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OUTFLOW OF TRAINED PERSONNEL FROM DEVELOPING COUNTRIES

Report of the Secretary-General

## PREFACE

The General Assembly in resolution 2320 (XXII) adopted at its twenty-second session requested the Secretary-General "to assemble and analyse the comments and information that have been received from Governments, specialized agencies, the International Atomic Energy Agency, the Advisory Committee on the Application of Science and Technology to Development and organs in the United Nations system pursuant to Economic and Social Council resolutions 1029 (XXXVII) of 13 August 1964 and 1274 (XLIII) of 4 August 1967 and General Assembly resolution 2090 (XX) and, when submitting the report, to highlight the advantages and disadvantages accruing to both the developed and the developing countries as a result of the tendency of trained personnel from the latter to remain in the industrialized countries or to leave their country after they have received their training".

In view of the very active role of the United Nations Institute for Training and Research in investigating the problem of the outflow of high level personnel from developing countries, the Secretary-General invited the co-operation of UNITAR in the preparation of a study which would serve as the basis for the present report. The Executive Director acceded to this request and transmitted a study on the outflow of both high-level and middle-level personnel from developing countries. The first draft of the report was reviewed by a panel of four experts meeting at United Nations Headquarters over a period of three days. In preparing the report, UNITAR has had access to information on the subject submitted by interested organs of the United Nations system and particularly by the ILO and UNESCO. Some of these data were submitted through the Administrative Committee on Co-ordination.

The present report represents a shortened version of the text of the original study and has been prepared in the Social Development Division. All the tables and charts which appeared in the original study are reproduced here.

The Secretary-General wishes to record his deep appreciation to the Executive Director of UNITAR for his collaboration in this study.

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## INTRODUCTION

1. The tendency of skilled and highly educated and trained persons to migrate from the less developed to more highly developed countries involves at least two sets of circumstances which, although interrelated, should be analysed separately in order to be better understood. The first set relates to the size, character and causes of this movement as well as to its origin and destination. The second set is concerned with the evaluation of the migration, both for the deprived and for the receiving countries. In brief, the question is to determine whether the migration of skilled and highly trained persons in fact constitutes a developmental problem for both the developing and the developed countries and, if so, to what extent.
2. In considering the migrants, a distinction should be made between those who are already skilled or educated before they migrate and those who acquire skills and education after settling abroad. For the purpose of this report, those studying or who are being trained abroad are excluded from the definition of migrants or "brain drain". However, those who remain abroad following a course of education and training or those who take steps to acquire a more permanent immigration status than that on which they entered the country will be included in the category to be considered as migrants or "brain drain". The assumption here employed is that education and training are necessary components of development and might be used for developmental ends. While the distinction between skilled or educated migrants and those who have settled abroad in the course of acquiring skills and education is an important one in terms of formulating appropriate policies to stem the loss of trained personnel, it has not always been possible, for lack of adequate information, to maintain this distinction throughout this report.
3. The outflow of trained personnel is a consequence, in part, of social and economic conditions in the countries of emigration and of immigration policies in receiving countries and thus must be viewed within the framework of public policy. It should, however, be kept in mind that the outflow is also, to a large extent, a direct result of decisions made by the individual, who may be strongly influenced by initiatives and policies stemming from the private sector.

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4. The dimensional question of the migration of the skilled and highly trained is at present considerably clearer than the problem of evaluating its effects. However, statistics are not nearly complete, particularly with regard to those returning to developing countries. On the other hand, recent immigration statistics from certain developed countries indicate that: (a) there are numerous flows of skilled and trained persons from developing to developed countries; (b) these are characterized by large flows from a comparatively small number of developing countries to a small number of developed countries and by smaller flows from a larger number of developing countries; (c) in these flows engineers, medical personnel and scientists usually tend to predominate; (d) the above flows have grown with increasing rapidity in recent years; (e) the higher the level of skill or training, the greater the susceptibility to migration tends to be; (f) the flows respond increasingly to the changed economic complexity of world societies and to legislation which reflects the demands of a new economic era; (g) these migratory trends are stimulated both by the character of national educational systems and by a lack of adequate planning for the training of students from developing countries in developed States as well as the proper utilization of their skills in their home country; and (h) except possibly for South America, there are no signs that this migration of talent is decreasing and there are fairly definite signs that its increase will, under present conditions, continue to accelerate.

5. The presence of trained and educated men has come to be universally regarded as a vital component of development. Should the present trends in the outflow of trained personnel continue the results might adversely affect development in the developing countries. The present study has been prepared in response to the interest of the United Nations in the development and utilization of human resources for development with a view to narrowing the gap between developed and developing countries. The tables and charts in the appendices, within certain areas, show the migration trends of trained personnel. The figures, however, have their limitations. They do not define migration as a problem nor can they properly delineate the problem because trained and educated men are of different values in the societies to which they migrate and in the societies they leave. The value of trained men within alternative situations is subject to many variables. The

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persons. This flow is not only responsive to conditions in the countries of origin but also to the preference provisions and work permits contained in the new immigration laws and regulations of a number of countries. As a result the migration of scientists and technicians has increased both numerically and in proportion to the total immigration in some developed countries.<sup>4/</sup>

10. It would be desirable, in studying the migration of the skilled, to have all countries use comparable definitions. However, despite the efforts of the ILO to standardize definitions of qualified manpower, similar uses have not always been made of occupational terms.<sup>5/</sup> In general, these variations do not appear to alter substantially the meaning or conclusions of a preliminary study of the present kind.

11. While the immigration policies of several industrialized countries are undoubtedly more important factors in changing present migration patterns than those of developing countries, many of the latter have also recently adopted legislation which limits immigration to those possessing needed skills or capital. These immigration changes also appear to have some significance for the general pattern of world migration movements. The Philippines, for example, abolished general immigration in 1960 and adopted selective immigration "to facilitate entry of foreigners who can contribute to the well-being and economy of the country". Thailand, with a total quota of only 200 immigrants per year, gives preference to applicants who have capital to invest in the country, who have professional or technical qualifications or who are closely related to Thai citizens. Measures of this kind are almost universal in south-eastern and eastern Asia where, in general, "entry for permanent settlement is now restricted almost entirely to close relatives of citizens and, in several countries, to a few professional or highly skilled workers".<sup>6/</sup> This restricting of immigration into developing countries probably has some influence on the increasing tendency for migration to developed ones.

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<sup>4/</sup> For the United States, see graphs 1-3 appended. Canadian immigration has become still more skill-intensive than that of the United States, as can be seen by comparing table II with table I-A. Only in the instance of physicians is Canadian immigration less skill-intensive.

<sup>5/</sup> International Labour Office, International Standard Classification of Occupations (Geneva, 1958).

<sup>6/</sup> Prof. R.T. Appleyard, "Immigration Policies and Economic Development in south-eastern and eastern Asia", Migration Today (Geneva), No. 9, October 1967. Some countries like Jamaica require many years of residence for citizenship and permit entry for purposes of work only to those with prior employment or to those with sufficient capital to support their own employment or businesses. Entry for work is on work permits renewable by the Ministry of Labour. /...

12. Most major receiving nations of migrants have introduced laws or regulations that give preference to skilled labour and professionals and have left decreasing room for unskilled entrants, other than family members of those admitted. This trend is reflected in a series of legislative or administrative steps, the most recent coming into force in countries such as Canada in October 1967, the United Kingdom in 1962 and 1965, in the United States of America in 1962 and 1965, and in Australia in 1958 and 1966.<sup>7/</sup> With these developments, the United States of America, Canada and Australia have also relaxed restrictions on the entry of non-Europeans who fall into the newly defined immigration categories. This has meant, on the one hand, the lifting of racially restrictive legal barriers to immigration and, on the other, an implicit invitation to the professionals of the developing world by some developed countries.

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<sup>7/</sup> Australia's immigration policy is not written into legislation. The Minister for Immigration is given power to admit such persons as he sees fit. Until 1938 encouragement was usually given only to British migration. Since 1947 the range of immigrants from Europe has increased. It remains "cardinal with us that Australia... should remain a substantially homogeneous society". A "dictation test" in a European language was abolished in the Migration Act of 1958 and on 9 March 1966 the Government announced the provision "for the admission of non-Europeans capable of integration and of contributing to our progress". Additional non-Europeans became eligible for entry in regulations of July 1956 including "distinguished and highly qualified non-Europeans" who should be admitted for indefinite stay. In 1957, non-Europeans admitted for temporary residence became qualified to apply for naturalization. The decisions of 1966 regarding non-European entry include consideration of "qualifications which are in fact positively useful to Australia", including "technical skills" and "high attainment in the arts, sciences and other fields for professional appointments". (The Hon. Hubert Opperman, Minister for Immigration, Government of Australia, paper delivered to student seminar, Canberra, 28 May 1966.) Consultation with Governments regarding depriving of "under-developed countries of skills and talents which they need" is stated to be an immigration policy.

13. The reasons for these policy changes and the resulting new migration pattern are indicated by some Governments such as Canada and the United States of America.<sup>8/</sup> Developed countries with expanding industrial economies offer most of their employment opportunities to persons with education, training and skill. The development of these societies into highly complex industrialized urban settlements demands ability and training of those entering the labour force, whether native-born or immigrant. Those who lack the appropriate training become burdens rather than assets. The developed countries concerned have, therefore, availed themselves of the opportunities offered them to benefit from the present world competition for trained immigrants.

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<sup>8/</sup> The Canadian Minister of Immigration stated in his White Paper on Immigration, October 1966:

"Canada has become a highly complex industrialized and urbanized society. And such a society is increasingly demanding of the quality of its work force. If those entering the work force, whether native-born or immigrants, do not have the ability and training to do the jobs available, they will be burdens rather than assets. Today, Canada's expanding industrial economy offers most of its employment opportunities to those with education, training, skill... The high cost of training professional and skilled people - engineers, doctors, skilled technicians, etc. - is a measure of the benefit derived upon [their] arrival in Canada... Other countries are in competition with us for immigrants." The Hon. Jean Marchand, Minister of Manpower and Immigration, Government of Canada White Paper on Immigration, Canada, October 1966, pp. 8 and 11.

At the hearings on the 1965 United States immigration bill, the Secretary of State of the United States said:

"The significance of immigration for the United States now depends less on the number than on the quality of the immigrants. The explanation for the high professional and technical quality of present immigration lies in part in the non-quota and preference provisions... that favor the admission of highly qualified migrants. But still more it depends on world conditions of post-war economic and social dislocations... Under present circumstance, the United States has a rare opportunity to draw migrants of high intelligence and ability from abroad; and immigration, if well administered, can be one of our greatest national resources..." And again, "We are in the international market of brains". United States Government, Hearings of the Sub-committee on the Judiciary, House of Representatives, part II, serial No. 13, July-August 1964, pp. 389-390 and 401.

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14. Despite the lack of precise statistics for most countries on this subject, similar objectives are either explicit or implicit in the immigration policies of certain other developed countries; an example is the manner in which foreigners in the medical profession have been permitted to practise in France (table I-d) and Germany. Migration has become a selective process and an important aspect of the development policies of both developed and developing countries. The need, especially among the developed countries, for scientists and technicians has become considerably greater and, despite increased education and training facilities, the supply of these highly trained persons has often lagged behind demand. This is particularly the case in the medical, engineering and scientific professions. Consequently, keen international competition now exists in these fields.

15. These policies add "pull" incentives to the existing emigration pressures of growing population, unemployment and limited opportunity, particularly in developing countries. The new immigration policies and the changes they bring promise to be of considerable long-range importance to the international community. They call for a reappraisal of the effects of migration on social and economic development and for the identification of national and international advantages and disadvantages.

16. In considering the migration policies being adopted by developed and developing countries and their effect on the new migration trends, attention should be given to the rights and freedoms set forth in the Universal Declaration of Human Rights and in the relevant conventions of the United Nations.

17. The Declaration in article 13, paragraph 2 proclaims: "Everyone has the right to leave any country, including his own, and to return to his country". This right is an extension of the right in paragraph 1 of the same article which states: "Everyone has the right to freedom of movement and residence within the borders of each State". The first may very well be regarded as the right of personal self-determination and would involve consideration of a number of related rights of the individual, such as the right to liberty (article 3). Freedom of movement or locomotion is a constitutional element of personal liberty.<sup>9/</sup>

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<sup>9/</sup> United Nations publication (Study of discrimination in respect of the right of everyone to leave any country including his own and to return to his country) Sales No.: 64.XIV.2, p. 9.

18. Article 23 paragraph 1, of the Universal Declaration of Human Rights further states: "Everyone has the right to work, to free choice of employment, to just and favourable conditions of work and to protection against unemployment". The discrimination (employment and occupation) Convention<sup>10/</sup> enjoins the right to work, to free choice of jobs, to just and favourable conditions of work and to protection against unemployment.<sup>11/</sup> These principles are emphasized and elaborated in the International Labour Organisation Convention (No. 122) concerning employment policy,<sup>12/</sup> which states in article 3, "in the application of this Convention, representatives of the persons affected by the measures to be taken and in particular representatives of employers and workers, shall be consulted concerning employment policies, with a view to taking fully into account their experience and views and securing them full co-operation in formulating and enlisting support for such policies".

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<sup>10/</sup> Convention No. 111, adopted on 25 June 1958 by the International Labour Conference at its forty-second session. By June 1968, sixty-four countries had ratified this Convention.

<sup>11/</sup> Yearbook on Human Rights for 1958, (United Nations publication, Sales No.: 60.XIV.1), pp. 307-308.

<sup>12/</sup> International Labour Organisation, Convention No. 122 concerning employment policy 1964, adopted on 9 July 1964:

Article 1 reads:

"1. With a view to stimulating economic growth and development, raising levels of living, meeting manpower requirements and overcoming unemployment and under-employment, each member shall declare and pursue, as a major goal, an active policy designed to promote full, productive and freely chosen employment.

"2. The said policy shall aim at ensuring that: (a) there is work for all who are available for and seeking work; (b) such work is as productive as possible; (c) there is freedom of choice of employment and the fullest possible opportunity for each worker to qualify for, and to use his skills and endowments in a job for which he is well suited, irrespective of race, colour, sex, religion, political opinion, national abstraction or social origin."

(See Yearbook on Human Rights for 1964. United Nations publication, Sales No.: 67.XIV.1, pp. 329-330.)

19. In setting forth these principles on human rights and freedoms, the Declaration and the covenants also stress the individual's duties and obligations to the community and the need for the co-operation of the international society. Article 29 of the Declaration<sup>13/</sup> states that everyone has duties to the community and that in the exercise of his rights and freedoms there are certain limitations to be taken into consideration, including those related to the general welfare in a democratic society. Article 2 of the International Covenant on Economic, Social and Cultural Rights,<sup>14/</sup> contained in General Assembly resolution 2200 (XXI), also calls upon each State Party to co-operate fully, especially economically and technically, to achieve the rights recognized in the Covenant. In the interpretation and application of these articles, the problem is to reconcile the exercise of these rights and freedoms of the individual (in this case of the migrant) both with the interest of the States concerned, and with that of the international community.

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13/ Article 29 reads:

"(1) Everyone has duties to the community in which alone the free and full development of his personality is possible.

"(2) In the exercise of his rights and freedoms, everyone shall be subject only to such limitations as are determined by law solely for the purpose of securing due recognition and respect for the rights and freedoms of others and of meeting the just requirements of morality, public order and the general welfare in a democratic society." United Nations Yearbook, 1948-1949, (United Nations publication, Sales No.: 50.I.11), p. 537.

14/ Paragraph 1 of article 2 reads:

"1. Each State Party to the present Covenant undertakes to take steps, individually and through international assistance and co-operation, especially economic and technical, to the maximum of its available resources, with a view to achieving progressively the full realization of the rights recognized in the present Covenant by all appropriate means, including particularly the adoption of legislative measures.

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## II. PROFESSIONAL MIGRATION INTO SELECTED COUNTRIES

20. At the present time, statistics for most countries on the migration of skilled or highly trained persons tend to be incomplete and inadequate. Among countries with high immigration rates, the figures for Canada, the United States of America and, to a lesser extent, Australia are more complete than are those for other countries. For this reason, these countries have been selected for fairly extensive examination of the problem being considered. It would appear that a number of other countries, although not considered here or not given as full attention in this study for lack of adequate statistical immigration data, nevertheless have comparatively high rates of immigration of professionals and skilled personnel. Statistics for Europe on this subject are generally incomplete which means that it is not possible to give France and the Federal Republic of Germany the weight in the immigration picture which they merit.

21. The emphasis placed in this study on the major receiving countries also tends to disregard a multiplicity of movements to other countries and between other areas which are also significant. Migration to socialist countries, for instance, is probably small. Professionals do move considerably between developing countries, as when West Indian lawyers and teachers move to Africa. Sometimes professionals from one developing country with a slower rate of growth may move to another with a more rapid economic growth rate, as sometimes happens in Latin America. In other cases, persons might migrate for the purpose of filling specific manpower needs in countries such as Kuwait and Saudi Arabia. These movements, although not often significant for large numbers of highly trained personnel and beyond the stated bounds of this study, nevertheless warrant inquiry. They could probably demonstrate that professional emigration from developing countries may be made to yield benefits for development in general rather than contributing to a widening of the wealth-poverty gap. In short, the statistics available at present both with regard to quality and quantity do not permit a really balanced or complete picture of the problem.

22. The immigration statistics which are being used are incomplete and are misleading in other respects. Some persons, and this would apply in particular to professional persons, who enter as immigrants return to their own countries. In this area of the return flow there is an almost complete lack of satisfactory

statistics. One authority,<sup>15/</sup> who has closely examined the Latin American migration of experts, surmises that the return flow from the United States of America amounts to something like 25 per cent of the inflow, or even more. Far better statistics are urgently needed from the developing countries. Another area which needs more adequate statistical coverage concerns the onward flow or staged migration from an intermediate country.

23. The tables and charts annexed to the present report give, for both the major receiving countries and for the main countries of origin, the available statistics on migration during the last decade. They are a useful reference for determining the trends and certain comparisons on a country-by-country basis. They are, however, subject to a number of reservations for the reasons given later in this report.

24. In recent years there have been a number of efforts to obtain reliable and more sophisticated migration statistics on the outflow of trained personnel. Although these efforts have not always been successful and while the available data are sometimes incomplete they nevertheless strongly indicate large flows and a rapidly rising tempo of this migration to the developed nations. In interpreting these statistics, it is important to observe that the negative effects on a country's development arising from the migration of professionals are not necessarily in exact proportion to the numbers involved. For instance, the emigration of a thousand professionals from India would not necessarily mean that India has a "brain drain" problem one hundred times as serious as in the case of a less populous country from which ten professionals migrated. Even when emigrants are compared to manpower resources, as is attempted in table VI, the effect of removal on development cannot be demonstrated, for this would depend primarily on the utilization of professional manpower resources together with the use which could and would have been made of those who depart. The degree of utilization of manpower for development cannot now be statistically demonstrated and may never be satisfactorily quantifiable.

