seriously under-estimated has not been taken into consideration. Clearly, when this rough estimate of the death rate by residual difference for a certain province turns out to be significantly lower (or negative which is impossible) than the crude death rate estimated by moving average, the situation may be accounted for by a high rate of growth which in turn is caused by a high degree of in-migration.

Thus, from Table IV, it is noted that there was considerable net in-migration in Oriental Mindoro, Rizal, Davao, Agusan, Camarines Norte, Bukidnon, Isabela and Nueva Vizcaya.

The data presented in Table V further attest to the presence of considerable net in-migration in these places. Of those born in Southern Luzon and Islands, 5% were living in other regions in 1957 while 17% of the residents of the region were born elsewhere, indicating a considerable net in-migration.

However, it must be emphasized that since the figure of migration as measured in Table V is "lifetime migration" it is

TABLE IV

CRUDE DEATH RATES (PER THOUSAND) 1950-1955, 1953 (PHILIPPINES)

Province	Estimated Crude Death Rate a/	Registered Death Rate by Moving Average
PHILIPPINES	18	11
MANILA	13	10
ILOCOS & MOUNTAIN PROVINCE		
Ilocos Norte	27	12
Ilocos Sur	23	11
La Union	26	12
Mountain Province	11	6
CAGAYAN & BATANES		
Cagayan	19	18
Isabela	11	17
Nueva Vizcaya	12	15
CENTRAL LUZON		
Bataan	17	16
Bulacan	21	12
Nueva Ecija	25	13
Pampanga	17	12
Tarlac	24	15
Zambales	13	11
SOUTHERN LUZON & ISLANDS		
Batangas	22	12
Cavite	15	14
Marinduque	26	15
Oriental Mindoro	7	14
Palawan	12	5
Quezon	14	15
Rizal	*	11

a/ Estimated Crude Death Rate = Crude Birth Rate Minus Rate of Growth.

* Negative.

TABLE IV (Continued)

Province	Estimated Crude Death Rate [a] /	Registered Death Rate by Moving Average
BICOL		
Camarines Sur	18	10
Albay	25	12
Camarines Norte	7	17
Catanduanes	19	12
Masbate	17	8
Sorsogon	32	12
WESTERN VISAYAS		
Antique	38	11
Iloilo	29	10
Negros Occidental	29	9
Negros Oriental	24	9
Romblon	23	12
Capiz	30	11
EASTERN VISAYAS		
Bohol	32	15
Cebu	29	12
SOUTHWESTERN MINDANAO & SULU		
Davao	*	10
Zamboanga de Norte	12	9
Sulu	25	2
NORTHEASTERN MINDANAO		
Agusan	*	9
Bukidnon	*	7
Misamis Occidental	29	13
Misamis Oriental	42	9
Surigao	21	10

[a] / Estimated Crude Death Rate = Crude Birth Rate Minus Rate of Growth.

* Negative.

TABLE V

POPULATION BY REGION OF BIRTH BY AND OF REGION RESIDENCE MAY, 1957

Region	Living in Specified Region			Born in Specified Region		
	Total (000)	Percent Living in the same region	regions other in the Living Percent	(000) Total	in the Born Percent region same	Percent Born in the other regions
Manila	894	74.5	25.5	1,184	56.3	43.7
Ilocos and Mt. Province	1,596	84.7	15.3	1,406	96.2	3.8
Cagayan Valley and Batanes	850	96.6	3.4	1,024	80.9	19.1
Central Luzon (including Zambales and Bataan)	3,681	84.7	15.3	3,202	97.3	2.7
Southern Luzon & Neighboring Islands (Marinduque, Mindoro and Palawan)	3,026	94.8	5.2	3,439	83.4	16.6
Bicol Provinces (including Masbate)	1,945	94.7	5.3	1,971	93.5	6.5
Western Visayas	3,772	90.5	9.5	3,500	97.5	2.5
Eastern Visayas	4,205	86.8	13.2	3,730	97.8	2.2
Southwestern Mindanao and Sulu	1,440	98.0	2.0	2,019	69.9	30.1
Northeastern Mindano	1,375	95.7	4.3	1,472	89.3	10.7

Source: Bureau of the Census and Statistics, *The Philippine Statistical Survey of Households Bulletin*, No. 6 (June 1960), p. 13.

not a good measure of recent or current migration. Unfortunately, data on current migration for the provinces are not available to confirm the findings of this report.