25. Therefore, although these statistics are useful as a general guide to the problem of the "brain drain", their limitations should be recognized. Canada and the United States of America, which probably have the largest

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<sup>15/</sup> Dr. Charles V. Kidd, Executive Secretary, Federal Council for Science and Technology, United States of America.

immigration of professionals from both developing and developed countries, are also the two countries that have the most comprehensive statistics on the problem (see tables II-A and B and graphs 1, 2 and 3). Both countries have very skill-intensive ratios of professional, technical and kindred workers to immigrants with occupation. In both, the rate of increase in intake of professionals is rapid, especially with regard to immigration from developing countries. Statistics for Australia and the United Kingdom show somewhat similar trends. The former, however, takes a small proportion of its professional intake from developing countries while the latter relies almost entirely from developing countries. Statistics for France and Germany are almost non-existent. The situation for each country is summarized below.

26. The rapid increase in all varieties of immigration into Canada from 1962-1967 is shown in table II-A. Immigration into Canada, as into Australia, has traditionally come predominantly from Europe. A new trend has been a tendency to absorb professionals from developing countries owing to the increasing difficulty of getting skilled workers and professionals from Europe.<sup>16/</sup> The percentage of professionals immigrating to Canada from countries other than the United States, the United Kingdom and the chief European sources rose from 7.2 per cent in 1946 to 27.6 per cent in 1963; 37 per cent of Canadian professional immigrants came from outside the United States and Europe in 1967; for skilled occupations the leap between 1946 and 1963 was from 8.5 per cent to 36.3 per cent.<sup>17/</sup> In proportion to its population, Canada's intake of professionals appear to be among the largest in the world; the trend towards an increasing reliance on the skilled from developing countries is strong (see tables I-B, I-C, II-A and IV).

27. Australia remains more firmly oriented towards Europe for her skilled labour supply than the other developed countries. Most of its immigrants tend

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<sup>16/</sup> Annual report for the fiscal year ending 31 March 1966, Department of Manpower and Immigration, Ottawa. Similar sentiments appear in the previous year's annual report.

<sup>17/</sup> Louis Parai, Immigration and Emigration of Professional and Skilled Manpower during the Post-War Period, Ottawa, 1965 (Economic Council of Canada), tables A-19 and A-20. Other figures are from the annual Canadian immigration statistics.

to be craftsmen. For the financial year 1966-1967, of 138,676 settler arrivals, 76,496 came from the United Kingdom and Ireland. The statistics for Australia are not broken down according to the occupations and nationality of the immigrants. Australia's present immigration policy increasingly permits the migration of professional and skilled persons from non-European areas.

28. From about the eighteenth century to the present time, the United Kingdom has been both a centre of attraction for professionals and men of talent and an exporter of talent, especially to her commonwealth and former colonies.<sup>18/</sup> In recent years a large proportion of the United Kingdom supply of engineers and scientists has emigrated,<sup>19/</sup> while substantial numbers of professional and skilled persons, very largely from the less developed countries of the Commonwealth<sup>20/</sup> have replaced them.

29. With the enactment of the Commonwealth Immigrants Act of 1962 the over-all number of migrants from Commonwealth countries was reduced considerably while at the same time a remarkable intake of highly trained persons from these countries was stimulated. In 1964, for instance, 3,300 teachers, 1,600 engineers, 1,300 nurses and 800 doctors emigrated from developing Commonwealth countries to the United Kingdom. In August 1965, a White Paper on Commonwealth<sup>21/</sup> Immigration defined more sharply the skills for which provision for entry was made to include doctors, dentists and trained nurses, qualified teachers, graduates in science and technology with at least two years' experience since

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<sup>18/</sup> United Nations Committee on Manpower Resources for Science and Technology, "The Brain Drain", report of the working group on migration (London, 1967), p. 3.

<sup>19/</sup> For engineers, mounting from 24 per cent in 1961 of the new supply three years earlier to 42 per cent in 1966, for scientists varying between 20-23 per cent in those years, *ibid.*, table 1, page 8. A small minority of these are persons born in the Commonwealth who were educated in the United Kingdom. In addition, it should be cautioned that these "losses" are not necessarily permanent: some go on emigration visas and then return. They are, however, the best measure available of a situation regarded as serious. Emigration is mostly to the United States, Canada and Australia.

<sup>20/</sup> These are sometimes regarded as "replacement" for emigration although in some large import categories such as nurses this interpretation has little truth.

<sup>21/</sup> Commonwealth White Paper, "Immigration from the Commonwealth", H.M. Stationery Office, 1965, Cmd. 2729.

graduation and non-graduates with certain professional qualifications and two years' experience. By 1966 immigrants in this category had risen to 5,425 or by 65 per cent, of whom 5,141 came from developing countries within the Commonwealth. The United Kingdom is estimated to rely on immigrant health personnel, for upwards of one third of its medical staff needs, so that 1,526 physicians from the Commonwealth were added to the medical roll in 1966. Between 30 and 40 per cent of all hospital nurses are foreign born, 46 per cent of all hospital registrars were born and most were trained outside the United Kingdom and Ireland. Statistics in other areas are unsatisfactory but it would appear that British intake of scientific and engineering personnel is considerably less than that of medical. Recent United Kingdom experience thus illustrates a trend in which the immigration of the unskilled (except for dependents) has been drastically reduced while at the same time maintaining the migration of skilled and professional persons at a rate at least as high relative to Britain's population as the United States of America's rate for the year ending 30 June 1967. Compared with more than 5,000 professionals taking up residence in Britain annually from developing Commonwealth countries, approximately 3,000 appointments are made annually for service overseas by the Ministry of Overseas Development and the Crown Agents under the Overseas Service Aid.<sup>22/</sup>

30. Immigration into the United States of America is characterized by a large and rapid increase in the immigration of professionals, particularly from developing countries (see tables I-A (2) and IV and graphs 1 to 3). In 1947 only 2,382 natural scientists, engineers, physicians or surgeons immigrated to the United States. The national origins of these are not known. By 1965, while "immigrants with occupations" had doubled over 1947, professional, technical and kindred workers had nearly tripled. Among these, engineers, scientists and medical personnel had increased to 11,749, or almost quintupled. There was a further rise to 20,760 in the year ending 30 June 1967.

31. The rise in immigration of professionals from developing countries greatly exceeded the over-all increase. The immigration of scientists from developing

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<sup>22/</sup> "The supply of British professional and technical staff to the less developed countries", a paper prepared by the British Ministry of Overseas Development for the Ditchley Hall Conference.



countries rose nearly ten times and that of engineers nearly six times between 1956 and 1967.<sup>23/</sup> The Committee on Government Operations of the United States House of Representatives has predicted: "After 1 July 1968, scientific immigration from certain advanced countries in northern Europe will virtually cease. As of that date, the large national quotas of these countries will no longer be valid, and while their scientific professionals can apply for entry under a numerically limited occupational category of the immigration law, they will find some 50,000 persons [third preference quota = professionals 17,000 plus relatives] - mainly from the developing countries - ahead of them in the waiting line. It will take about three years to work off this backlog, so that during that period the brain drain from the developing countries will continue unabated..."<sup>24/</sup>

32. If the House Committee's predictions are fulfilled, it appears that professional immigration from developing countries to the United States may rise by upwards of another 70 per cent over the level of 1967 and may be maintained for three years at a level of around - more probably over - 17,000 a year.<sup>25/</sup> Noting that the United States of America spent \$75 million "toward providing some 5,400 trained persons (including United States nationals) to the very countries engaged in 'exporting' some 5,200 of their scientific professional"<sup>26/</sup> to the United States,

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<sup>23/</sup> Government of the United States of America, House Report No. 3, p. 12. For totals from many developing countries, see table I-A and for 1967 figures compared to those of 1962-1966, by developing country, see table I-A (2).

<sup>24/</sup> Government of the United States of America, House of Representatives, Committee on Government Operations, "Scientific Brain Drain from the Developing Countries", twenty-third report, 28 March 1968, pp. 16-17; quotation from the Committee news release of 28 March summarizing these pages. See also Department of State (United States), Report of the Visa Office, 1967. It should be borne in mind, however, that professionals from Europe could enter as brothers of those already here and that disqualifications and cancellations among the present backlog could reduce the period required for its dissipation.

<sup>25/</sup> The third preference quota is not the only quota on which professionals may enter. They could also enter as brothers of foreign professionals already here or, if present unlimited immigration from Latin America continues, from there. Thus, a 20,000 level, or even above, is quite possible. In addition, Latin American immigrants are, as of the time of writing (April 1968) not yet subject to quotas and whether their professionals will fall within the third preference quota is improbable. As in 1967, therefore, the totals of professional intake may run above 17,000.

<sup>26/</sup> Government of the United States of America, House of Representatives, Committee on Government Operations, "Scientific Brain Drain from the Developing Countries".

the Committee has recommended to the United States Congress revision of the current Immigration and Nationality Act,<sup>27/</sup> which would, in effect, reduce United States intake of professionals from the developing countries to something like the proportions prevailing during 1967. The United States Department of Labor estimates that by 1975 the number of professional workers required will reach 13.2 millions. Thus, almost 40,000 professional immigrants will be needed annually to supply estimated needs of nearly 400,000 professional immigrants required during the decade 1965-1975. At present immigration rates, this would require an annual intake of 20,000 professionals from developing countries. Similarly, it is estimated that by 1970 the United Kingdom will be short of nearly 100,000 people with advanced training.<sup>28/</sup>

33. The countries thus far considered have fairly adequate statistics on large-scale professional immigration from developing countries. However, other countries, probably also having high levels of intake, lack adequate statistical data on the problem. In the case of France, it is known in general terms that numbers of persons entering the country for advanced study, mostly from former French colonies, have remained in employment. For instance, a World Health Organization study<sup>29/</sup> shows that about 100 Cameroonians are practising medicine outside Cameroon, mostly in France, while only forty-seven practice in Cameroon. A private survey of 1965 claims that 12,000 sub-Saharan African students have remained in France with their

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<sup>27/</sup> Ibid. The countries concerned are India, Korea, Turkey, China, Brazil, Pakistan, the Philippines, Iran, Chile, Israel and Colombia which account for most of the countries outside Europe each of which have received cumulatively \$1 billion, or more, in United States aid in the post-Second World War period. (Colombia received just under \$1 billion.) Such countries provided two-thirds of United States scientists intake from the developing world. The 5,400 trained persons provided by the United States included 1,500 United States technicians working in all these eleven countries (except Israel where none worked) and 3,900 nationals of these countries whose study and training in the United States, and occasionally third countries, was financed by the American Aid Program. AID-financed training was, in general, at a substantially lower scientific level and for far shorter time periods than was the training received by the migrating professionals.

<sup>28/</sup> "The Supply of British Professional and Technical Staff to the Less Developed Countries", a paper prepared by the British Ministry of Overseas Development for the foregoing conference. The above figures omit those overseas in private capacities whose numbers are unknown. Determination of quality components of the balance is not possible.

<sup>29/</sup> World Health Organization, "Brain Drain" (unpublished report), 31 July 1968, p. 7.

families as against 11,000 who were then still pursuing their studies.<sup>30/</sup> Such estimates are difficult to reconcile with table I-D which shows a very modest number of new working licences issued to foreign engineers, natural scientists, physicians and professors by the French Government between 1962-1966. Many are perhaps employed in non-professional jobs despite some higher training. A few are known to have made their way from France to Canada.

34. The situation in the Federal Republic of Germany is as unclear as that in France. Germany has become a major trainer of students from developing countries. It has been suggested that many of these students have sought permanent residence in the country and that some have succeeded. Various estimates of foreign physicians and nurses practising in Germany have been made but without much claim to accuracy.<sup>31/</sup>

35. Professional immigration from developing countries to countries other than the afore-mentioned probably does not occur in significant numbers.

36. The statistics used in this paper generally record flows. Where statistics for stocks appear, as for residents abroad during several years, they may imply a continued presence abroad of a considerable number of nationals where, in fact, during the period, many may have returned home and a similar number arrived. A known illustration of the phenomenon in the area of untrained labour is that of the Irish in Great Britain.

37. Finally, the technical and educational level of those described as engineers, scientists or medical personnel differs widely. The 8,501 medical personnel immigrating into the United States in 1967 includes 4,784 nurses. The physicians category (3,326 in 1967) covers some of the world's most highly skilled doctors and many doctors who have just received their medical degree. In 1967, among the 8,822 engineers entering, 3,476 fell in a category of "other" engineers which in some cases covers highly technical fields, but in others appears to refer to engineers

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<sup>30/</sup> Perspectives marocaines (Paris), No. 944, September 1965.

<sup>31/</sup> Unpublished information gathered by UNITAR.

of lower qualification. It is difficult to express the value of talent in statistical terms. There is, however, evidence to suggest that immigrant professionals often have higher qualifications than the native professionals. In the sciences, 60 per cent of foreign-born scientists in the United States National Register and 13 per cent of foreign-born engineers reported holding doctoral degrees compared with 40 per cent for National Register scientists in general and 5 per cent for engineers in general; 59 per cent of foreign-born scientists were primarily engaged in research and development compared with 45 per cent of their native colleagues. The United States National Academy of Sciences in 1961 included in its membership 24 per cent of foreign born and 18 per cent of persons trained abroad. A high percentage of American Nobel Prize Winners were foreign-born.<sup>32/</sup> 38. On the basis of the available statistics it would seem that the balance of trained manpower exchange between developed and developing countries, in numbers at least, may be adverse to the latter. The United Kingdom sent out 3,000 but during the same period received 5,000 professionals. At the same time it is most difficult, if not impossible, to evaluate this exchange in terms of the quality of manpower. France makes the highest contribution of the developed countries in relation to her population and resources in providing French teachers and technicians to her former colonies. The United States of America received, in 1967 alone, 5,189 scientists, engineers and physicians as immigrants from the same eleven nations to which, that year, it provided 1,500 technicians.<sup>33/</sup> One authority<sup>34/</sup> estimated that in the latter part of 1966 1,043 graduates from India were teaching in United States universities and colleges while, at the same time,

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<sup>32/</sup> Thomas J. Mills, "Scientific Personnel and the Professions", The Annals of the American Academy of Political and Social Science (Philadelphia), September 1966, pp. 35-41. Mr. Mills is in charge of scientific manpower and education studies for the United States National Science Foundation. Such figures do mingle pre-war with post-Second World War immigration. There are also, of course, problems of equivaluation in doctoral degrees.

<sup>33/</sup> House Report, 28 March 1968, pp. 14-15.

<sup>34/</sup> Alain Mercier, "Brains for Sale", Bulletin of the Atomic Sciences (Chicago, March 1968), p. 43.

192 United States citizens occupied analogous positions in India. Socialist countries, however, appear to maintain a balance favourable to developing countries. As far as is known, students studying in socialist countries are closely bound by the terms of the agreements applying to them and very few professionals from developing countries remain in socialist States.

39. In addition to the technicians provided through bilateral aid, teachers and other professional groups operating on their personal initiative are, through private organizations, contributing to the total manpower aid from developed countries. The extent of this contribution is not known.

### III. THE MIGRATION OF MIDDLE-LEVEL PERSONNEL

40. The migration of middle-level or sub-professional personnel would appear thus far to have attracted less attention and study than that of high-level personnel and there are even less available data for evaluating this aspect of the problem than in the case of highly trained persons.

41. Middle-level skill covers an enormous and diverse range. The International Labour Organisation, in describing non-manual workers, includes, in addition to the "professional, technical and related workers", administrative and managerial workers, clerical and related workers as well as sales and services workers.<sup>35/</sup> Much high skill is represented among manual workers, including various kinds of craftsmen, foremen, electricians, mechanics, machinists and tool and die-makers. Between 1921 and 1961 the proportion of non-manual workers to total employment rose by over 50 per cent and by 25 per cent in England and Wales, respectively. The United States expects the number of non-manual workers to increase four times faster than other workers between 1960 and 1975, reaching three-fifths of total employment.<sup>36/</sup> These needs have been reflected in the immigration of middle-level skills to the United States of America.

42. The United States Department of Labour estimates that the craft and service occupations will make "significant gains" in immigration and that between 1965 and 1975, 230,000 craftsmen, foremen and kindred workers will enter (as against 380,000 professionals) as well as 330,000 clerical and kindred workers. If these estimates are realized, one of every additional ten clerical workers and craftsmen in the United States labour force will be an immigrant (in comparison to one in every eleven for professionals).

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<sup>35/</sup> International Labour Organisation, Report of the Director-General, Non-Manual Workers Problems and Prospects, part I (Geneva, 1967), pp. 7-8.

<sup>36/</sup> Ibid., p. 8. "non-manual" includes professional but has a large majority of non-professional.

43. Canada relies to a far greater extent on immigrant skills than does the United States. The pattern is similar to that for professionals. The size of immigration increases for middle-level groups in Canada is shown in table IX. Between 1963 and 1967, the immigration increases in key middle-level skills were of the order of 275 per cent.

44. Australia's immigrant "craftsmen and production process workers" make up over 30 per cent of all workers and dependents. The majority of these, however, are believed to come from Europe or developed Commonwealth countries.

45. There is migration of skilled workers from Latin America to the United States. The emigration to the United States from Latin America annually in the period between 1961 and 1966 was around 0.7-0.9 per cent of the continental stock of sub-professionals. In 1965, according to Economic Commission for Latin America estimates,<sup>37/</sup> there were about 2.2 million "intermediate level professionals" or sub-professionals in Latin America. The over-all number of sub-professionals in sectors closely related to production was about 600,000 and in medical services, 30,000. In these two groups, there was substantial emigration. Thus far, there is no evidence that migration from developing countries of middle-level skilled personnel have created problems for these countries. Canada, which alone publishes satisfactory breakdowns of these middle-level skills by nationality, receives the majority from Europe or developed Commonwealth countries. There is an increasing intake from the Caribbean.<sup>38/</sup>

46. In the statistics on migration for most of the countries studied, nurses are included in the professional category. For present purposes, however, it would be more appropriate to treat nurses as middle-level personnel. A Pan American Health Organization study has indicated that nurses in Latin America

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<sup>37/</sup> Cited, M. Simai, "The Problems of Brain Drain - Economic Impact on the Developing Countries", United Nations, Department of Economic and Social Affairs, March 1968, draft paper p. 10.

<sup>38/</sup> Clerical personnel (555 from Jamaica, 239 from Barbados, 392 from Trinidad and Tobago, 162 from Guyana) and manufacturing and mechanical personnel (391 from Jamaica, 136 from Barbados, 309 from Trinidad and Tobago). Government of Canada, Canada Immigration Division, 1967 Immigration Statistics, 1967, pp. 9 and 18.

"are in a difficult economic and social position, and this is the primary cause of migration".<sup>39/</sup> There is a high incidence of migration of nurses from the Philippines, Korea, parts of South Asia and even the Near East and Africa. While in most Latin American countries the proportion of nurses migrating to those trained is not high, in some of these countries the migration rate is a cause for concern. In 1965, of the 464 graduates of the principal nursing schools of Bolivia, 114, or 24 per cent, have migrated. About 12 per cent of Colombia's nurses, 19 per cent of Ecuador's and 20 per cent of Honduras' emigrated in 1965. Although about 130 nurses graduate annually in Jamaica, 200 apply for work abroad each year while others who were trained abroad remain overseas.

47. The number of foreign-born nursing students in the United Kingdom rose from 5,850 in 1959-1960 to 15,773 in 1965-1966. Almost all of these came from Commonwealth countries and the majority from developing countries of the Commonwealth. Statistics for nurses returning and those remaining are not known but it has been stated that the British nursing services rely in no small measure on student nurses from overseas being trained in the United Kingdom.<sup>40/</sup> The movement and distribution of these nurses and midwives between 1962 and 1965 throw some light on the problem being considered. Of the 1,216 foreign-born registrants who completed their studies in midwifery between 1962 and 1965 in the United Kingdom, 25 per cent returned home, 2 per cent went to a developed country besides the United Kingdom, 2 per cent went to a developing country other than their own and 71 per cent remained in England and Wales.<sup>41/</sup> One in four new Commonwealth West African midwives remained in the United Kingdom. Out of every seven new West Indian midwives, three remained in the Caribbean while four settled in the United Kingdom.

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<sup>39/</sup> "Migration of Health Personnel, Scientists and Engineers from Latin America", Pan American Health Organization, World Health Organization, Washington, 1966, p. 18.

<sup>40/</sup> Government of the United Kingdom, Ministry of Overseas Development, Record of Proceedings at the Commonwealth Medical Conference, 1965, (London, 1965), p. 88.

<sup>41/</sup> For present location of nurses, figures are available for England and Wales only. Those for Scotland and Northern Ireland are kept by other midwifery boards which could not be investigated. Any discrepancy involved, however, would probably be insignificant and would add rather than subtract from the effects of the "drain" of nurses following their training.



#### IV. DIFFERENCES AMONG NATIONS WITH RESPECT TO PROFESSIONAL MIGRATION

48. Within the developing areas of the world, striking differences exist in the migration pattern of talents and these differences will affect a proper understanding of the problem as a whole.

49. Some developing countries lacking adequate means of providing high level training for their students, will be obliged for some time to come to utilize training facilities abroad. For the time being, they will be dependent on the services of expatriates together with nationals trained overseas. A "brain drain" problem is virtually non-existent for these countries. However, the need often exists to plan for the more efficient use of their available trained manpower. New nations are in the process of substituting their own trained citizens for expatriates. During the first phase of their independence, these countries are able to provide enough prestige jobs for all their trained citizens. Here again, the problem of a "brain drain" hardly arises. Other countries have probably entered a second phase in their utilization of trained manpower, during which the most desirable jobs are filled, leaving few places for an increasing number of new graduates. Still in other countries, universities and other institutions of training are turning out more trained people than the economy can absorb. These countries tend to lose some of their trained personnel through emigration.

50. Certain countries which are large contributors to the brain drain have relatively advanced educational systems (see tables I-A and I-A (2), I-B and IV). Reference has already been made to the large numbers of professionals migrating to the United States from certain Asian countries. Of 2,369 engineering, scientific and medical personnel migrating to the United States during the year ending 30 June 1967, from developing countries of North America, 1,712 came from the Caribbean. Of 1,047 coming from South America, 295 were from Argentina and 239 from Colombia. In addition, Iran loses many professional migrants to Germany. From India, Pakistan and the Caribbean they tend to go to the United Kingdom and Canada, and from India to Australia.

51. There are countries from which there appears to be far less professional migration than might otherwise be expected. A good example is Japan. Although Japan's salary levels for professionals have, in general, remained well below

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those of other developed countries, her rate of professional emigration has remained low. There are exceptions in certain fields such as mathematics. A language problem would not appear to be a satisfactory explanation for Japan's<sup>42/</sup> very low migration rate since a language difficulty would apply equally to China (Taiwan), Korea and Iran, where professional emigration is relatively higher. We do not know to what extent the explanation lies in the fact that Japan is an industrialized nation with organizational and career opportunities. Japan's case warrants further study. One suggestion is that the explanation might be partly due to the nature of Japanese society which is characterized by a cohesive social structure that binds social classes and occupational groups. It would be interesting to determine whether similar factors operate under different structural and developmental conditions.

52. In addition, while this report could not examine immigration into all developed countries, from preliminary observations it would appear that professional immigration to some smaller developed countries such as the Scandinavian nations is relatively less than to certain larger countries. This would seem to be the case even though standards of living in some smaller developed countries are equally high if not higher than those of their larger counterparts and their social welfare systems might offer more comprehensive protection to shield the newcomer. From the information available it would also appear that professional immigration to the Soviet Union is very low despite its developed economy. Investigation is needed to shed light on the approach to problems of manpower utilization by the States concerned.

53. Judging from the available data, it would seem then that the "brain drain" is not yet a problem of wide geographical scope. Moreover, its effects vary in degree among the countries affected. The few States receiving comparatively large numbers of trained immigrants are the United States of America, Canada, the United Kingdom, Australia, and, perhaps, France and Germany. Prominent among the countries that experience a loss are [the Republic of] China (Taiwan), and Korea, Iran and India. On the other hand, although some nations do not

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<sup>42/</sup> At the same time it should be observed that Japan's unusually active translation activity removes to some extent the incentives for Japanese to master English completely.

actually experience large numerical losses, still they tend to be more adversely affected in terms of their stocks of manpower and the rates of output of their educational system. In addition, professional migration has become, at varying levels, very widespread.

54. The flow of highly trained personnel from developing countries will probably continue to increase. This could be the case, in part, because of the growth in the number of institutions of higher learning, or their expansion, in several developing countries. This means a higher output of trained personnel which, if unaccompanied by accelerated social and economic development, must inevitably lead to an increasing outflow. In view of the slow economic growth of some developing countries, it is likely that in a number of these the expansion of job opportunities will not keep pace with this increasing output of highly trained job seekers.<sup>43/</sup>

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<sup>43/</sup> Hla Myint, "The Under-developed Countries: A Less Alarmist View", in The Brain Drain, op. cit., pp. 239-244. UNESCO, International Institute for Educational Planning, Manpower Aspects of Educational Planning, 1968, p. 27, gives 5-15 per cent for annual increases in educational output and 4-5 per cent for gross national product increases, coming to precisely the same conclusions.

V. EDUCATION AND MIGRATION<sup>44/</sup>

55. There has been a large increase in the number of students studying abroad since the Second World War.<sup>44/</sup> In 1938-1939 there were in all colleges and universities in the United States 6,004 foreign students of whom approximately 3,195 were from developing countries and 195 were studying under exchange programmes. After the Second World War, the number of foreign students studying in developed countries showed a steep annual increase. In 1967 there were 100,262 foreign students enrolled in United States institutions of higher learning.<sup>45/</sup> Although this figure does not distinguish between students from developing and developed countries, it is estimated that approximately 70 per cent were from developing countries.<sup>46/</sup> The increase in foreign students has been even more rapid in the United Kingdom. The British Council estimated that before 1939 there were hardly more than five or six hundred foreign students studying in Britain. By 1967, there were 73,000 of whom 54,000 came from developing countries. France received from Africa a preponderant proportion of the 18,500 foreign students studying in French institutions.<sup>47/</sup> In the Federal Republic of Germany,

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<sup>44/</sup> Education, as used in this chapter, refers to training in institutions of higher learning. Except where noted, it does not refer to training limited to the needs of a particular job and usually shorter in duration. Students whose training for a particular job is obtained through regular enrolment at institutions of higher learning would, however, be taken into account here.

Students actively and primarily engaged in the educational process are, of course, not considered migrants: a student becomes a migrant under the definitions here used when he is fully employed following the end of his education and, generally, when he has taken some formal action to change his status - permanent residence status in the United States, work permits in the United Kingdom etc.

<sup>45/</sup> Institute of International Education, Open Doors (New York, 1967).

<sup>46/</sup> The Brain Drain of Scientists, Engineers, and Physicians from the Developing Countries into the United States, United States Government Printing Office, Washington, 1968, p. 17.

<sup>47/</sup> Angus Maddison, Foreign Skills and Technical Assistance in Economic Development, Organization for Economic Co-operation and Development (Paris, 1967), pp. 20-25 and 51-57.

foreign students, which numbered about 100 in 1950, increased to 31,000 by 1965.<sup>48/</sup> Similar increases were observed in the percentage of foreign students studying in other major developed countries.

56. It would appear that too few students from developing countries are finding their way directly into development programmes and favourably influencing the development process in their own countries. Therefore wastage may well be excessive from a developmental point of view. Public as well as private programmes supporting the education of students abroad usually specify or assume that the opportunity would be used to the national advantage of their country of origin. Students from developing countries<sup>49/</sup> applying for places at institutions of higher learning in developed countries often indicate their intention to serve their own country after graduation. The fact is, however, that a growing number of students being educated abroad would seem to view their future careers in terms of entering a profession in a developed country. If providing leadership for development at home is one important purpose of sending students overseas to be trained, then, first, the manpower needs of the country should be clearly indicated to them; secondly, appropriate programmes of training should be worked out reflecting development needs and, finally, manpower planning should be fostered so that the skill of the student will be adequately utilized after completing his training.

57. It would seem that no comprehensive effort is being made in any major country providing training to co-ordinate officially-sponsored programmes with private study programmes for the purpose of maximum development. Developing countries attempting co-ordination are usually those having relatively small

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<sup>48/</sup> Material on the "brain drain" for Germany has been drawn from German newspaper clippings and notices in publications of the Alexander von Humboldt Stiftung, the Deutscher Akademischer, Bustauschdienst, etc.

<sup>49/</sup> The Institute of International Education (IIE) (US) has "traditionally defined a foreign student as a person who comes to the United States expressly for an education and states his intention of returning home afterwards". Until 1966, few students expressed intention in IIE questionnaires of staying in the United States. In 1965, however, the number rose to 6,000, in 1966 to 11,00 and in 1967, 13,000 (13 per cent). (Open Doors 1966, p. 4, ibid., 1967 (New York, Institute of International Education.)) The cited question is taken from IIE questionnaires.

numbers of students abroad. It is reported that certain smaller, new nations, especially in Africa, apply selection processes in both the public and private areas and do in fact inform departing students of national needs. Few countries, at least until very recently, have assisted their private students abroad with an eye to the relevance of their courses for national needs nor have they been given counsel regarding priorities in national development.

58. The over-all rate of foreign students from developed and developing countries who remain in the United States was estimated in 1967 at 15 to 25 per cent. One sample survey that distinguished between returning and non-returning students showed that 24.5 per cent of those replying wished to remain in the United States. In 1966-1967, 13,000 foreign students (of a total of 100,000) declared their intention of remaining in the United States.<sup>50/</sup> Among these, the proportion is higher for certain groups, for example, 30 per cent for Asian students (who constitute one third of all foreign students in the United States). From a few dozen in 1946 and a few hundred in 1948, the number of students from French-speaking Africa and from French possessions elsewhere in France reached over 15,000 by 1964.<sup>51/</sup> One French survey of 1965 found 12,000 former sub-Saharan African students remaining in France with their families, compared to 11,000 students and lycéens still pursuing their studies. Some of these have been described in French statistics as "étudiants à perpétuité".<sup>52/</sup> The Australian Minister for Immigration referred in 1966 to estimates that 20 per cent of 12,000 foreign students in Australia wished to remain there.<sup>53/</sup> In Canada, the problem is similar. Numbers of students from developing countries are known to stay in Germany as medical doctors. One seventh of all persons receiving United States

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<sup>50/</sup> Institute of International Education, Open Doors, op. cit., 1967, p. 1. See also page 43, n. 2.

<sup>51/</sup> Dr. Louis-Paul Aujoulat, "Invasion noire ou présence africaine?", Hommes et Migrations, Paris, numero special, p. 111.

<sup>52/</sup> Perspectives marocaines (Paris), No. 944, September 1965. Such former students are, of course, the products of entry in many prior years. According to another survey conducted in connexion with a doctoral dissertation, 50 per cent of students from the Maghreb studying at the Faculté des sciences in Paris wished to work in France at the conclusion of their studies, 70 per cent of Viet-Nameese and 15 per cent of other Africans. The percentages of those undecided were 0 per cent for North Africans, 52 per cent for other Africans and 25 per cent for Viet-Nameese.

<sup>53/</sup> Hon. Hubert Oppenheim, "Australia's Immigration Policy", 28 March 1966, p. 18. The 12,000 students are later (p. 19) identified as Asian students, 11,000 of whom are private.

doctorates are foreign citizens and, for 1960-1966, citizens of developing countries constituted 65 per cent of this group compared with about 49 per cent for the period 1920-1959. Most of these degrees were taken in the physical sciences and engineering (42 per cent), biological sciences (25 per cent) and social sciences (15 per cent). The percentage of foreign recipients of doctorate degrees who intend to remain in the United States for their first post-doctoral employment has risen steadily in recent years and, for 1964-1966, was 51 per cent. Only 64 of 325 Koreans who obtained doctorates in the United States have returned to Korea.<sup>54/</sup> One study has shown that a non-return rate of 49 per cent for foreign students who have earned masters' degrees in nuclear engineering rose to 73 per cent when students in this field obtained doctorates.<sup>55/</sup>

59. It has been frequently stated that the educational system which most developing countries acquired or inherited from the developed nations is in several respects not suited to their own development needs. Indeed, it has even been observed that often the educational systems of the developed countries require important adjustments to fulfil their own requirements. Of the 600,000 professionals trained at "university level" in Latin America, for example, only 3 per cent were employed in the agricultural field, which employed 46 per cent of the total labour force. In India, according to the National Sample Survey of 1960-1961, there were 1,192,000 professionals on or above graduate level of whom 90 per cent had diplomas in law, arts and commerce, 4.9 per cent in engineering and technology, 3.4 per cent in medicine, 1.2 per cent in agriculture and 1.7 per cent in other technical subjects.<sup>56/</sup> From education thus not closely related to development at home, the student enters an educational system in a developed country which may also not be directly geared to the development needs of developing countries. In the sciences and engineering, it has been observed that "a startlingly disproportionate number" work on general basic problems of interest to the entire community of scholars rather than on applied problems whose

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<sup>54/</sup> Answer to UNITAR questionnaire, 1968.

<sup>55/</sup> House Reports, 23 January and 28 March 1968.

<sup>56/</sup> Cf. E.K. Ramaswami, "Problem of Unemployed Engineers", The Hindu Weekly Review, 19 February 1968, "The education system is so badly oriented that there is no correlation to need."

solution is quite specific to the home country.<sup>57/</sup> At the same time, in many cases, facilities for higher education in developing countries are inadequate to meet the needs of their citizens.

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<sup>57/</sup> Dr. William C. Thiesenhausen, Assistant Professor, University of Wisconsin, Land Tenure Center, House Report, 23 January 1967, pp. 31-32.



#### IV. ECONOMIC AND SOCIAL FACTORS AFFECTING OUTFLOW

60. Besides the educational factor, other basic causes lie behind professional migration. Indeed, in the case of sub-professionals, except for nurses and midwives, education is a negligible factor. The other causes have been described as a combination of "push" factors, such as under-employment, lack of opportunity, poor working facilities and low salaries, and "pull" factors like high salary, large research grants and general logistical support. These factors are, however, not identical in all situations nor do they have the same force everywhere. In general, "it is the comparison of the potential migrant's situation in his country of origin with the situation of persons of similar qualifications in the country of destination that enters into his decision".<sup>58/</sup> Some of the main factors affecting the outflow are here considered.

61. There is usually a substantial difference between the salary of a professional at home and that offered abroad in a developed country, particularly in North America. In India, in the middle 1960's for example, medical and engineering graduates received Rs.677 (\$90.00) and Rs.540 (\$72.00), respectively, a month, those trained in geology, mathematics, statistics and zoology were paid Rs.420 or \$56 a month while falling between the last two categories were chemists and other scientists.<sup>59/</sup> It has been stated that "in March 1966, the National Science Foundation reported that in the United States the median annual salary for chemists and mathematicians was \$11,000; for physicists, economists, and statisticians, \$12,000; and for professional medical personnel, \$15,000".<sup>60/</sup> Even considering

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<sup>58/</sup> Enrique Oteiza, "A Differential Push-Pull Approach", The Brain Drain, op cit. p. 126. UNITAR's long-range research project on the "brain drain" seeks to apply systematic methodology to the background of motivations and conditions relating to the "brain drain" and how individuals perceive them, thus adding much needed objective data to studies of these causes.

<sup>59/</sup> A. Rahman, Scientist-in-Charge, Research Survey and Planning Organization, in paper submitted to International Conference on Comparative Research on Social Change and Regional Disparity within and between Nations.

<sup>60/</sup> W. Adams and J.B. Dirlam, "An Agenda for Action", in The Brain Drain, op. cit., p. 248.

substantial differences in purchasing power, the strong desire of many to remain at home and the fact that India has exceptionally low salary levels, such differentials are too great not to encourage substantial emigration. In addition to the higher material life which salary differentials offer, salary not infrequently becomes in itself a status symbol.<sup>61/</sup>

62. Certain categories of professionals in many developing countries are poorly paid relative to the upper wage level of their own society and far below their expectation. Private physicians tend usually to be relatively well-rewarded but this is not usually the case for researchers, for teachers at universities or schools. In many developing countries, government officials are paid salaries calculated at higher multipliers of local unskilled labour than they are in developed countries; in others they are underpaid. Sometimes the rewards for the kind of training which is less directly related to development are far greater than for technical skills of immediate developmental benefit. Many countries have, in the view of one authority, distorted income structures which place a premium on occupations in terms of tradition, family status, and political connexions rather than on the relative importance of jobs for the needs of development.<sup>62/</sup> Sensitivity to internal wage inequities has grown along with knowledge of structures elsewhere and as well as of the preference categories of immigrant-receiving countries.

63. A lack of employment opportunities for professionals as well as of job content requisite for advanced training are among the major factors affecting talent migration. It is reported that several thousand Indian engineering graduates are at present unemployed while a 1961 census showed that 10.4 per cent of all scientific and technical personnel were unemployed and 18.6 per cent were employed

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<sup>61/</sup> Salary is an inducement at least as powerful for migration between developed countries, salaries for certain professionals in the United States being two to five times those in, for example, the United Kingdom. For junior staff of British hospitals with typical take-home pays of \$25.20 for up to 100 hours work per week, as for many professionals in developing countries, such a salary level is an obvious inducement. (W. Adams and J.B. Dirlam, "An Agenda for Action", in The Brain Drain. op. cit. p. 248.)

<sup>62/</sup> R.K.A. Gardiner, "Africa" in The Brain Drain, op. cit.