A rough gauge of provinces with net out-migration could be established if we try to compare the indicated estimates of crude death rates with the registered death rates by moving averages corrected for under-registration.

We mentioned previously that subtracting the annual rate of growth of 32 from crude birth rate of 50 would give an estimate of crude death rate of 18 per thousand. Assuming that our choice of the survival ratios, P_b and P_{0-4}, for use in the reverse survival method was in error, then the resulting crude birth rate would have been slightly lower, say 48, thus giving a crude death rate of 16.

Turning our attention to the characteristics of typical stable populations arising from different levels of mortality and fertility, and using the models calculated by the UN[8] we note that the Philippine population fall between the two models shown below:

Gross Reproduction Rate	Expectation of Life at Birth	Percent of Population Aged			Crude Rates/1,000 Population		
		Under 15	15-19	60 or more	Birth Rate	Death Rate	Natural Increase
4	50	51.5	45.8	2.7	55.7	16.2	39.5
3	50	44.6	50.9	4.5	44.9	15.8	29.1

The 1960 Census revealed that 45.7% the population was under 15 years of age, 50% was aged 15-59, and 4.3%, 60 years old and over. With a birth rate falling within the range of the two birth rates of the model as illustrated, the crude death rate would

[8] United Nations, *The Future Growth of World Population*, Population Studies, No. 28 (New York: United Nations Publicaitons, 1958), p. 43.

be around 16 per thousand.[9] Besides, if the crude death rate of 18 per thuosand is adopted as the average for the Philippines, it would be inconsistent with the premise that deaths are most probably better registered than births.

Adopting a crude death rate of 18 per thousand as the hypothetical corrected rate and a registered death rate by moving average of 11 per thousand[10] would imply 39% unregistered deaths. Similarly an estimated crude birth rate of 50 by reverse survival and registered birth rate of 32 by moving average would imply about 36% unregistered births. Hence, in our correction of the registered crude death rates by moving average, a decision was made to adopt 16 as the crude death rate for the whole Philippines, implying 31% incompleteness of registration.[11] This would signify that 5% more deaths than births are apt to be registered on account of government control of cementeries and the strong pressures exerted by mores and customs concerning burials.

Aside from the assumption made in the previous paragraph, the method of correction for each of the provinces is heavily dependent on the idea that the crude birth rate (estimate II) closely approximates the true birth rate, hence, no attempt was made to correct the said rate or the birth rate by moving averages. The procedure of correcting registered death rates in-

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[9] B. Aromin of the NEC obtained a hypothetically corrected death rate of 17 by method I and 18 by method II for 1951-55 and 14 by method I and II for 1956-60. See B. Aromin, "The Trend of Mortality in the Philippines 1903 to 1960," *The Statistical Reporter*, Vol. V, No. 3 (July, 1961), pp. 1-7.

[10] All figures on registered death rates by moving averages were taken from the results of Nawarat Hongpairoch's findings.

[11] In a study by the Department of Health in 1961 to determine the degree of under-registration of deaths, they took names from the graves and these were matched with the Register of Deaths of the Local Civil Registry. In the 19 municipalities of Luzon surveyed, the proportion of cases with missed registration ranges from 16 to 33%.
Another survey in Nueva Ecija in 1956 by the Department of Health indicated 11% under-registration of deaths in that province.

volves: (i) estimating the degree of completeness of registration of births for each province by dividing the registered crude birth rate (estimate I) by birth rate (estimate II); (ii) adding 5% to the amount of completeness of registration obtained in (i); (iii) using this measure to correct the death rate as registered for the province. The results are presented in TableVI.