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outside the occupations for which they had been trained. Some developing countries like China (Taiwan), Korea and India, educate more people, especially at high levels, than they can employ at those levels. The educational system of some countries has failed to adapt itself to the changing economic conditions and continues to turn out graduates who too often are not suited to the needs of the society.

64. Lack of manpower planning or miscalculation in these plans may result in overproduction of trained personnel and consequently lead to unemployment. In India, between 1951 and 1965, the number of engineering students increased at the degree level from 4,188 to 24,695 and at the diploma level from 6,216 to 48,048. This expansion has proved at least temporarily to be beyond the country's capacity to employ them although not in excess of the nation's development needs. This over-supply of engineers, with estimates varying as much as between 7,000 and 50,000 has resulted in ~~official estimates to~~ Indian student engineers ~~to find~~ *seeking* employment overseas. <sup>63/</sup>

65. In certain cases, cultural and social considerations lead professional persons to prefer living in the capital city or other large urban centres. If the urban centres become saturated, the professional sometimes prefers to migrate to centres abroad rather than to a more rural environment at home, where his services could be used. In some instances, graduates returning from abroad may experience difficulties in making economic and social adjustments and, consequently, choose to practice their professions abroad.

66. Graduates in the fields of science and engineering have come to expect the use of modern, usually expensive equipment for the efficient utilization of their skill. There is also the desire for the kind of professional environment that offers stimulation. Developing countries sometimes are unable to provide either this kind of equipment or environment. As a result, the graduates sometimes leave their country in search of them.

67. With few exceptions, developing countries lack adequate arrangements for informing their overseas students about employment opportunities at home. Too little information is often available to them abroad about development needs,

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63/ Information gathered by UNITAR.

programmes and trends at home. There is in this respect an undesirable gap between the sponsored student who is automatically placed, and the private student who is probably a very valuable asset but who sometimes may be made to feel unwanted when he looks for a job at home. There have been instances where the returning student feels that his home country does not view his training as an asset to be used for economic and social betterment. Some graduates from developing countries who were trained overseas feel that they are employed by their Governments at levels not commensurate with their skills. When these returnees then re-emigrate permanently to the country of training, their personal tales of discouraging employment experience may have an effect on the return plans of fellow nationals studying abroad.

68. Only a comparatively small number of Governments of developing countries allocate substantial funds for research. Even among the twenty or thirty nations who do research, sharply different levels of expenditure, plant, equipment and professional opportunity occur. These differences are a factor leading to brain drain even among these countries. Research is an example of a pull which developed countries possess. The technologist of earlier times usually performed his work at home and probably did so because there was hardly any alternative. Today there are more alternatives. Moreover, as a result of the improved international system of communications, not only is information about these alternatives now brought to previously inaccessible areas but several means of facilitating the acceptance of alternative employment in other lands are now available.

## VII. THE ADVANTAGES AND DISADVANTAGES OF THE MIGRATION OF SKILLED PERSONNEL

69. The advantages or disadvantages to both the developed and developing countries of the migration of trained personnel are difficult to determine because so many factors must be considered in trying to understand the problem. Statements about the adverse effects of the emigration of skill on development are usually based on a variety of assumptions regarding the value of professionals for development under widely different conditions. The answer depends very much on the definition of the term "value" for the purpose of this discussion. For developed countries that bid for talent, the migration of skills would seem to offer net advantages. For the countries of origin that lose those talents, two kinds of costs are involved, the educational costs of producing the skill and the social and economic benefits forfeited with the loss of the skilled migrant's career. At the same time, there are some advantages. The extent of such benefits and losses seems to vary greatly between countries. It is rarely possible to quantify precisely the benefits, still less the losses. However, it is possible to distinguish the areas in which advantages and disadvantages occur.

70. Much of the alarm expressed with reference to the "brain drain" is based on the assumption that this migration deprives a developing country of persons with skills and professional training which are in extremely short supply and needed by these countries for development purposes. Statistics that might throw light on this problem are extremely scarce. However, the following factors should probably be taken into consideration in discussing the problem:<sup>64/</sup> the magnitude of the outflow; the existing supply of the particular skill or profession in question; the speed and ease with which the supply can be increased (or the annual output of graduates in the related field of study); and the manpower requirements, currently and over an extended period.

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<sup>64/</sup> For this section, this report has drawn heavily on an unpublished International Labour Organisation study, "Brain Drain from Developing to Developed Countries", April 1968.

71. The occupation of physician is the only one on which figures of manpower stocks are available. The extremely low ratio of medical doctors to population in developing countries is apparent from table III. In 1960, the number of inhabitants per physician was 10,100 in developing countries in Africa, 5,700 in developing countries in Asia and 1,800 in North and South America excluding the United States of America and Canada.<sup>65/</sup> The degree to which a country will be affected by the emigration of any number of its physicians will depend roughly on the proportion of its physicians to its total population. For instance, although only fourteen Ethiopian physicians emigrated to the United States of America during the period 1962-1967, this could have a serious effect on that country, where there is a high ratio of population per physician.<sup>66/</sup> The 1,158 physicians immigrating to the United States from the Philippines were 5.3 per cent of its stock of physicians and almost half of these came in 1967 alone. In contrast, the 742 physicians who came from Argentina represented only 2.3 per cent of its relatively enormous medical stock. Though, in general, few African physicians emigrated, it was observed that for 1967 there was a noticeable rise in the emigration of Ghanaian physicians to the United States and nurses to the United Kingdom.

72. The figures in column (6), table III, suggest a similar situation with regard to nurses. Virtually no developed country has sufficient native nurses to supply its demand and the situation is far worse in most developing countries. This shortage greatly affects the efficiency of the work of physicians. Where this occurs, it may be a factor leading to the decision of physicians to emigrate.

73. The 10,308 professionals immigrating into the United States of America between 1962 and 1967 represented over 1.7 per cent of Latin America's estimated total number of university-level professionals in 1965.

74. Colombia is considered to have had a net loss of 11,000 professionals between 1958 and 1964 and to have professional emigration of about 1,000 persons

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<sup>65/</sup> Calculated by the International Labour Organisation from data in annexes 4-6, World Health Organization, World Directory of Medical Schools, Third Edition, (Geneva, 1963).

<sup>66/</sup> See Bruce M. Russett, Alker, Deutsh and Lasswell, World Handbook of Political and Social Indicators, (Yale, 1964).

a year equal to 15-20 per cent of those graduating annually from Colombian universities,<sup>67/</sup> of which 80 per cent proceed to the United States of America. In the case of Argentina, the number of engineers who emigrated to the United States between 1950 and 1964 corresponded to 14.3 per cent of the total number of engineers working in industry in the country in 1962.<sup>68/</sup> Nearly 10 per cent of India's medical doctors are working in foreign countries, mainly the United Kingdom and the United States, while in India a large number of vacancies for physicians in government clinics remains unfilled.

75. Table III attempts to indicate the level of professionals compared to the level of development. For certain countries, striking differences can frequently be observed between columns 2 and 3, as in Thailand and India, where the predominance of agriculture is reflected. Comparison of the percentage of professional, technical and related workers among non-agricultural workers (column 2 of table III) with the percentage of "professional, technical and kindred workers" emigrating to the United States and Canada (columns 1 and 2 of table IV) further demonstrates that the emigrating labour force is far more skill-intensive than the labour force as a whole in almost any developing country. The current preference quota and work permit immigration system which operates in some developed States has had the effect in some developing countries of encouraging the over-production of skills as well as the migration of these skills.

76. Table V shows the annual number of graduates in various fields of study in each country. Table VI shows the ratios of the annual rate of emigration of each type of manpower to the annual number of graduates from the related field of study. This ratio attempts to show the degree of educational investment lost as a result of emigration.

77. From these tables it can be inferred that the "brain drain" would seem to be most serious with regard to engineers and of least concern with regard

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<sup>67/</sup> E.A. Osorio, "La Emigración de Profesionales Colombianos-Diagnostico del Problema y Estrategia para su Solución." (Bogota, 1966), mimeographed (unpublished).

<sup>68/</sup> Enrique Oteiza: "La ingeniería y el desarrollo económico en la Argentina", Buenos Aires, 1965, and "Emigration of Engineers from Argentina - A Case of Latin American 'Brain Drain'", International Labour Review, (Geneva, December, 1965).

to social scientists. Over two and a half times the engineers graduating in Hong Kong emigrate, a fact explained by the abnormal refugee situation in that territory. More engineers than the number graduating annually in Honduras and Haiti leave those countries and high percentages of engineers graduating annually leave the Dominican Republic, Iran and Syria. High percentages of graduates in natural science do not return to Costa Rica, Venezuela and El Salvador. The Dominican Republic is currently losing almost one half of its annual medical graduates and Venezuela loses over one half its graduating nurses, so apparently do Jamaica and Barbados,<sup>69/</sup> while Chile, Colombia and Jordan lose almost as many. Some countries, like Korea, from which large numbers of nurses emigrate, sometimes on contract, are themselves short of nurses especially for their rural population.

78. If need is defined in terms of what is necessary to raise levels of living, then the need or requirement of developing countries for a variety of professional and skilled services is very great.<sup>70/</sup> However, the capacity of developing countries, even with aid, to support the employment of specialists and professionals so that they can effectively administer to these needs and also obtain a satisfying return on their personal educational investments, is limited. The gap between needs and economic demands reflects a lack of purchasing power, inadequate mobility of labour within the country or the insufficiency of labour or capital. This gap constitutes a serious development problem. The specialist and the professional are frequently the victims of this situation, since they often lack both the tools and the material support necessary for effective performance of their skill.

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<sup>69/</sup> In the case of Caribbean and West African countries, it is probably more accurate to speak of percentages of nurses of, for example, Jamaican origin practising outside Jamaica. In many of the above cases, girls who could not find - or were not admitted to - training in their own countries were given nursing training in the United Kingdom.

<sup>70/</sup> According to J.G. Scoville of the International Labour Organisation: The Occupational Structure of Employment, 1960-1980, paper presented to the Inter-Regional Seminar on Long-Term Economic Projections for the World Economy (Sectoral Aspects), August 1966, the net requirements for manpower in professional occupations in developing countries between 1970-1980 will be 16.9 million, compared to 5.3 million in the previous decade. Some earlier projections and estimates have been, in various categories, still higher (E/3901/Add.1). The "brain drain" raises the question whether professionals in such numbers can be absorbed.

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79. It is not reasonable to assess the manpower requirements in developing countries on the basis of current effective demand alone. Ideally, such demand should be assessed in accordance with national planning and development strategy. Few countries have a clearly defined strategy. Fewer still reflect the needs of the country in terms of figures on manpower targets by occupation and skill. India for instance, has a detailed plan but over-optimism in employment capacity has resulted in many jobless and some of these have emigrated. If India is to reach her present targets set for physicians, while maintaining her present rate of emigration, it will be necessary for her to train more than 154 additional medical graduates each year. A vicious circle is set. Professionals are forfeited because they cannot be effectively employed; and they cannot be effectively employed because the economy loses, along with them, an incentive for development.

80. The migration of trained personnel means the loss to the country of its expenditure on the person's education and other services provided without the prospect of receiving the benefits of his services. A large part of the cost of education in developing countries is government-subsidized. Higher education provided by new nations tends to be costly because of the high cost involved in equipment, books and teaching staff.

81. The problem of how to cost the education of an emigrant professional involves many assumptions. For example, assumptions must be made about the timing of his departure, whether or not he would be replaced in the system by someone who would have remained, whether one can divide the costs of education evenly among the total of those educated or, if not, how to account for the marginal cost of a given educational system.

82. In selecting the following example of costing for this discussion, it is recognized that the method is by no means infallible. According to some estimates Indian educational total costs are estimated at Rs.3,093 or \$367 for a non-technical diploma, Rs.4,176 or \$560 for a technical diploma, Rs.10,237 or \$1,374 for a college degree and Rs.19,083 or \$2,561 for a technical degree.<sup>71/</sup> On this basis, the

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<sup>71/</sup> A.M. Nalla Gounden, "Investment in Education in India", The Journal of Human Resources, vol. II, No. 3 (University of Wisconsin, Madison, 1967), pp. 347-358. Education obtained before the devaluation of the rupee in 1966 should be valued at approximately 70 per cent higher.

aggregate costs of education lost to India due to emigration of professionals to Canada, France and the United States (before 1966) would have been over many years in excess of \$1.7 million per annum. If one assumes that India loses the equivalent in cost of a degree for each of the professionals lost to the United States of America in 1967, as well as lost nurses to the United States and other countries, the total loss for that year in educational costs alone would be approximately \$5.5 million. Compared with Africa and Latin America, Indian costs would appear to be exceptionally low. It has been estimated that in Latin America it costs \$20,000 per person to train those professionals who emigrated to the United States of America.<sup>72/</sup> Thus, the value of Latin America's contribution in trained personnel to the United States in 1967 may have exceeded \$20 million. However, UNESCO has a much lower estimate of these educational costs which when calculated would probably amount to about one third or less of this figure.<sup>73/</sup> This costing method assumes that educational costs alone are considered with regard to emigrating professionals. The other costs to his country during the years that he was a dependant should be added.

83. So far, in this chapter, an attempt has been made to relate the loss to developing countries from the outflow of trained men and women with regard to categories which to a certain extent can be measured and statistically assessed. The most important losses, however, which cannot be quantitatively measured are the contributions trained persons make to development not only professionally, but also creatively and in terms of leadership. It is the loss of talent to meet the demands of leadership, planning and imaginative management. In a sense, the total effect of the outflow cannot be assessed since the potential contribution did not take place. The closest assessment possible under the circumstances is probably one which takes into account the different levels of effectiveness with which a skill is used and with which a person's abilities beyond his skill are used.

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<sup>72/</sup> Government of the United States of America, House of Representatives, Sub-Committee of the Committee on Government Operations, "The Brain Drain into the United States of Scientists, Engineers, and Physicians", a staff study, (Washington, D.C., July 1967), p.105.

<sup>73/</sup> UNESCO estimates that a year of elementary education in Latin America costs the Government about \$42 and that university education averages \$700 per person per annum. House Report, 28 March 1968, p.27.

84. Some developing countries have a relatively high percentage of unemployment among certain categories of professional or skilled persons. For instance, India is said to have several thousand unemployed civil engineers. Hong Kong, China (Taiwan), Dahomey and a few other countries, at some time or other, have had a fairly high rate of unemployed professional and skilled persons.<sup>74/</sup> The unemployed person makes no contribution economically although he might contribute ideas to stimulate change and development. He is a loss to the economy of his country. Moreover, the loss is sustained regardless of whether or not the person migrates. The fact is that migration to a job would have the effect of relieving the country of an economic liability and could even be profitable to the country if the migrant sends remittances home.

85. The "brain drain" sometimes results from a lack of adequate manpower planning. As shown elsewhere in this report, this has resulted in the over-production of some skills and the under-production of others. For example, India has over-produced engineers and Korea, pharmacists. In several countries some skills and professions are not properly distributed to serve adequately the needs of all sections of the society. While 51 per cent of Bolivia's annual output of physicians applied for immigration to the United States in 1965, most of Bolivia's rural areas were inadequately served by doctors.<sup>75/</sup> Half of the government clinics in the Punjab are vacant while several thousand Indian doctors, comprising 10 per cent of her stock, emigrate to developed countries. Physicians tend to concentrate in cities. The rural areas in most countries are seriously short of medical personnel.

86. The tendency of certain societies to place lower value on some skills or professions than the value generally given them in developed countries today has been a factor contributing to the emigration of trained persons. Countries such as China (Taiwan), Korea and South Viet-Nam have encountered problems in valuing the services of technicians and specialists as highly as those of generalists.<sup>76/</sup>

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<sup>74/</sup> Information gathered by UNITAR.

<sup>75/</sup> Government of the United States of America, Department of State. Council on International Education and Cultural Affairs, "The International Migration of Talent and Skills", proceedings of a workshop and conference, October 1966, p.131

<sup>76/</sup> Information gathered by UNITAR.

Latin America has under-valued the agronomist and the veterinarian. Even though the professional is fully employed in his country, nevertheless, he may wish to emigrate for various reasons. Sometimes these are political reasons, the desire for change, or even frustration. However, among those remaining in their countries, frustration may provide the impetus to take initiatives to improve professional and other conditions in the home country.

87. Development is for no nation an orderly and straightforward process. For development purposes, professional skills have other values apart from those that might be calculated in terms of input and output. Leadership is one of these assets. The highly educated provide most of the national leadership and much of the initiative leading to much of the progress in the social, economic and political fields. The trend towards specialization, especially in science and technology has also affected the "brain drain". Greater specialization also gives rise to greater concern on the part of the student with regard to his technical contributions within the profession.

88. Certain advantages undoubtedly accrue to developing countries as a result of the migration of skilled and highly educated nationals to developed countries. The remittance of portions of overseas earnings to the home country has historically played a significant role in the balance of payments of a number of developing countries. In some cases this has even led some Governments to encourage emigration. In this regard, China (Taiwan) ~~India~~ and some Latin American countries have benefited. Although there are some statistics on total remittances, unfortunately there appear to be none which separate the earnings of the highly trained from those of others. It should, however, be borne in mind that such remittances are voluntary and private, going usually to relatives. They do not repay the contribution which the nation made to the emigrant's education. Moreover, the immigration legislation of most receiver countries is written to encourage the immigration of relatives of permanent immigrants, including not only their wives and children but frequently siblings and parents as well. This would mean, in effect, the retention in the developed country of the funds formerly remitted. For example, 8,907 such "preference relatives" were adjusted to permanent status in the United States in 1967 alone and several thousand more appear to have entered as relatives under other categories.

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89. Although some students studying abroad do not return home, others returning home have been valuable to developing countries. They have also aided a general flow of knowledge and techniques of all kinds from developed to developing countries. Those taking up appointments abroad by placing their productive skills in well-equipped institutions and by associating with other highly trained staff may be able to maximize their contribution to the general advancement of knowledge and to its dissemination in the developing countries. In contrast, if these same persons had remained in their own countries without research facilities, their potentials might probably have been lost. Many migrant scientists are deeply committed to this view.<sup>77/</sup> Many high-ranking scientists, including Nobel Prize winners, were probably to achieve eminence only by emigrating. The question, however, arises as to the extent to which this argument applies in relation to present migration. Of the 10,506 professional immigrants into the United States from developing countries in 1967, only 1,472 were natural scientists. As in all professional categories, these represent higher and lower levels of occupation. The argument would apply with little force to the majority with lower level skills and it is therefore unlikely that it applies to more than a very small minority of the present professional migration.

90. When the professional is unemployed within a developing country, emigration relieves the economy of the need for his support. A recent ILO draft report on the "brain drain", however, shows that unemployment of high level personnel is exceptional. As a rule, shortages of high-level personnel, especially engineers, natural scientists and medical personnel exist in most developing countries.<sup>78/</sup>

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<sup>77/</sup> See Harry G. Johnson, "The Economics of the Brain Drain: The Canadian Case", Minerva (Berlin), spring, 1965, and Herbert B. Grubel and Anthony D. Scott, "The International Flow of Human Capital", American Economic Review (Evanston), Papers and Proceedings, May 1966 and Grubel in Proceedings of the Conference on the "International Migration of Talent and Skills". Ibid. In addition to capital expenditures, the emigration of professionals reduces to some degree the imports of certain luxury and other expensive goods.