Figures from Table VI showed that the death rates are high in Cagayan Valley, Western Visayas, some provinces of Central Luzon (Bataan, Bulacan and Nueva Ecija), and some parts of Southern Luzon (Cavite and Oriental Mindoro). The rates are noticeably low in the Ilocos Provinces, Cebu, Davao, Albay, Batangas and of course, Manila.

The crude death rate of 13 for the Ilocos Provinces was surprisingly low, suggesting some special explanation. It appears that we have understated the level of mortality in the estimation of birth rates, such that the resulting crude birth rate was was quite low. A low crude birth rate by the reverse survival would result in high degree of completeness of registered births, hence hypothetically low corrected death rate. It should be emphasized, however, that the low estimates of the crude birth rate obtained was in accord with the low proportion of females married in the province. Another possibility is that the method of correction is not justified for the province. Nevetheless, the possibility of death rates being really low in these provinces should not be ruled out especially on account of lower child mortality.

A comparison of the hypothetically corected death rates and the rough measure of death rates (assuming rate of growth = rate of natural increase) presented in Table IV revealed the provinces of net out-migration. When the differences in the two estimates result from lower corrected death rates, this would indicate considerable net out-migration in those provinces, assuming the rates are fairly correct. Thus, the provinces of net out-migration were: Misamis Occidental, Misamis Oriental, Ilocos Provinces, Albay, Sorsogon, Antique, Iloilo, Capiz, Bohol and Cebu. This same finding was borne out by the data on Table V.

TABLE VI
HYPOTHETICALLY CORRECTED CRUDE DEATH RATE, 1953
(PER THOUSAND)

Province	Hypothetically Corrected Crude Death Rate	Province	Hypothetically Corrected Crude Death Rate
PHILIPPINES	16	BICOL	
MANILA	10	Camarines Sur	17
ILOCOS & MT. PROVINCE		Albay	13
Ilocos Norte	13	Camarines Norte	18
Ilocos Sur	13	Catanduanes	16
La Union	13	Masbate	17
Mt. Province	13	Sorsogon	20
CAGAYAN VALLEY & BATANES		WESTERN VISAYAS	
Cagayan	18	Antique	20
Isabela	18	Iloilo	16
Nueva Vizcaya	16	Negros Occidental	24
CENTRAL LUZON		Negros Oriental	19
Bataan	18	Romblon	20
Bulacan	21	Capiz	20
Nueva Ecija	18	EASTERN VISAYAS	
Pampanga	15	Bohol	16
Tarlac	15	Cebu	13
Zambales	14	SOUTHWESTERN MINDANAO & SULU	
SOUTHERN LUZON & ISLANDS		Davao	13
Batangas	13	Zamboanga del Norte	16
Cavite	22	Sulu	15
Marinduque	16	NORTHEASTERN MINDANAO	
Oriental Mindoro	19	Agusan	18
Palawan	17	Bukidnon	14
Quezon	17	Misamis Occidental	14
Rizal	15	Misamis Oriental	17
		Surigao	20

This study furnished some evidence of the presence of considerable internal migration which makes crude birth and death rates unreliable indicators of population growth in those areas most subject to internal re-distribution. It is hoped that the studies relating to a sample of the 1960 population now underway may furnish conclusive evidence of the volume and direction of movement among the provinces, thus providing reliable bases for the correct estimation of vital rates.

PHILIPPINE STATISTICAL ASSOCIATION
Incorporated
P.O. Box 3223, Manila

11TH ANNUAL REPORT

The Philippine Statistical Association entered its eleventh year of existence as a professional society engaged in promoting the need for and use of statistics in public and private sectors of the economy through its meetings, seminars and conferences.

During the year 1962, five meetings were held by the membership including the usual annual elections and Christmas get-together on December 14. The first meeting was held on January 20 at which the Hon. Benjamin Gozon, Secretary of Agriculture and Natural Resources, emphasized the administration's need for accurate and current basic data dealing especially with production of staple crops. After his talk, Secretary Gozon inducted the newly-elected officers of the Association who are as follows:

President	Cesar M. Lorenzo
First Vice-President	Cristina P. Parel
Second Vice-President	Burton T. Oñate
Secretary-Treasurer	Mercedes B. Concepcion
Members	Domingo C. Alonzo
	Perfecto R. Franche
	Manuel O. Hizon
	Bernardino A. Perez
	Enrique T. Virata
	Exequiel S. Sevilla (ex-officio)

The next guest speaker of the Association was visiting Vanderbilt University Prof. Nicolas Georgescu-Roegen who consented to grace the February 9th meeting. A noted economist, Dr. Georgescu-Roegen, concentrated on some aspects of agro-industrial economies. A lively discussion followed his talk. The energetic Secretary of Commerce and Industry, Rufino Hechanova, was the next guest speaker at the monthly meeting held

on August 24. In clear and lucid terms, Mr. Hechanova explained the 5-year socio-economic development program of Pres. Macapagal. He also clarified the contents of Executive Order No. 13 promulgated on June 28, 1962 creating the Business Guidance and Statistical Center as the sole agent responsible for the publication and release of official statistics.

In November, a population and economic development survey mission under the auspices of the Ford Foundation visited Manila for nine days. The mission consisted of Dr. Philip M. Hauser of the University of Chicago as Chairman, Dr. Dudley Kirk of the Population Council and Dr. Oscar Harkavy of the Ford Foundation. The Association invited the members of the mission to its November 6 meeting. In his brief talk, Dr. Harkavy touched on the Ford Foundation's overseas program and the reasons for the survey. Dr. Kirk focussed his attention on the need for census monographs. As the principal guest speaker, Dr. Hauser placed primary importance on the population factor as a component of economic development. He compared population growth rates in the underdeveloped and developed areas of the world and showed where rapid growth may hinder economic development.

The annual election meeting and traditional Christmas party was very well-attended by the members. The Board members were elected from a list of nominees prepared by the Nominating Committee composed of Messrs. Elpidio Makanas, Pedro Florentino, and Perfecto Rivera. Gifts were exchanged during the short program that followed the luncheon.

In addition to the meetings described in the preceding paragraphs, the Tenth Annual Conference of the Association was held on June 29. The site of the conference was the Institute of Public Administration's air-conditioned conference room located on the ground floor of Rizal Hall. Five papers were presented and discussed by those present. Dr. Tito A. Mijares presented a paper entitled "A Beta-Approximation to the Trace of the Roots of a Multivariate Matrix." Dr. Burton T. Oñate spoke on "Ratio Estimation in Multi-Stage Design." "Population Pressures and Some Ethical Aspects of Government Planning" was the topic selected by the Rev. Francis C. Madigan, S.J. of Xavier

University, while Dr. Cristina P. Parel chose to speak on "The Effect of Observational Errors on Least Squares Regression Estimates." Dr. Federico M. Sioson of the Ateneo de Manila University drew the interest of the audience with his paper "The Mathematics of Decision Making." As in previous years, the proceedings of this Conference was published in the June and September issues of the **Philippine Statistician**, official organ of the Association. For its June issue, the cover page was attractively set out with the contents readily identified on the cover.

Under the guidance of the Committee on statistical quality control and following the enthusiastic response of the industrial sector, the **Second Seminar on Statistical Quality Control** was held on January 30 and 31 at the Erlanger and Galinger Auditorium. Seventy participants representing some forty private and public agencies listened to the six speakers whose papers dealt with a variety of topics. "Sequential Inspection Procedures in Industry" was touched upon by Dr. Domingo C. Alonzo while "Statistical Quality Control in Government Operations" was discussed by Dr. Burton T. Oñate. Mr. J. M. Abreu of the Philippine Manufacturing Company presented the quality control procedures in his company. The veneer and plywood industry problems in quality control were written up by Mr. Aurelio C. Lagman of Sta. Clara Lumber Co. A suitable quality control program for a petroleum refinery laboratory was the main emphasis in Filoil's Benjamin D. Capayas' paper. In the closing paper, Dr. P. B. Patnaik traced the development of SQC in the Philippines. The questions from the floor were prompted by the novel content of these papers. At the luncheon given by the Association, NEC Chairman Cornelio Balmaceda as the guest speaker, spoke on the important role of SQC in the attainment of greater production at least cost and best quality possible. The proceedings of the Seminar has since been published through a grant from the Office of Research Coordination, University of the Philippines.