<sup>78/</sup> S. Watanabe, International Labour Organisation, "Brain Drain from Developing to Developed Countries", (unpublished manuscript) April 1968, p. 39. For such United Nations reports, see for example, United Nations, Economic Survey of Asia and the Far East, 1965, (United Nations publication, Sales No.: 66, II. F. 1).

91. The migrant professional can provide a means of communication in his special field between his native and his adopted country and this might be mutually beneficial. Professional success in the developed countries may serve as a stimulus for fellow countrymen in developing countries to enter and work hard at similar professions. Such motivation may tend to perpetuate emigration but at the same time might stimulate needed social change. Prestigious academic departments in such countries as India (statistics) or Hungary (mathematics) might operate less efficiently and consequently experience lowering of quality and standing if they did not produce partly in excess of local demand.

92. The advantages to the economically advanced countries of the immigration of professionals might be assumed from the immigration legislation passed by these countries during the last decade. This legislation ensures that persons admitted will not be a public charge, will adapt easily and will be of maximum benefit to the economies they enter. The offer of a job is usually an important requirement. Such legislation justifies a presumption of full employment of professional immigrants. Immigrant professionals are, in fact, employed at virtually every technical and teaching level from Nobel scientist to teaching assistant. The majority are young and this is especially true of those from developing countries. <sup>79/</sup> This means that their services to the country are likely to extend over a long period.

93. The problems of costing education have been referred to above. For purposes of value to the developed countries, a figure could be taken which expresses approximately the equivalent investment in education in the United States. The figure of \$20,000 per person is used by the Research and Technical Sub-Committee of the United States House of Representatives as representing the average cost of education and training in

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<sup>79/</sup> Government of the United States of America, Department of Justice, Annual Report of the Immigration and Naturalization Service, Washington, D.C. 1967, gives the median age of all migrants to the United States at about twenty-four, the age level remaining quite stable over a number of years. The average age of professionals from developing countries is believed to be in the late twenties.

developing countries.<sup>80/</sup> On this basis, the cost to developing countries of educating professionals who emigrated to the United States of America from developing countries since World War II would be on the order of slightly over US\$4,000 million,<sup>81/</sup> an annual average of over \$45 million a year. Its value in terms of United States education would be still higher.

94. The value of professional immigrants absorbed into all other industrialized countries is even less known. Taken together, however, it may approach the United States of America figure. In developed economies, the cost of educating a professional is a very small percentage of the value of this output over twenty-five man years of his working life. Hence the projected value of such immigrant professionals to the countries to which they go would be several times greater than the value of their education. To this, the value of sub-professional skills must be added. Thus it is possible that the above evaluation, with all the reservations which must be made about it, is an under-estimation.

95. Among other factors, the value placed on professionals from developing countries depends upon the level at which their skill is used in the new country. For instance, while there are many practising physicians of distinction among the immigrants, the majority of medical doctors from the developing countries appear to be used in middle-level resident and interne positions. It is said that fairly large numbers of former African students remaining in France are educational drop-outs or take exceptionally long periods of time to finish their

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<sup>80/</sup> In view of the fact that so many of those represented come from large educational systems in China (Taiwan), Korea and India in which the per person cost is comparatively low, this figure, originally used for the South American graduate, may be high for its purpose. On the other hand, the cost of educating an equivalent American would currently be far higher.

<sup>81/</sup> This does not mean that the same figure can be used to describe the value of such people to developing countries if they returned home. Lower employment and utilization of such persons would substantially lower the valuation which one could place on such persons.

degrees after which they sometimes find relatively modest employment.<sup>82/</sup> While some professionals from developing countries have become professors of great distinction, many others are at smaller colleges and schools which in the United States could not retain accreditation without obtaining Ph.D's whose supply from native graduates is inadequate. If there is, in fact, a tendency to use fairly large numbers of professionals from developing countries in middle-level rather than upper-level positions, the total value of the above contribution would be lowered, the long-term promise of career may be lessened and the tendency to eventual return may be greater.

96. One advantage which may accrue to a developed country from the immigration of professionals trained in other cultures is the value of an "international mix". Certain large, older business firms, for example, have found over a period of many years' experience that they obtain more value and stimulation, particularly in research, by mixing people from different cultures and educational systems than they would obtain from persons with the same background.

97. It is difficult to find in the immigration situation disadvantages to developed countries. The following are the few which could be identified:

98. Since, on the whole, the expansion of educational systems in developed countries has generally lagged behind need, the significant number of places which countries like the United States, the United Kingdom, France and Germany provide within their own higher educational systems for foreign students does involve a certain expenditure for them. This cost is increased by the fact that considerable organizational expense has been invested in arrangements for the selection and admission of these students and for their welfare while abroad. It can be argued that the receiving country in consequence, has deprived some of its nationals of the opportunity to obtain a higher education.

99. The developed countries concerned might be said to be using foreigners to solve problems of internal adjustment between educational supply and job demand which they would have been forced to solve for themselves using their own citizens if a ready supply of foreign trained manpower had not been readily available. This would apply especially in the field of medicine in some of the developed countries where medical schools are unable to meet the need.

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<sup>82/</sup> Paul Bourget Sack, "Formation et évation des cadres au Cameroun", mémoire présenté pour le diplôme de l'école pratique des hautes études - année académique 1967-1968, (unpublished, Paris), p. 39.



VIII: MEASURES CURRENTLY BEING TAKEN REGARDING THE OUTFLOW OF TRAINED PERSONNEL

100. The "brain drain" has become a political issue in a few countries, like the United Kingdom and India. In others, there is a division of opinion between those who support and those who oppose, while the rest remain neutral on the subject. Several international and national attempts have been made to solicit Governments' opinions on the migration of talent. Among the international, the latest was Economic and Social Council resolution 1274 (XLIII) asking, in part, for the "observations of Member States" on the results of "consultations with the United Nations bodies" regarding the proposals and priorities contained in the Secretary-General's first report on the development and utilization of human resources in developing countries (E/4353 and Add.1).

101. Another attempt was made by the United States Department of State relating to eighty countries and territories. Of seventy-six replies received, fifty-three stated that failure of academic visitors to return home after completing programmes in the United States did not pose a serious problem of migration of talent to the United States. Sixteen replied that they were affected to some degree, seven stated that migration to countries other than the United States of America posed a problem and seven stated that they needed more information upon which to evaluate the issue more thoroughly. In addition the National Association of Foreign Student Affairs (NAFSA) in the United States recently conducted a survey among 120 foreign embassies in Washington to ascertain the kind of contact these embassies maintained with students relative to future employment. Only thirty replies were received of which only five reported regular recruitment efforts.

102. On the whole it would appear that few developing countries, thus far, have taken action on the question of the "brain drain". However, because of concern for the "brain drain" or for administrative purposes, some countries have taken steps which relate to study abroad or to other aspects bearing on migration.

103. Some countries, including Colombia, Malta, the United Republic of Tanzania and Somalia have appointed committees to select recipients of government scholarships as well as those offered scholarships by foreign Governments and private institutions. These countries and others like Lesotho, Guyana and Niger,

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stated in response to a UNITAR questionnaire, that they attempt to select students on the basis of national need. The nations from which many students emigrate, however, appear to put comparatively few of those students through such selection procedure or otherwise try to co-ordinate education abroad with the national need.

104. Most countries limit or control the use of foreign exchange by students and a few countries, like the United Republic of Tanzania, require either that the student deposit a bond against his return or that his family agree to make payment in the event of non-return.

105. Some countries limit the validity of their students' passports to short periods. Some demand, in this connexion, an official record of grades before renewal is given. In a very few cases, foreign embassies retain the student's passport at the embassy until his departure. Others have policies of allowing students to hold passports only for study in certain fields, usually technical and scientific. India no longer permits the examination of the United States Educational Council for Foreign Medical Graduates to be given in India,<sup>83/</sup> and does not usually grant passports for students to study law.

106. Regarding more positive measures, NAFSA's survey, referred to above, found that only five foreign embassies reported regular efforts to recruit their own foreign students in the United States of America for employment at home. Five others reported occasional recruitment. Two had regular and two occasional job-interview boards, twenty-six had none. The rest reported no recruitment efforts. Five had special publications giving information on employment opportunities, two occasionally sent such publications, twenty-three had none. A very small number of embassies maintain special student offices which keep students constantly in touch with job opportunities; in the case of Thailand, this effort appears to have had good results. Iran, in addition to a quarterly newsletter, has offered students wishing to return home for the summer, substantial air fare subsidy and has moved toward considerable leniency on its military service requirements. Kenya recruitment tours have reportedly obtained the return of some 170 students. India mails its students a weekly listing of

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<sup>83/</sup> Passing this examination has been a requirement for admission to United States hospitals as internes or residents.

employment openings. Positive efforts of this character help to broaden contact with students abroad, many of whom feel greatly isolated from their homeland.

107. The Colombian Institute for Advanced Training Abroad is an autonomous government agency, which conducts studies to ascertain Colombian national priorities and facilitates the selection of those overseas students most likely to serve Colombian needs. It also selects foreign scholarship recipients, provides loans and allocates foreign exchange for overseas study. Where it administers scholarship funds from other institutions, it normally requires that students helped by it should work two years in Colombia for every year spent in study abroad.

108. India maintains a Scientist Pool which will support Indian scientists suitably trained abroad for as long as two years during the time they are looking for jobs. Korea is setting up an Institute for Science and Technology which will provide research facilities in a well-equipped environment favourable for Korean scientists trained abroad. Nearly thirty of these have (as of May 1968) agreed to return home to work at this Institute. These scientists are assured a salary of between \$300 and \$400 per month plus free housing. This salary scale would offer about three to five times the income that government scientists could obtain at present. Argentina has relaxed import taxes and helped provide housing for returning Argentine professionals. Another measure, designed to enable migrants to return to their countries and provide them with a transitional period in which to resettle, is now being considered in Latin America. Foreign contractors engaged in large infra-structural projects would be required to recruit a certain proportion of professional and highly trained manpower from among citizens who have remained abroad. The terms of employment would be the same as those governing foreign employees. Similarly, the Pahlavi University in Iran has as one of its main purposes the recruitment, as faculty members, of Iranians who received their graduate degrees in the United States of America and remained there.<sup>84/</sup>

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<sup>84/</sup> W.A. Copeland, "The Pahlavi-Pennsylvania Contract", International Development Review (Baltimore), vol. X, No. 3, September 1968, pp. 21-23.

109. The United Nations International Centre for Theoretical Physics in Trieste plays a major role in stemming the migration of high-ranking physicists from developing countries. It finances associateships under which a scientist from a developing country receives a three-year appointment to spend one to three months each year at the Trieste Centre. The Inter-American Development Bank has extended financial assistance for planning in Latin American education with special priority to developmental education and attention to structural changes in universities, teacher training and loans to students doing practical work and research.

110. Assistance is, in a number of instances, provided to educational institutions in developing countries by universities and institutes in developed countries. The Royal Society in the United Kingdom, awards fifty scholarships with provision for dividing the time of the recipient between the United Kingdom and the home country.

111. The Exchange-Visitor (J) visa of the United States of America can be regarded as an official attempt to help the return of the foreign graduate. This is done by specifying the purpose of the foreigner's visit in terms of a strict programme of between two and five years and by requiring that on completing his programme, the foreigner should leave the country for two years before reapplying for admission in any other category. However, the waivers of the departure requirement, which annually were 184 or less until 1965, mounted to 1,115 for "hardship" and 429 "granted at the request of other government agencies", during 1967.<sup>85/</sup> Frequently, also, instead of going home, J-visa holders went to Canada from which they gained permanent entry to the United States. Nevertheless, the vast majority of J-visa holders have returned to their countries and the provisions have, at least until 1967, constituted considerable pressure for doing so.

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<sup>85/</sup> Government of the United States of America, Department of Justice, Annual Report of the Immigration and Naturalization Service, Washington 1967, p. 10. The Worksheets of the United States Immigration and Naturalization Service give 1,051 in this category for fiscal year 1967.

## IX. CONCLUSIONS AND SUGGESTIONS

112. It has been shown that highly trained personnel from many developing countries are emigrating to a few major developed countries, that the size of this flow is large and that it is increasing at a rapid rate.

113. Developed nations often export more of their professionals than do less-developed nations. Of the number of engineers annually graduating in Canada 48 per cent emigrated to the United States between 1956-1961. Norway loses 23.8 per cent of her graduating engineers, Switzerland, 22.4 per cent, Netherlands, 21.8 per cent, Greece, 20.7 per cent - many to larger European countries.

114. Professional flows from developing countries add somewhat to the capacities of several major economies. The value of these flows appears to be considerable and they do not contribute significantly to the wealth and development of the developing countries. In some cases they may contribute to widening the present gap between industrialized and non-industrialized countries. On the basis of available information, the United States of America and Canada are the largest net gainers.

115. Such conclusions might justify, in themselves, some recommendations. They leave, however, the main issue of development unanswered: how much, if at all, and in what way does this outflow adversely affect developing countries by retarding the development process?

116. The conclusions which follow must rest on the assumption that the outflow of skilled and professional persons may retard development. In essence, they are concerned principally with improved utilization of trained men and women for development. Finally, they represent an effort to ameliorate rather than solve. The current migration of professionals may have salutary results both in terms of technical and research advances and as an expression of the expansion of human choice and will. Its cessation is neither feasible nor desirable and could be accomplished only in contravention of United Nations declarations and conventions on human rights and freedoms.

117. Since no single, sweeping recommendation leading to a solution of the "brain drain" is at this state of knowledge of the problem possible or desirable, certain preliminary guidelines might be helpful to developing States, developed States and international agencies.

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118. Several Governments of developing countries are at the present time attempting to formulate general science policies. Consideration might be given in these to emphasizing programmes relevant to the development of the nation concerned. They would include graduate education, measures improving the transfer of technology, and those concerned with study abroad. Such policies should relate to questions of employment of graduates in the relevant professions. Science policies, in the broad sense, might appropriately apply to graduates in business and management. Consideration might also be given to drawing up regional arrangements in which educational services, including centres for higher learning, and employment opportunities might be shared.

119. Nations with many professional emigrés are heavily financing professional education while losing increasing numbers of the beneficiaries abroad. The educational and manpower policies of these nations might be reviewed and their priorities reassessed.

120. Developing countries may wish to consider formulating educational policies related more closely to their own needs. This would involve drawing up curricula more closely related to local conditions and involving their citizens more directly in dealing with the problems of their countries.

121. Most countries will continue to need skills and education which can be best obtained in foreign institutions. It would be helpful if the fields in which studies abroad are needed were specified in national policies. Appropriate committees could be formed for awarding scholarships and fellowships, allocating of foreign exchange, maintaining contact with students abroad and facilitating their employment on returning home.

122. Governments in developing countries should formulate manpower policies co-ordinated with their developmental needs. Planned development of human resources and their effective use should be encouraged. This would require appropriate institutions.

123. Countries concerned with talent emigration should consider establishing offices especially concerned with the employment of persons trained highly overseas.

124. Developing nations, especially those with large professional outflows, might study the effect which salary levels and related conditions have on the migration of talent and, where possible, adjust salaries and enhance conditions of professional employment. Every effort should be made to improve working conditions and to offer rewards commensurate with levels of training.

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125. There is a need for improving knowledge of manpower resources and flows. Much more information concerning the return of students and of highly trained manpower from overseas is needed.

126. Developed nations which at the present time rely on developing nations for numbers of their trained personnel should expand their training facilities and improve their internal career ladders so as to avoid heavy reliance on the human resources of developing nations. This would apply, in particular, to the medical field.

127. Developed countries which have profited from the immigration of professionals from developing countries should feel special obligation to help these countries to improve conditions of education, especially in the fields of science and technology.

128. Developed countries should offer substantial assistance to establish additional international institutions for development that would provide education with competent international staff.

129. Research and development programmes in the major developed countries should be extended where possible to appropriate centres in developing countries, especially in such fields as tropical medicine, agriculture and other fields in science and technology. Efforts should then be made to recruit for these centres scientists from developing countries, particularly among those who have studied abroad. The result would be the wider application in developing countries of the idea of scientific institution-building as illustrated by the Korean Institute for Science and Technology.

130. At present, interest in the "brain drain" is widespread among international agencies in the fields of education, employment, health and social development and it is generally recognized that there is need for great co-ordination.

131. Consideration might be given first to establishing an international pool of skilled manpower for development, and then to whether those countries which have profited from the immigration of this talent might make financial contributions to development through support to this pool.

132. To reduce professional isolation in developing countries, international organizations and institutions in developed countries should provide centres affording wider opportunities to scientists and other professional personnel for study and research.

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133. Universities should be encouraged to develop policies of their own emphasizing the role of higher education in development. In this regard affiliations between universities in developed countries and those in developing countries should be encouraged.

134. If there is strong feeling that the critical nature of development justifies the maximum participation of the private student, national vocational guidance and career advice services should be established for such students both at home and in the developed countries where they study. Consideration might be given to holding an international conference, possibly under the auspices of UNESCO, to discuss the problem of the "private" student from developing countries studying in advanced countries in order to clarify his role in the development process.

135. It would be highly useful, in future studies by international agencies of problems associated with the outflow of trained personnel, to ascertain what practical measures have been taken or are contemplated by developing countries to reduce the outflow or to attract those who have already migrated. In so far as possible, the effectiveness of such measures as those described earlier - the Scientist Pool in India, the Institute for Science and Technology in Korea and others - should be examined.