The Board of Directors honored several visiting statisticians during the year. Miss Irene Hess, Assistant Director of the Survey Research Center at the University of Michigan came

to Manila enroute back to the US after a short assignment in Calcutta, India. Mr. Ajit Das Gupta, Regional Demographic Representative of ECAFE at Bangkok conferred with those agencies involved in the analysis of population census data. Both these persons were present at the welcome luncheon tendered by the Board of Directors on April 13.

To honor departing members, Dr. P. B. Patnaik, Atty. P. Franche and Mr. E. S. Sevilla, a farewell luncheon was given by the Board members on October 11. Dr. Patnaik has rendered invaluable assistance in several Association projects during his three and a half years assignment as UN Principal Adviser to the U.P. Statistical Center. He will assume the post of Project Manager at the UN Special Fund-Assisted Statistical Research and Development Center in Djakarta, Indonesia. Atty. Franche was recruited by the UN to serve a one-year term as director of sample surveys in La Paz, Bolivia. Mr. Sevilla, president of the National Life Insurance Co., was embarking for Japan to attend an international insurance conference.

The growing strength of the Association has been due to quality membership. During 1963, 15 new members were admitted into the Association, making a total of 218, 9 of whom are life members. Seventeen members discontinued their membership. In addition there are 15 active institutional members whose encouraging support has proved effective in spurring on further activities of the Association.

The finances of the Association continue to be healthy. The year 1962 started with a total of ₱16,284.29 in the treasury. During the year cash receipts amounted to ₱10,698.95, mainly coming from individual membership dues, institutional member contributions and registration fees for the statistical quality control seminar. To carry out the activities of the Association, ₱9,779.27 was spent during the year. The printing of the "Philippine Statistician" accounted for ₱4,115.90. As the year ended, the cash balance in the treasury amounted to ₱17,203.97, with membership dues receivable amounting to ₱1,038.00.

(Sgd.) CESAR M. LORENZO
President

THE PHILIPPINE STATISTICAL ASSOCIATION
Incorporated
P. O. Box 3223, Manila

DIRECTORY OF INDIVIDUAL MEMBERS

Recording Year of Admission

December 31, 1962

- A -

1958 **ABALOS, Mrs. Lagrimas V.**; Division of Research and Special Studies, Bureau of the Census and Statistics, J.P. Laurel, Manila.

1960 **ABAYA, Miss Teresita S.**; 959 E. de los Santos Ave., Quezon City.

1960 **ABESAMIS, Miss Aurora B.**; Filoil Refinery Corporation, 984 Taft Avenue, Manila.

1955 **ACAYAN, Mrs. Dolores S.**; 2435 Singalong, Malate, Manila.

1952 **AGUIRRE, Tomas B.**; Philippine National Bank, Escolta, Manila.

1960 **AGUSTIN, Napoleon**; Bureau of the Census and Statistic, J.P. Laurel, Manila.

1954 **ALIÑO, Reinaldo**; 522 Bagumbayan, Sta. Mesa, Manila.

1954 **ALONZO, Dr. Domingo C.**; U.P. Statistical Center, P.O. Box 479, Manila.

1961 **ALQUIZA, Rosalino A.**; G3 Div., Philippine Army, Fort William McKinley, Rizal.

1953 **ALZATE, Loreto V.**; Menzi and Co., Inc., Mati Project, Claveria, Davao City.

1952 **ANTIPORDA, Alfredo V.**; Foreign Exchange Department, Central Bank of the Philippines, Aduana, Intramuros, Manila.

1960 **ARO, Sergio M.**; 1118 Estrada, Singalong, Manila.

1958 **AROMIN, Basilio B.**; 326 Cannor Dormitory, University of North Carolina, Chapel Hill, North Carolina, U.S.A.

1958 **AROMIN, Policarpio.**; Kadig, Sta. Mesa Heights, Quezon City.

1960 **ASLAM Muhammad**; 144/E Jehangir, Road West Karachi-5, Pakistan.

1961 **AYCARDO, Miss Cecilia S.**; 115 Fortuna, Pasay City.

- B -

1953 **BALTAZAR, Tomas**; Bureau of Private Schools, Arroceros, Manila.

1961 **BANAG, Miss Consuelo Cruz**; 869 Teresa, Ermita, Manila.

1953 **BANCOD, Ricardo T.**; Philippine American Life Insurance Co., Philamlife Building, Isaac Peral, Manila.

1953 **BANTEGUI, Bernardino G.**; FAO Regional Office, Maliwan Mansion, Phra Atit, Bangkok, Thailand.

1958 **BANTEGUI, Mrs. Celia G.**; Philippine Atomic Energy Commission, Herran, Manila.

1960 **BARBER, Dr. Clarence L.**; Department of Economics, University of Manitoba, Winnipeg, Canada.

1958 **BARRETTO, Mrs. Felisa R.**; Bureau of the Census and Statistics, J.P. Laurel, Manila.

1959 **BARTOLOME, Pedro V.**; National Income Branch, Office of Statistical Coordination and Standards, National Economic Council, Padre Faura, Manila.

1957 **BATARA, Adriano B.**; Government Service Insurance System, Arroceros, Manila.

1960 **BAUTISTA, Mrs. Lourdes O.**; Group Actuarial Department, Insular Life-FGU Insurance Group, 21 Plaza Moraga, Manila

1960 **BELARMINO, Isagani C.**; Agricultural Economics Division, Department of Agriculture and Natural Resources, Dliman, Quezon City.

1959 **BELLEZA, Miss Ines G.**; Department of Mathematics, University of the Philippines, Diliman, Quezon City.

1959 **BELLEZA, Miss Ines G.**; Departmen of Mathematics, University of the Philippines, Diliman, Quezon City.

1960 **BELTRAN, Capt. Diosdado G.**; Statistical Division, GHQ, Armed Forces of the Philippines, Camp Murphy, Quezon City.

1961 **BENDAÑA, Manuel**; Department of Mathematics, University of the Philippines, Diliman, Quezon City.

1953 **BENGZON, Arturo**; Development Bank of the Philippines Branch, Iloilo City.

1952 **BLARDONY, Sr., Mauro**; Control and Analysis Department, Insular Life-FGU Insurance Group, 21 Plaza Moraga, Manila.

1960 **BREEN, Thomas J.**; Office of the Director, U.S. Bureau of Census, Washington 25, D.C., U.S.A.

1959 **BRENNAN, Mrs. Carolina**; Department of Mathematics, University of the Philippines, Diliman, Quezon City.

1952 **BRINGAS, Honesto**; Labor Statistics Services, Department of Labor, Mendoza, Quiapo, Manila.

1952 **BUENAFE, Manuel E.**; Bureau of the Census and Statistics, J. P. Laurel, Manila.

1957 **BUENAVENTURA, Miss Angeles R.**; International Students' Association, 33 Garden St., Cambridge, Massachusetts, U.S.A.

1960 **BUENAVENTURA, Miss Corazon R.**; Information and Statistics Division, Rice and Corn Board, Port Area, Manila.

1961 **BULATAO, Rev. Jaime C., S.J.**; Central Guidance, Ateneo de Manila University, P.O. Box 154, Manila.

- C -

1960 **CALABIO, Wilfredo T.**; Philippine Rural Reconstruction Movement, Manila.

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