Table I-A

Total immigrants, immigrants with occupation, "professional, technical and kindred workers", engineers, natural scientists, social scientists, physicians and nurses admitted into the United States, by country of origin, from the year ended 30 June 1962 to the year ended 30 June 1967

Country of origin	(1) Total immigrants admitted	(2) Immigrants with occupation	(3) Professional, technical, and kindred workers	(4) Engineers	(5) Natural scientists	(6) Social scientists	(7) Physicians*	(8) Professional nurses
<b>Europe</b>								
Greece	39,608	12,006	2,068	323	150	26	180	83
Turkey (Europe and Asia)	7,808	3,455	1,518	327	31 (x)	16	319	34
<b>Asia</b>								
Burma	NA	NA	NA	40	10	4	13	3
China (Taiwan)	51,218	23,291	7,343	1,406	610	72	99	112
Hong Kong	11,942	1,666	814	478	189	17	83	127
India	10,034	6,121	5,078	2,341	624	78	174	34
Indonesia	6,056	2,634	680	25	14	4	5	4
Iran	5,363	3,074	1,564	369	85	18	311	52
Iraq	3,128	1,434	608	122	52	3	33	10
Israel	6,694	2,304	1,201	371	130	48	174	153
Jordan (including Arab Palestine)	5,880	2,508	636	79	38	7	18	17
Lebanon	2,981	1,359	547	177	72	11	89	62
Malaysia	311 (a)	165 (a)	75 (a)	35	26	3 (x)	27	18
Pakistan	993 (b)	681 (b)	546 (b)	119	45	4	33	6
Philippines	30,149	10,384	5,421	434	187	36	1,158	793
Republic of Korea	15,093	2,529	1,895	293	226	71	163	61
Republic of Viet-Nam	765 (d)	168 (d)	114	27	6	3	3	15
Syria	1,613 (c)	794 (c)	311 (c)	83	23	3	24	6 (x)
Thailand	NA	NA	NA	28	4	3	40	152
<b>North America</b>								
Costa Rica	11,558	5,682	803	59	26	3 (x)	32	132
Dominican Republic	60,344	26,468	2,094	168	49	11	235	160
El Salvador	8,896	4,538	634	21	20	3	27	99
Guatemala	8,269	4,286	722	33	11	5	30	103
Haiti	16,232	8,130	1,988	34	34	10	114	161
Honduras	10,297	5,039	760	42	18 (x)	4 (x)	32	83
Mexico	262,014	90,941	3,628	328	176	48	559	248
Nicaragua	7,089	8,011	367	24	13	1 (x)	32	44
Panama	11,235	4,471	525	40	7	4	25	60
Other West Indies	-	-	-	1,127	388	74	1,184	1,733
<b>South America</b>								
Argentina	27,738	12,745	4,226	516	213	43	742	186
Bolivia	2,319 (e)	1,014 (e)	362 (e)	57	23	7	101	40
Brazil	12,891	5,389	1,339	251	106	23	168	95
Chile	7,767	3,142	912	136	44	13 (x)	50	81
Colombia	45,515	16,924	3,924	383	137	71	601	234
Ecuador	21,984	8,897	1,646	78	41	9	84	132
Paraguay	NA	NA	NA	8	8	1 (x)	27	10 (x)
Peru	12,877	4,894	1,229	144	30	13	195	114
Uruguay	NA	NA	NA	28	4	- (x)	20	13
Venezuela	5,788	1,450	650	211	72	20	125	60
<b>Africa</b>								
Algeria	918 (x)	418 (x)	98 (x)	4	1	- (x)	5	1
Ethiopia	NA	NA	NA	9	1 (x)	1 (x)	14	1
Ghana	NA	NA	NA	12	6	2	9	10
Kenya	NA	NA	NA	18	4	2	3	4
Morocco	1,894	747	183	14	3	- (x)	9	9
Nigeria	417 (r)	255 (r)	131 (r)	31	9	2 (x)	9 (x)	34
Tunisia	392 (g)	145 (g)	23 (g)	5	1 (x)	1 (x)	6	2
United Arab Republic	6,285	2,998	1,181	89	57	13	91	15
Total developing countries	749,355	291,157	58,044	10,787	3,978	811	7,475	5,606
All countries	1,863,980	818,660	180,877	27,877	10,686	1,895	14,029	23,886

Source: The figures in columns (1) and (3) have been compiled from the figures given in the first and second columns of table 8, the Annual Reports of the Immigration and Naturalization Service, United States Department of Justice, Washington, D.C., for the year 1962 through 1967 inclusive. Those in column (2) have been calculated by subtracting the figures on "Housewives, children and others with no reported occupation" of the same source from the corresponding figures in our column (1). Columns (4) through (8) have been compiled from the corresponding data in appendix A, tables I through V in the Staff Study.

Notes: (a) 1965 only; (b) 1966 and 1967 only; (c) from 1963 through 1967 only; (d) 1966 and 1967 only; (e) 1965, 1966 and 1967 only; (f) 1964 through 1966 only; (g) 1962, 1963 and 1964 only; (x) 1962 through 1966 only.

\* Physicians includes surgeons, and each occupation includes professors and instructors.

Table I-A (2)

Total immigrants, immigrants with occupation, "professional, technical and kindred workers", engineers, natural scientists, social scientists, physicians and nurses, admitted into the United States, by country of origin, (a) from the five years ended 30 June 1962 to 30 June 1966, and (b) for the year ended 30 June 1967

Country of origin	(1) Total immigrants admitted		(2) Immigrants with occupation		(3) Professional, technical, and kindred workers		(4) Engineers		(5) Natural scientists		(6) Social scientists		(7) Physicians*		(8) Professional nurses	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
<b>Europe</b>																
Greece	24,703	14,905	5,641	6,375	1,479	589	227	96	111	39	14	12	125	55	50	23
Turkey	5,595	2,213	2,423	1,032	1,091	427	256	71	31	14	2	208	111	26	8	
<b>Asia</b>																
Burma	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	25	15	3	7	1	3	9	4	3	0
China (Taiwan)	31,477	19,741	13,467	9,824	3,419	3,924	484	922	262	348	33	39	53	46	66	46
Hong Kong	6,587	5,355	851	815	411	403	251	227	90	99	8	9	50	43	75	52
India	5,392	4,642	3,315	2,806	2,604	2,474	1,074	1,067	355	269	38	40	87	87	14	20
Indonesia	5,586	470	2,430	204	559	121	14	11	9	5	1	3	-	5	2	2
Iran	3,949	1,414	2,178	896	1,014	550	236	133	57	28	10	8	188	123	32	20
Iraq	2,057	1,071	983	451	428	180	86	36	40	12	1	2	22	11	8	2
Israel	5,213	1,481	1,657	647	826	375	255	116	33	47	35	13	138	38	123	30
Jordan	4,276	1,604	1,895	613	461	175	54	25	35	3	3	4	12	6	12	5
Korea	11,137	3,956	1,454	1,075	1,065	830	185	108	140	86	34	37	93	70	37	24
Lebanon	2,229	752	1,031	328	414	133	136	41	48	24	9	2	50	39	45	17
Malaysia	311	n.a.	165	n.a.	75	n.a.	27	8	17	9	3	3	22	5	14	4
Pakistan	347	n.a.	646	n.a.	205	n.a.	341	62	57	28	17	1	19	14	4	2
Philippines	19,284	10,865	5,555	4,829	2,621	2,800	86	348	81	106	21	15	608	550	358	435
Republic of Viet-Nam	275	(a)	490	(a)	109	39	(a)	75	21	6	3	3	1	2	12	3
Syria	1,058	(c)	555	(c)	266	215	(c)	96	66	17	20	3	2	1	19	5
Thailand	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	15	13	3	1	2	1	32	8	76	78
<b>North America</b>																
Costa Rica	10,383	1,175	5,283	399	734	69	53	6	23	3	3	4	29	3	119	13
Dominican Republic	48,830	11,514	23,203	3,265	1,824	270	151	17	33	16	7	4	197	38	130	30
El Salvador	7,851	1,045	4,025	513	574	60	19	2	18	2	1	2	22	5	88	11
Guatemala	6,800	1,469	5,598	688	633	89	30	3	10	1	4	1	22	8	95	8
Haiti	12,665	3,567	6,559	1,571	1,681	307	65	13	30	4	8	2	74	40	133	28
Honduras	8,747	1,550	4,469	570	701	59	39	3	18	4	4	4	26	6	72	11
Mexico	226,643	42,371	78,607	12,334	2,931	697	267	61	142	34	34	14	473	86	202	46
Nicaragua	6,360	729	2,709	263	325	42	23	1	12	1	1	1	25	7	38	8
Panama	9,559	1,676	3,942	529	451	74	38	2	4	3	2	2	24	1	51	9
<b>South America</b>																
Argentina	25,261	2,477	11,637	1,108	3,720	506	424	92	172	41	33	10	616	126	167	19
Bolivia	1,684	655	732	282	266	96	41	16	19	4	5	2	85	16	30	10
Brazil	11,215	1,676	4,784	605	1,348	191	197	54	91	15	17	6	149	19	82	13
Chile	6,931	836	2,798	344	790	122	116	20	40	4	13	4	47	3	74	7
Colombia	40,959	4,556	15,428	1,428	3,532	392	310	73	122	15	63	8	485	116	213	21
Ecuador	19,265	2,719	8,109	788	1,495	151	62	16	37	4	7	2	67	17	116	16
Paraguay	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	6	1	6	2	1	1	19	8	10	10
Peru	11,207	1,670	4,020	874	1,097	132	122	22	27	3	12	1	168	27	98	16
Uruguay	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	25	3	3	1	-	-	13	7	9	4
Venezuela	5,249	539	1,350	100	357	293	189	22	62	10	17	3	110	15	60	60
<b>Africa</b>																
Algeria	918	n.a.	418	n.a.	98	n.a.	4	-	1	-	-	-	2	3	1	-
Ethiopia	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	6	3	1	1	1	1	13	1	1	-
Ghana	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	8	4	2	4	1	1	1	8	5	5
Kenya	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	12	6	2	2	-	2	2	1	4	-
Morocco	1,437	457	555	152	130	45	9	5	1	2	-	-	7	2	9	-
Nigeria	417	n.a.	255	n.a.	131	n.a.	14	17	5	4	2	-	9	9	19	15
Tunisia	392	n.a.	145	n.a.	23	n.a.	1	4	1	1	-	-	3	3	2	-
United Arab Republic	4,582	1,703	2,112	886	787	394	56	33	37	20	8	5	65	26	14	1
** Total above devel- oping countries	727,920	209,885	294,465	87,295	57,595	23,705	6,835	4,229	2,477	1,472	533	279	5,655	2,041	4,249	4,784
All countries	1,502,008	361,972	665,735	152,925	139,225	41,652	19,055	8,822	7,793	2,893	1,351	544	10,703	3,326	19,102	2,004

Sources: The figures in columns (1) and (3) have been compiled from the figures given in the first and second columns of table 8, the Annual Reports for the years 1962 through 1966 inclusive. Those in column (2) have been calculated by subtracting the figures on "Housewives, children and others with no reported occupation" of the same source from the corresponding figures in our column (1). Columns (4) through (8) have been compiled from the corresponding data in appendix A, tables I through V in the Staff Study.

Notes: (a) 1965 only; (b) 1966 only; (c) from 1963 through 1966 only; (d) 1966 only; (e) 1965 and 1966 only; (f) 1964 through 1966 only; (g) 1962, 1963 and 1964 only.

\* Physicians include surgeons, and each occupation includes professors and instructors.

\*\* The totals used are those of all developing countries. These add to the above listed countries the following rubrics appearing in the US statistics: 'Other Asia', 'Other North America', 'Other South America', 'Other Oceania', 'Other West Indies' and 'Fiji'. The totals of the above are generally of minor consequence except in the instance of 'Other West Indies', which contributed to 1,521 engineers, scientists and medical personnel to the United States in fiscal year 1967 of whom 1,025 were medical personnel which included 202 doctors and surgeons, 19 dentists, 784 professional nurses and 20 student nurses. Jamaica and Barbados are major contributors to the 'Other West Indies' category.

Table I-B

Total immigrants, total workers, professional and technical workers, engineers, natural scientists, physicians, nurses, and professors and principals, admitted into Canada, by country of last permanent residence, 1962-1967\*\*

Country	Total Immigrants (1962-1966)	Total Immigrant workers (1967)	Professional and technical workers (1962-1966)	Engineers (1967)	Natural scientists	Physicians* nurses principals	Professional nurses principals
Argentina	1,837	(544)	114	(58)	5	22	7
Brazil	2,019	(715)	137	(45)	3	8	1
Ceylon	387	(112)	66	(35)	2	1	3
China (Taiwan)	4,898	(6,409)	1,075	(1,376)	65	88	238
United Arab Republic	7,888	(1,728)	913	(309)	68	100	7
Greece	25,707	(10,650)	435	(177)	30	38	31
Hong Kong (1962-1965 only)	11,789		848		63	77	143
India	6,894	(3,966)	1,967	(1,213)	206	164	150
Israel	4,427	(2,345)	428	(262)	24	33	26
Lebanon	2,597	(1,096)	244	(165)	8	41	10
Mexico	645	(318)	75	(31)	4	19	3
Pakistan	1,447	(648)	477	(233)	52	37	7
Syria	266	(192)	37	(36)	2	9	2
Turkey	1,578	(488)	314	(109)	12	115	11

Source: Immigration Statistics, Canada, 1962-1967, Canada Immigration Division, Department of Manpower and Immigration.

Note: \* "Physicians" include surgeons.

\*\* Calendar years.

Table I-C

Total immigrants, total workers, professional and technical workers, engineers, natural scientists, social scientists, physicians, and nurses, admitted into Canada, by country of origin, over the period 1964-1967\*\*

Country	Total immigrants (1964-1966)	(1967)	Total immigrant workers	Professional and technical workers (1964-1966)	(1967)	Engineers	Natural scientists	Social scientists	Physicians*	Professional nurses
Algeria	21	(15)	11	5	(3)	1	2	1	-	-
Burma	66	(7)	28	19	(3)	4	3	-	7	1
Chile	213	(105)	167	33	(20)	12	4	2	3	2
China (Taiwan)	500	-	280	238	-	45	31	9	27	30
Colombia	200	(87)	93	41	(18)	5	2	4	11	-
Indonesia	33	(11)	19	13	(6)	3	2	-	1	2
Iran	293	(136)	147	93	(49)	17	15	1	33	3
Iraq	152	(102)	81	33	(16)	13	8	1	2	-
Jordan	256	(166)	149	35	(23)	-	3	2	2	4
Kenya	309	(239)	140	80	(61)	10	9	2	4	1
Malaysia	298	(199)	144	102	(66)	13	20	8	8	21
Morocco	2,151	(547)	1,506	119	(48)	4	13	3	5	2
Peru	177	(78)	73	30	(24)	8	3	1	5	5
Philippines	4,378	(2,994)	3,746	3,266	(2,022)	3,237	202	232	221	1,902
Tunisia	54	(12)	20	5	(3)	-	-	1	2	1
Uruguay	258	(101)	102	10	(5)	1	3	-	2	1
Venezuela	963	(374)	418	44	(24)	11	6	3	1	1

Source: Special tabulation prepared by the Canada Immigration Division.

Note: \* Physicians include surgeons.

\*\* Calendar years.

Table I-D

New working licences issued to foreign engineers, natural scientists, physicians, and professors by the French Government by country of origin over the period 1962-1966

Countries	(1) Engineers	(2) Natural scientists	(3) Physicians	(4) Professors
<u>Europe</u>				
Greece	100	50	-	-
Turkey	119	15	-	-
<u>Asia</u>				
Burma	-	-	-	-
China (Taiwan)	31	25	-	-
Hong Kong	-	-	-	-
India	57	36	-	-
Indonesia	3	1	-	-
Iran	73	43	1	-
Iraq	1	4	1	-
Israel	169	50	2	1
Jordan	-	-	1	-
Lebanon	129	24	-	1
Malaysia	-	-	-	-
Pakistan	13	1	-	-
Philippines	-	-	-	-
Republic of Korea	21	11	-	-
Republic of Viet-Nam	185	27	2	3
Syria	56	9	4	-
Thailand	1	-	-	-
<u>North America</u>				
Costa Rica	2	-	-	-
Dominican Republic	-	-	1	-
El Salvador	-	-	-	-
Guatemala	-	-	-	-
Haiti	26	15	1	-

Table I-D (continued)

Countries	(1) Engineers	(2) Natural scientists	(3) Physicians	(4) Professors
Honduras	-	-	-	-
Mexico	30	7	1	-
Nicaragua	2	-	-	-
Panama	-	-	-	-
<u>South America</u>				
Argentina	97	41	1	1
Bolivia	2	3	-	-
Brazil	62	23	-	-
Chile	18	8	1	-
Colombia	14	4	-	-
Ecuador	2	-	-	-
Paraguay	-	-	-	-
Peru	13	4	-	-
Uruguay	5	2	-	-
Venezuela	11	2	-	-
<u>Africa</u>				
Algeria	-	-	-	-
Ethiopia	-	-	-	-
Ghana	-	-	-	-
Kenya	-	-	-	-
Morocco	129	14	2	6
Nigeria	-	-	-	-
Tunisia	94	11	3	-
United Arab Republic	44	13	-	-

Source: A special tabulation provided by La Direction de la Population et des Migrations du Ministère des Affaires Sociales.

Notes: No definitions and qualifying remarks are available.

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Table II-A

Aggregate immigrants into Canada by occupation in the years  
1962-1967\*

Category	1962	1963	1964	1965	1966	1967
1. Total immigrants	74,586	93,151	112,606	146,758	194,743	222,876
2. Immigrants with occupation	36,748	45,866	56,190	74,195	99,210	119,539
3. Professional, technical and kindred workers	8,218	9,640	11,965	16,654	23,637	30,853
4. Engineers	967	1,198	1,416	2,254	3,210	3,704
5. Natural scientists	473	444	640	945	1,251	1,721
6. Physicians and surgeons	530	687	668	792	995	1,213
7. Professional nurses	1,621	1,379	1,967	2,829	3,732	4,262

Sources: The Canadian figures are compiled from the data in the Immigration Statistics, Canada, 1962-1967.

Note: \*The Canadian figures are related with each calendar year and do not include professors and instructors in the relevant fields.

Table II-B

Aggregate immigrants into the United States  
by occupation in the years 1962-1967

Category	1962	1963	1964	1965	1966	1967
1. Total immigrants	283,763	306,260	292,248	296,697	323,040	361,972
2. Immigrants with occupation	134,824	140,669	131,098	130,811	128,333	152,925
3. Professional, technical and kindred workers	23,710	27,930	28,756	28,796	30,039	41,652
4. Engineers	2,940	4,014	3,725	3,455	4,921	8,822
5. Natural scientists	1,104	1,612	1,676	1,549	1,852	2,893
6. Physicians and surgeons	1,797	2,093	2,249	2,012	2,552	3,326
7. Professional nurses	3,429	4,135	4,037	4,071	3,430	4,874

Sources: The annual reports of the United States Immigration and Naturalization Service, 1962-1967 and the tables in the House Reports of 1967-68, United States Congress.

Note: The United States figures are for the fiscal year, which starts on 1 July of the previous year and ends on 30 June of the year under which the figure is listed. The United States occupational figures include professors and instructors in the relevant fields.



Table III

Stock of high manpower by country around 1960  
and medical personnel around 1964

Country	(1) Harbison- Myers Index	(2) Professional technical and related workers as percentage of total non- agricultural workers (per cent)	(3) Professional technical and related workers as percentage of total econom- ically active population (per cent)	(4) Physi- cians	(5) Inhabi- tants per physi- cian	(6) Nurses
<u>Asia</u>						
Burma	14.2	N.A.	N.A.	2,079	11,700	3,376*
China (Taiwan)	53.9	6.3(a)	3.1	4,983	2,420	1,844
Hong Kong	N.A.	5.0	4.6	1,386*	2,660	714*
India	35.2	6.3	1.7	77,780*(b)	5,800	39,350*
Indonesia	10.7	N.A.	N.A.	2,935	35,000	21,117
Iran	17.3	3.4(a)	1.6	7,090	3,220	1,797
Iraq	31.2	N.A.	N.A.	1,470	4,760	683
Israel	84.9	13.1	11.4	5,928	420	2,955
Jordan	N.A.	6.4	4.1	361	5,300	289
Korea	55.0	5.9	2.2	9,695*	2,850	8,159*
Lebanon	24.3	N.A.	N.A.	1,691(c)	1,320	945*
Malaysia	23.65(d)	7.4(e)	2.8	1,295	6,600(n)	N.A.
Pakistan	25.2	5.5	1.4	15,668*	6,400	3,962*
Philippines	N.A.	6.9	2.7	21,859	1,430	22,953*
Republic of Viet-Nam	N.A.	N.A.	N.A.	748(b)	20,000	2,223
Syria	N.A.	3.8	2.2	978(c)	5,100	408*
Thailand	35.1	7.0	1.3	3,462	8,600	1,947

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Table III (continued)

Stock of high manpower by country around 1960  
and medical personnel around 1964

Country	(1) Harbison- Myers Index (o)	(2) Professional technical and related workers as percentage of total non- agricultural workers (per cent)	(3) Professional technical and related workers as percentage of total econom- ically active population (per cent)	(4) Physi- cians	(5) Inhabi- tants per physi- cian	(6) Nurses
<u>North America</u>						
Costa Rica	47.3	10.3(c)	5.2	705	1,970	N.A.
Dominican Republic	14.5	7.3	2.8	2,153*	1,620	437
El Salvador	N.A.	6.4	2.5	653	4,320	802
Guatemala	10.7	6.4(h)	2.3	1,066	4,040	920
Haiti	5.3	2.9(f)	0.5	314(g)	15,000	308
Honduras	N.A.	7.6	2.5	423(g)	5,400	259
Mexico	33.0	7.9	3.6	20,590(e)	1,750	N.A.
Nicaragua	N.A.	6.4(c)	2.6	649(g)	2,560	339
Panama	N.A.	8.4	4.5	534	2,220	264
<u>South America</u>						
Argentina	82.0	N.A.	N.A.	31,931*(b)	670	28,114*
Bolivia	14.8	N.A.	N.A.	977**(c)	3,680	367
Brazil	20.9	N.A.	N.A.	34,251***	2,300	6,054
Chile	51.2	6.8	4.9	4,250(i)	1,810	1,570
Colombia	22.6	5.0(j)	2.3	7,305(e)	2,470	1,177
Ecuador	24.4	7.3(b)	3.3	942	5,100	228
Paraguay	22.7	6.8	3.2	802(b)	2,300	157*
Peru	30.2	6.5	3.3	5,061	2,230	3,103
Uruguay	69.8	7.3(c)	5.9	3,100(c)	850	340
Venezuela	47.7	7.7	5.2	6,584	1,280	3,968(g)

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Table III (continued)

Stock of high manpower by country around 1960  
and medical personnel around 1964

	(1)	(2)	(3)	(4)	(5)	(6)
Country	Harbison- Myers Index	Professional technical and related workers as percentage of total non- agricultural workers (per cent)	Professional technical and related workers as percentage of total econom- ically active population (per cent)	Physi- cians	Inhabi- tants per physi- cian	Nurses
<u>Africa</u>						
Algeria	N.A.	N.A.	N.A.	1,301	9,000	993
Ethiopia	0.75	N.A.	N.A.	324	69,000	604
Ghana	23.15	5.2	2.2	315 (k)	21,000	N.A.
Kenya	4.75	N.A.	N.A.	908*(c)	9,700	1,824*
Morocco	N.A.	6.9	3.0	1,276 (c)	9,900	1,014
Nigeria	4.95	N.A.	N.A.	1,777*	32,000	9,039
Tunisia	15.25	N.A.	N.A.	485	9,400	55
United Arab Republic	40.1	6.4	3.1	12,120	2,380	1,214
<u>Developed countries</u>						
Austria	N.A.	8.8	6.8	12,953	560	12,614
Australia	137.7	9.4	8.4	15,060	740	N.A.
Belgium	123.6	8.6	8.0	13,425	700	15,123
Canada	101.6	12.1	10.6	21,000***(1)	900	50,730
Denmark	77.1	9.5	7.8	6,335	750	18,500 ***
Federal Republic of Germany	85.8	8.8	7.6	90,128	650	128,404

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Table III (continued)

Stock of high manpower by country around 1960  
and medical personnel around 1964

Country	(1) Harbison- Myers Index	(2) Professional technical and related workers as percentage of total non- agricultural workers (per cent)	(3) Professional technical and related workers as percentage of total econom- ically active population (per cent)	(4) Physi- cians	(5) Inhabi- tants per physi- cian	(6) Nurses
Finland	88.7	12.7	8.2	3,384	1,350	12,369
France	107.8	N.A.	N.A.	57,500***	840	121,671
Ireland	N.A.	11.0	7.1	2,952 (m)	950	15,230
Italy	56.3	7.3	5.3	81,200	610	38,000 ***
Japan	111.4	7.3	4.9	101,021 (m)	960	130,849
Netherlands	N.A.	10.3	9.2	13,904	870	15,000 (c)***
New Zealand	147.3	10.9	9.4	3,873*	670	3,634
Norway	73.8	10.0	8.0	4,556	810	10,869
South Africa	40.0	5.0	3.5*	8,968*	1,900	25,351
Sweden	79.2	14.9	12.9	8,221	930	39,420
Switzer- land	N.A.	10.1	8.9	7,771	760	15,228
United Kingdom	121.6	9.8	8.6	57,000***	830	114,857
United States	261.3	11.5	10.8	282,564	680	550,000 (c)

Sources:

Column (1): Harbison and Myers, Education, Manpower and Economic Growth, (New York, McGraw-Hill, 1964), p. 33.

Column (2): calculated from figures published in the International Labour Organisation Yearbook of Labour Statistics, 1965 or 1966. The figures for professional, technical and related workers are from its table 2 B, and those for non-agricultural workers have been calculated by subtracting the number of workers in all industries but "Agriculture, forestry, hunting and fishing" from the total number of workers.

Sources and Notes (continued)

Column (3): quoted from table 2 B in the above-mentioned source.

Columns (4)-

(6): table 1.1 in the World Health Statistics Annual, 1963, World Health Organization, (Geneva), 1967.

Notes

The figures in column (2) are either with 1960 or 1961, unless otherwise mentioned. Those in column (3) are related with the same year as the corresponding figure in column (2). The figures in column (4) are related with the year 1964, unless otherwise mentioned. Those in columns (5) and (6) are related with the same year as the corresponding figure in column (4). Physicians include surgeons, and nurses are professional ones.

\* Shows the figure is concerned with registered personnel.

\*\* Number of physicians in hospitals only.

\*\*\* Estimates.

(a) Figure for 1956.

(b) Figure for 1962.

(c) Figure for 1963.

(d) Malays only.

(e) Compiled from Malaya, Sabah and Sarawak figures; the first figure is for the year 1957, while the latter two are for 1960, so this is not accurate.

(f) Figure for 1950.

(g) Figure for 1965.

(h) Figure for 1964.

(i) Figure for 1960.

(j) Figure for 1951.

(k) Figure from World Directory of Medical Schools, Third Edition, World Health Organization (Geneva), 1963, annex 4, which is concerned with the year 1960.

(l) Figure for 1962-1963.

(m) Figure for 1961.

(n) Calculated from the figure on the stock of physicians in the World Health Statistics Annual, op. cit., and the estimate of population in the United Nations Demographic Yearbook, 1966, (United Nations publication, Sales No.N 67.XIII.1).

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Notes (continued)

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- (o) The Harbison-Myers Index is an indicator of the levels of human resource development presented by Professors Harbison and Myers. It is the arithmetic total of (1) enrolment at the second level of education as a percentage of the age group fifteen to nineteen, adjusted for length of schooling, and (2) enrolment at the third level of education as a percentage of the age group, multiplied by a weight of 5. Hence those countries with lower numbers are less developed according to these criteria, those with higher numbers more developed. (Frederick Harbison and Charles A. Myers, Education, Manpower and Economic Growth: Strategies of Human Resources Development, op. cit., pp. 31-32).

Table IV

Proportion of "professional, technical and kindred workers" out of the total immigrants with occupation into the United States and Canada over the period 1962-1966

Country	(1) Immigrants into the United States (per cent)	(2) Immigrants into Canada (per cent)	Country	(1) Immigrants into the United States (per cent)	(2) Immigrants into Canada (per cent)
<u>Europe</u>			Guatemala	17.6	n.a.
Greece	26.3	2.9	Haiti	25.6	n.a.
Turkey	45.0	45.7	Honduras	15.4	n.a.
			Mexico	3.7	36.0
<u>Asia</u>			Nicaragua	12.0	n.a.
Burma	n.a.	67.9*	Panama	11.4	n.a.
China (Taiwan)	25.4	57.8			
Hong Kong	48.2	28.4 (g)	<u>South America</u>		
India	78.6	60.7	Argentina	32.0	15.6
Indonesia	23.0	68.4*	Bolivia	36.3 (d)	n.a.
Iran	46.6	63.3*	Brazil	28.2	14.8
Iraq	43.5	40.7*	Chile	28.2	19.8*
Israel	49.8	19.8	Colombia	22.8	44.1*
Jordan	24.3	23.5*	Ecuador	18.4	n.a.
Lebanon	40.2	20.0	Paraguay	n.a.	n.a.
Malaysia	45.5 (a)	70.8*	Peru	27.3	41.9*
Pakistan	83.7 (b)	61.8	Uruguay	n.a.	9.8*
Philippines	47.2	87.2*	Venezuela	26.4	10.5*
Republic of Korea	73.2	n.a.			
Republic of Viet-Nam	66.1 (b)	n.a.	<u>Africa</u>		
Syria	40.7	23.4	Algeria	n.a.	45.5*
Thailand	n.a.	n.a.	Ethiopia	n.a.	n.a.
			Ghana	n.a.	n.a.
<u>North America</u>			Kenya	n.a.	57.1*
Costa Rica	13.6	n.a.	Morocco	24.9	7.9
Dominican Republic	7.9	n.a.	Nigeria	51.4 (e)	n.a.
El Salvador	14.3	n.a.	Tunisia	15.9 (f)	25.0*
			United Arab Republic (Egypt)	37.2	29.0

Source: The figures in column (1) have been compiled from the Annual Reports, 1962-1966, and those in column (2) from data in the Immigration Statistics, Canada, 1962-1966, while those marked by \* come from data in the special tabulation provided by the same authorities.

Notes: (a) 1965 only; (b) 1966 only; (c) 1963-1966 only; (d) 1965 and 1966 only; (e) 1964-1966 only; (f) 1962-1964 only; (g) 1962-1965 only; \* 1964-1966 only.

Table V

Annual number of graduates by field of study  
and qualified nurses around 1960

Country	(1) Engineers	(2) Natural scientists	(3) Social scientists	(4) Physicians	(5) Nurses
<u>Europe</u>					
Greece	273	313	1,210	424	196
Turkey	1,160	73	2,133		266
<u>Asia</u>					
Burma	n.a.	n.a.	n.a.	141	86
China (Taiwan)	1,392	496	1,539	401	413
Hong Kong	19	57	13	45	
India	5,151 (a)	n.a.	14,273 (a)	3,119	2,894 (i)
Indonesia	n.a.	n.a.	n.a.	303	n.a.
Iran	130 (b)	163 (b)	-(b)	493	192
Iraq	233 (c)	n.a.	144 (c)	108	n.a.
Israel	666 (i)	168	n.a.	84	262
Jordan	-	-	-	-	17
Korea	1,030 (d)	1,246 (d)	4,397 (d)	600	662
Lebanon	160 (e)	154 (e)	355 (e)	74	n.a.
Malaysia	n.a.	n.a.	n.a.	n.a.	n.a.
Pakistan	472	3,163	1,517	n.a.	n.a.
Philippines	4,253 (f)	451 (f)	13,178 (f)	1,010	2,000
Thailand	311 (e)	422 (e)	954 (e)	225	590
Syria	45	53	49	69	n.a.
Republic of Viet-Nam	54 (g)	34 (g)	-(g)	59	n.a.
<u>North America</u>					
Costa Rica	21	5	6	-	n.a.
Dominican Republic	65 (e)	n.a. (e)	200 (e)	85	n.a.
El Salvador	20 (h)	15 (h)	11 (h)	29	n.a.

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Table V (continued)

Country	(1) Engineers	(2) Natural scientists	(3) Social scientists	(4) Physicians	(5) Nurses
Guatemala	12	12	5	30	n.a.
Haiti	15 (e)	- (e)	15 (e)	41	n.a.
Honduras	7	n.a.	7	34	n.a.
Mexico	818	239	9,054 (h)	1,011	n.a.
Nicaragua	n.a.	n.a.	n.a.	22	n.a.
Panama	n.a.	n.a.	n.a.	n.a.	n.a.
<u>South America</u>					
Argentina	2,036	576	813	1,770	n.a.
Bolivia	n.a.	n.a.	n.a.	n.a.	n.a.
Brazil	1,601	697	2,099	1,528	352
Chile	102 (j)	50 (j)	134 (j)	280	71
Colombia	269	193	147	442	93
Ecuador	40	45	19	n.a.	n.a.
Paraguay	6 (h)	68 (h)	n.a.	97	n.a.
Peru	204 (h)	297 (h)	150 (h)	n.a.	n.a.
Uruguay	44 (k)		32 (k)	91	62
Venezuela	312 (g)	31 (e)	756 (e)	258	23
<u>Africa</u>					
Algeria	n.a.	n.a.	n.a.	n.a.	n.a.
Ethiopia	29	5	n.a.	-	26
Ghana	12	40	37	-	n.a.
Kenya	n.a.	n.a.	n.a.	-	n.a.
Morocco	n.a.	n.a.	n.a.	-	n.a.
Nigeria	25 (e)	77 (e)	47 (e)	19	936
Tunisia	-	24 (e)	4 (e)	-	n.a.
United Arab Republic	1,099	473	2,648	815	387

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Source and Notes of table V

Sources: The figures of columns (1), (2), and (3) are quoted from UNESCO Statistical Yearbook 1963 and sometimes 1964, Paris, and are related with the year 1960 unless otherwise noted. The figures of column (4) are from annexes 4-7 in World Directory of Medical Schools, World Health Organization, Geneva, 1963 and are related with the year 1960. The figures of column (5) are from National Reports of Member Associations, International Council of Nurses, London, 1965 and are related with the year 1962 unless otherwise noted.

- Notes:
- (a) Not including intermediate colleges.
  - (b) Figures for 1957.
  - (c) Distribution is by college, rather than field of study.
  - (d) First degree only.
  - (e) Figures for 1961.
  - (f) Not including public universities and equivalent degree granting institutions.
  - (g) Not including either the National Institute of Administration or the National College of Agriculture, for which data are not available.
  - (h) Figures for 1959.
  - (i) Figure for 1961.
  - (j) University of Chile only.
  - (k) Figures for 1962.

Table VI

Ratio of the annual number of emigrants\* to the annual number of graduates from the related field of study by country of origin or last permanent residence over the period 1962-1966

	Engineers		Natural scientists		Physicians		Nurses		Social scientists U.S.	
	F + U.S.	F + U.S. + C	F + U.S.	F + U.S. + C	F + U.S.	F + U.S. + C	U.S.	U.S. + C		
<u>Europe</u>										
Greece	23.9	26.6	10.3	12.2	5.9	7.7	5.1	8.3	0.2	
Turkey	6.5	6.9	12.6	15.9	9.8	15.2	1.9	2.8	0.1	
<u>Asia</u>										
Burma	n.a.	n.a.	n.a.	n.a.	1.3	2.9	0.7	1.0	n.a.	
Hong Kong	264.2	514.2	31.6	59.3	22.2	65.1	n.a.	n.a.	12.3	
India	4.4	6.1	n.a.	n.a.	0.6	1.6	0.1	1.1	0.1	
Indonesia	n.a.	n.a.	n.a.	n.a.	-	0.1	n.a.	n.a.	n.a.	
Iran	47.5	51.9	12.3	14.1	7.7	10.0	3.3	3.9	n.a.	
Iraq	7.5	9.2	n.a.	n.a.	4.3	4.9	n.a.	n.a.	0.1	
Israel	12.7	15.7	15.8	18.6	43.8	54.3	9.4	11.4	n.a.	
Jordan	∞	∞	∞	∞	∞	∞	14.1	21.8	∞	
Lebanon	33.1	35.5	9.4	10.5	15.2	24.9	n.a.	n.a.	0.5	
Malaysia	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	
Pakistan	3.2	9.2	0.2	0.5	0.5	1.4	n.a.	n.a.	0.01	
Philippines	0.4	2.3	3.6	18.5	12.0	19.3	3.6	35.3	0.03	
Republic of Korea	4.0	2.4	2.4	3.1	3.1	3.1	1.1	1.5	1.5	
Republic of Viet-Nam	76.3	17.6	17.6	11.7	1.0	9.3	n.a.	n.a.	n.a.	
Syria	54.2	10.9	10.9	6.7	6.7	6.7	n.a.	n.a.	0.8	
Thailand	1.0	0.1	0.1	2.9	2.9	2.9	2.6	0.04	0.04	
<u>North America</u>										
Costa Rica	52.4	92.0	92.0	∞	∞	∞	n.a.	n.a.	10.0	
Dominican Republic	46.5	n.a.	n.a.	46.6	46.6	46.6	n.a.	n.a.	0.7	
El Salvador	19.0	24.0	24.0	15.2	15.2	15.2	n.a.	n.a.	1.8	
Guatemala	50.0	16.7	16.7	14.7	14.7	14.7	n.a.	n.a.	16.0	
Haiti	121.3	∞	∞	36.6	36.6	36.6	n.a.	n.a.	10.7	
Honduras	111.4	n.a.	n.a.	15.3	15.3	15.3	n.a.	n.a.	11.4	
Mexico	7.3	7.7	12.5	12.8	9.4	9.7	n.a.	n.a.	0.07	
Nicaragua	n.a.	n.a.	n.a.	22.7	22.7	22.7	n.a.	n.a.	n.a.	
Panama	n.a.	n.a.	n.a.	24.0	24.0	24.0	n.a.	n.a.	n.a.	

Table VI (continued)

	Engineers		Natural scientists		Physicians		Nurses		Social scientists	
	F + U.S.	F + U.S. + C	F + U.S.	F + U.S. + C	F + U.S.	F + U.S. + C	U.S.	U.S. + C	U.S.	U.S. + C
<u>South America</u>										
Argentina	5.1	5.2	7.4	7.5	7.0	7.2	n.a.	n.a.	0.8	0.8
Bolivia	n.a.		n.a.		n.a.		n.a.	n.a.	n.a.	n.a.
Brazil	3.2	3.6	3.3	3.4	2.0	2.1	4.7	4.7	0.2	0.2
Chile	26.3	30.3	19.2	21.2	3.4	3.7	20.8	21.8	1.9	1.9
Colombia	24.1	24.8	13.1	13.5	21.9	22.8	45.8		8.6	8.6
Ecuador	32.0		16.4		16.1		n.a.		7.4	7.4
Paraguay	23.3		1.8		3.9		n.a.		n.a.	n.a.
Peru	13.2	14.5	2.1	2.5	4.1	4.4	n.a.		1.6	1.6
Uruguay	13.6	14.2	n.a.		2.9	3.6	2.9			
Venezuela	12.8	14.0	41.3	47.8	8.5	8.6	52.2	53.5		0.4
<u>Africa</u>										
Algeria	n.a.	n.a.	n.a.		n.a.		n.a.		n.a.	n.a.
Ethiopia	4.1		4		∞		∞		0.8	n.a.
Ghana	13.3		1		∞		∞		n.a.	0.5
Kenya	n.a.	n.a.	n.a.		∞		∞		n.a.	n.a.
Morocco	n.a.	n.a.	n.a.		∞		∞		n.a.	n.a.
Nigeria	11.2		1.3		9.5		0.4		0.9	0.9
Tunisia	∞		12.5		∞		n.a.		5.0	5.0
United Arab Republic	1.8	1.9	2.1	4.6	1.6	3.7	0.7	1.1	0.06	0.06

Source: Calculated from the figures in table I-A through table I-D, and table V.

Note: \*Simple annual average over the period covered by the data in table I-A through table I-D.

Table VII

Total graduates. graduates from the faculties of engineering, natural sciences and medicine by region. around the year 1960 (1)

	Developed countries	Asia (2)	North America (3)	South America	Africa (4)
1. Total graduate	899,348	285,554	14,131	38,843	14,968
2. Engineers	119,753	37,422	1,116	4,951	1,179
3. Natural Scientists	92,763	6,738	644	1,971	1,737
4. Physicians	92,763	17,188	2,377	10,714 (5)	1,138

Source: Calculated from basic data published in UNESCO Statistical Yearbook, 1965.

Notes: (1) So far as available, figures for 1960 have been taken; otherwise, figures for the nearest year ranging 1959-1962.

(2) Excludes Japan.

(3) Excludes Canada and the United States.

(4) Excludes South Africa.

(5) Out of this total, Argentina and Brazil produced 3,192 and 3,952 each.

Table VIII

Awards of Ph.D.'s and federal funding for basic research, 1958-1967

(Figures in parentheses represent the figures in each series normalized to a base of 100)

	Agricultural sciences		Biological sciences		Engineering sciences		Mathematical sciences		Astronomy, physics chemistry, earth sciences		Psychological sciences		Social sciences	
	Ph.D.s	Dollars	Ph.D.s	Dollars	Ph.D.s	Dollars	Ph.D.s	Dollars	Ph.D.s	Dollars	Ph.D.s	Dollars	Ph.D.s	Dollars
1958	337 (100)	\$13m (100)	1091 (100)	\$28m (100)	629 (100)	\$25m (100)	238 (100)	\$11m (100)	1650 (100)	\$191m (100)	745 (100)	-- (100)	853 (100)	\$9m (100)
1959	342 (102)	\$14m (108)	1021 (94)	\$41m (146)	699 (111)	\$58m (232)	289 (121)	\$14m (127)	1801 (109)	\$289m (151)	787 (106)	\$9m (100)*	893 (105)	\$5m (56)
1960	413 (123)	\$16m (123)	1160 (106)	\$55m (196)	792 (126)	\$75m (300)	291 (122)	\$18m (164)	1861 (113)	\$315m (165)	773 (104)	\$17m (189)	924 (108)	\$8m (89)
1961	438 (130)	\$18m (138)	1171 (107)	\$82m (293)	940 (149)	\$81m (324)	332 (139)	\$21m (191)	1993 (121)	\$438m (229)	820 (110)	\$21m (233)	1001 (117)	\$11m (122)
1962	470 (140)	\$21m (162)	1299 (119)	\$98m (350)	1215 (193)	\$114m (456)	388 (163)	\$26m (236)	2096 (127)	\$597m (313)	857 (115)	\$28m (311)	1071 (126)	\$18m (200)
1963	465 (138)	\$24m (185)	1411 (129)	\$117m (418)	1357 (216)	\$234m (536)	484 (203)	\$42m (382)	2428 (147)	\$578m (397)	892 (120)	\$36m (400)	1186 (139)	\$25m (278)
1964	517 (153)	\$24m (185)	1584 (145)	\$142m (507)	1662 (264)	\$131m (524)	590 (248)	\$52m (473)	2527 (153)	\$862m (451)	1013 (136)	\$47m (522)	1291 (151)	\$34m (378)
1965	576 (171)	\$40m (308)	1825 (167)	\$177m (632)	2068 (329)	\$143m (572)	684 (287)	\$57m (518)	2859 (173)	\$891m (466)	955 (128)	\$58m (644)	1422 (167)	\$37m (411)
1966	572 (170)	\$45m (346)	1981 (182)	\$207m (740)	2283 (363)	\$167m (668)	766 (322)	\$62m (564)	3028 (183)	\$1003m (525)	1133 (152)	\$73m (812)	1533 (180)	\$49m (544)
1967		\$45m (346)		\$222m (793)		\$204m (816)		\$68m (618)		\$1072 (561)				\$58m (644)
Normalized ratio of Ph.D.s to \$ in 1966	1:2.0		1:4.1		1:1.8		1:1.8		1:2.9		1:5.2		1:3.0	

\* Conservative estimate based on National Institutes of Mental Health support of research.

Sources: National Association of Science, Survey of Earned Doctorates; National Science Foundation, "Federal Funds for Research, Development and Other Scientific Activities", vol. XV (NSF 66-25), 1966.

Table IX

Immigration of middle-level skills

	<u>United States fiscal year 1967</u>	<u>Canada Calendar year 1967</u>	<u>Australia year ended March 1967</u>
Managerial-administrative (managers, agents, proprietors)	7,974	3,023	2,450
Clerical + kindred	16,062	16,609	7,232
Sales workers	3,721	3,358	2,755
Craftsmen, foremen and kindred (1)	18,921	38,761	15,130

For Canada, 1963-1967

	<u>1963</u>	<u>1964</u>	<u>1965</u>	<u>1966</u>	<u>1967</u>
Clerical	6,186	7,931	9,919	13,235	16,609
Construction trades	3,852	4,799	6,601	9,535	10,643
Manufacturing and mechanical	10,563	12,677	17,566	24,512	28,118

(From Canadian Immigration Statistics for these years)

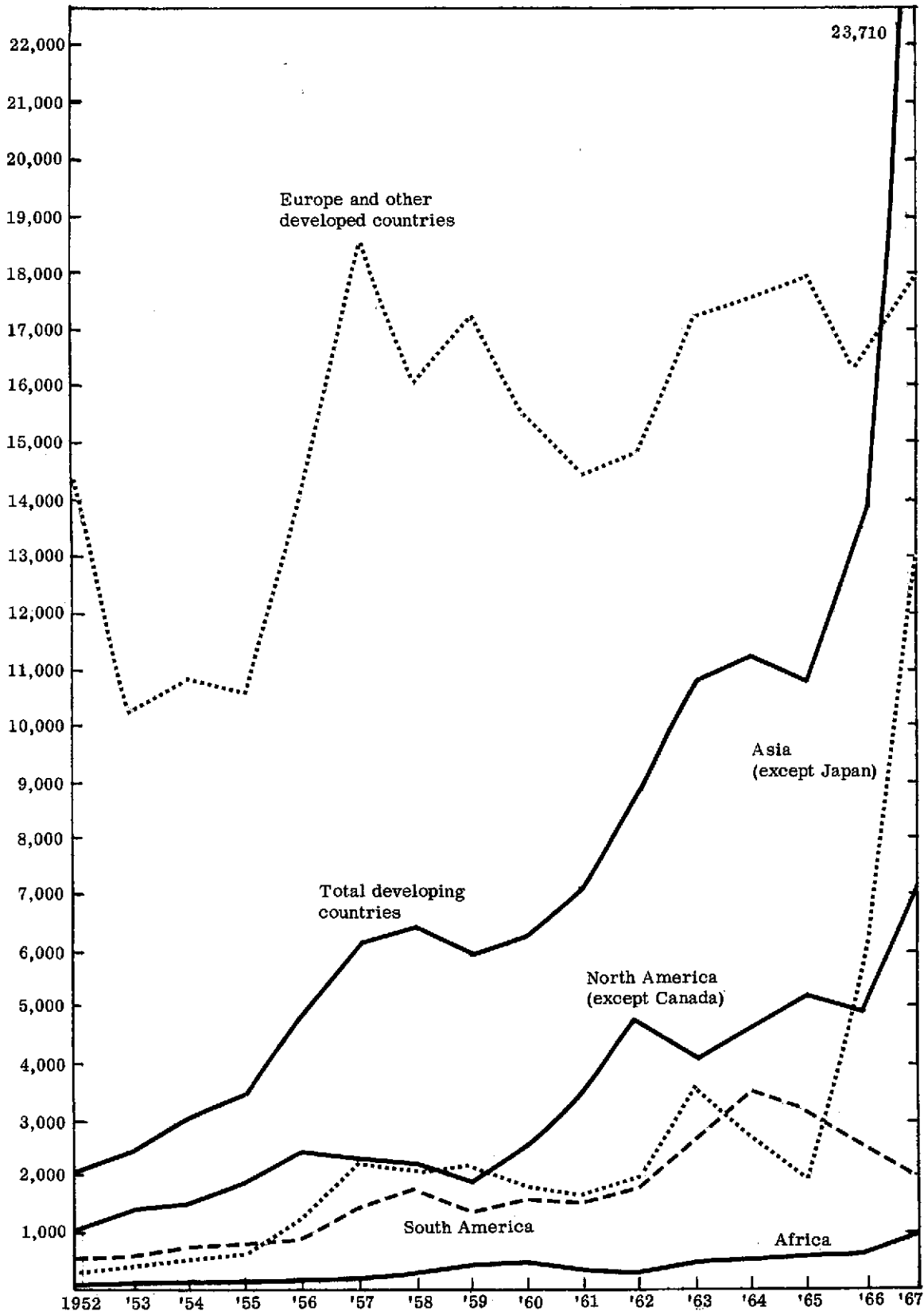
Note: Each country has slightly differing title categories for the above and its definitions of the workers included thereunder also differ. Strict comparison should therefore be avoided.

- (1) Includes, inter alia, brickmasons, carpenters, typesetters, electricians, foremen, furriers, jewellers, linemen, mechanics, machinists, painters, plumbers, tailors, tool die makers. While the categories for the three countries are not identical, Canada's import of 8,954 machinists vis-à-vis the United States 1,328 tends to show that differences may represent more those of internal demand than of definition. Canada does, however, include some categories like textile workers under craftsmen which the United States includes under operatives.

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Graph 1

Annual number of "professional, technical and kindred workers" immigrating into the United States by region of origin, 1952-1967

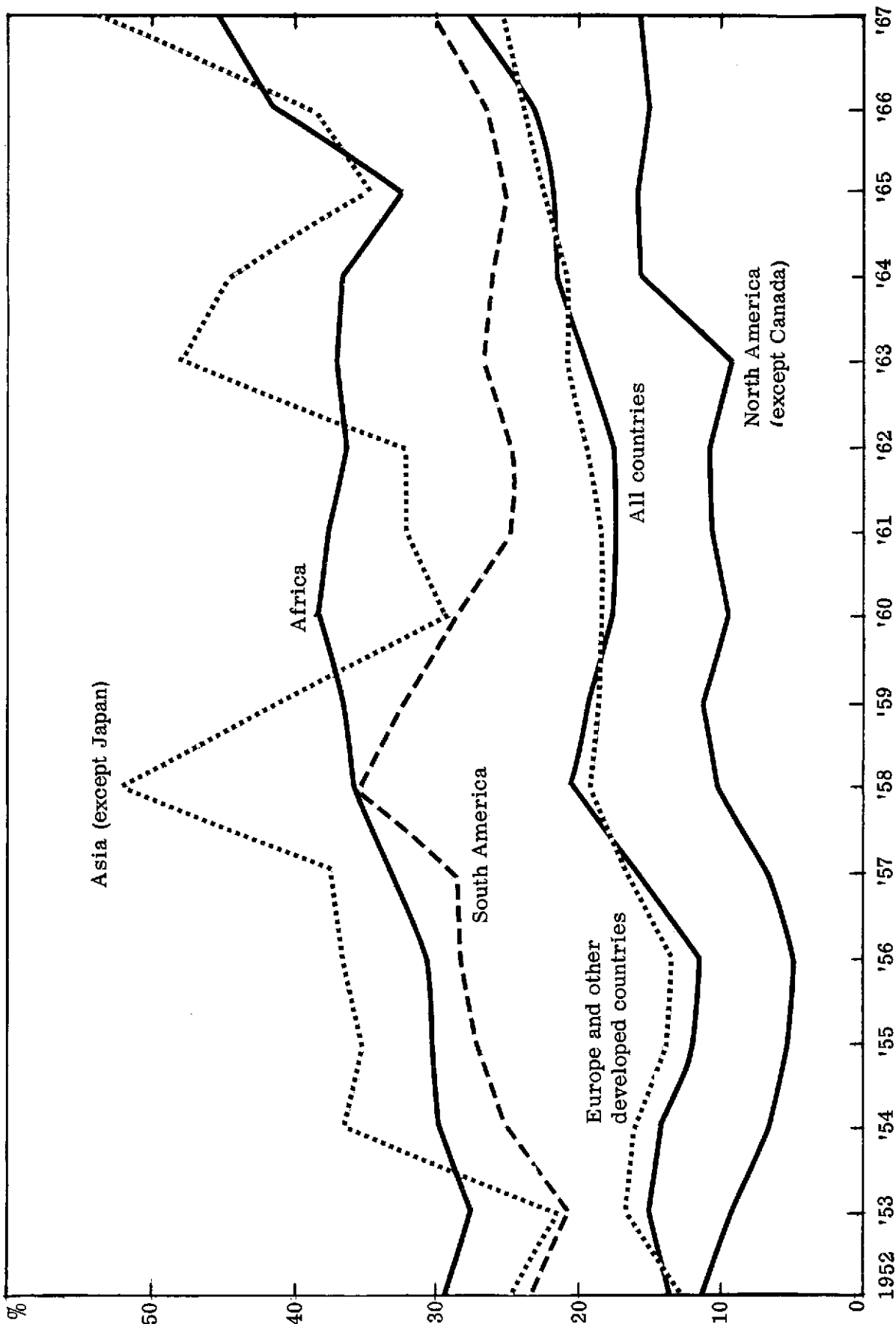


Source: The U.S. annual immigration reports, 1952-67.



Graph 2

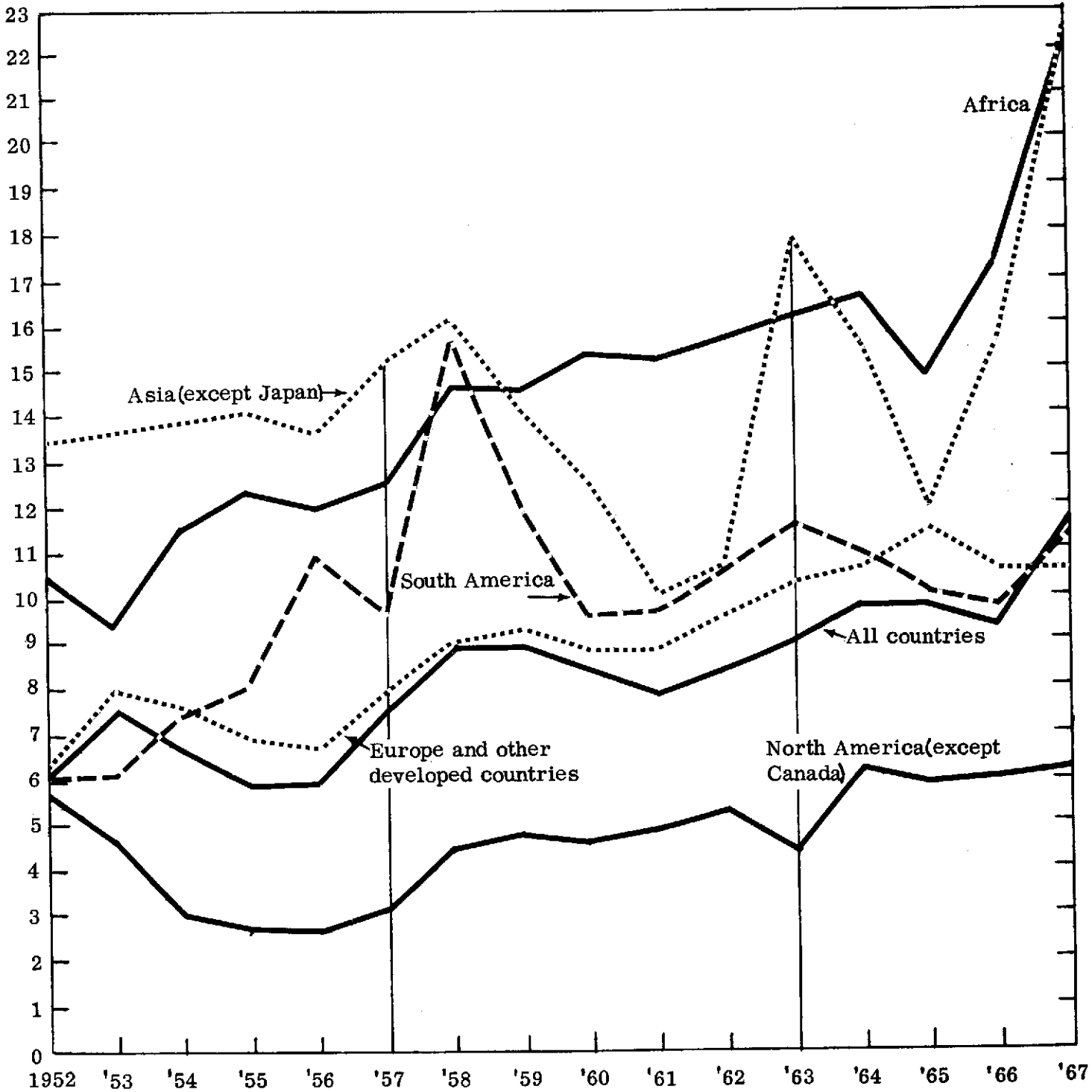
Percentage of "professional, technical and kindred workers" out of immigrants with occupation admitted into the United States by region of origin, 1952-1967



Source: The U.S. annual immigration reports, 1952-67.

Graph 3

Percentage of "professional, technical and kindred workers" out of total immigrants into the United States by region of origin, 1952-1967



Cited from S. Watanabe, Economic Branch, ILO, Geneva, "Brain Drain from Developing to Developed Countries", April, 1968.