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HOW BIG IS THE BRAIN DRAIN?

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"For too long, the United States and the international community have swept the issue of /~the~/ brain drain under the rug," declared Senator Edward Kennedy early in December. "As a result, far too little is known about its extent and significance." In fact, even defining the term "brain drain" is difficult. In addition to trained people who emigrate to richer countries from poorer ones, it seems as though the concept should be broadened to include subtle losses of expertise which may be even more important.

A distinguished panel of researchers and policy makers indicated its preoccupation with the best known aspects of the issue by discussing the international migration of talent and skills (IMTS) at a State Department workshop last June. Although this seminar concluded that "the primary locus of the problem lies in the developing countries," representatives from poor nations were notably absent from the meeting. Presumably to rectify this deficiency and hopefully to rethink the entire matter, Senator Kennedy called for an international conference to discuss the brain drain.

About two-thirds of the 90 - 100,000 foreign students in the U.S. currently are from less developed countries (LDC's). Between 1953 and 1965 numbers of students here from Africa rose about 700 percent and approximate figures for Latin America, the Near and Middle East, and the Far East are 170, 330 and 350 percent respectively. Indications are that as scholars who come to the U.S. from LDC's become more numerous, the numbers who emigrate also increase.

At least of equal interest, however, are less visible aspects of talent leakage that occur in LDC's themselves: large numbers of semi-trained students who fail along the gamut of primary and secondary education and find themselves with inadequate vocational skills; numerous applicants for university entrance who are rejected after a classical course of study that ill prepares them for life as a skilled laborer or white-collar worker; dissidents who have received a university education but are not available for public service because they are of the wrong political stripe; self-seekers who find it more profitable to work at cross-purposes to development efforts or, at least, to tacitly favor maintenance of the status quo over change and development; and the willing who return to work and who possess skills the LDC needs, but are frustrated by a lack of imagination in employment policies at home.

Then, too, some foreign scholars receive training in the United States which is less than appropriate for their country in its present stage of development or simply inapplicable to a cultural milieu different from our own. Although these students return home for a full professional life, their training may not fully equip them to deal with--or even think objectively about--the most pressing problems to be confronted in their native lands.

The Migratory Brain Drain (IMTS)

Each student from an LDC who is trained in the U.S. or Western Europe and then fails to return home represents a substantial financial loss to an underdeveloped area. The recipient nation assumes only the marginal costs of graduate training while all expenses of primary, secondary, and undergraduate education (approximately 54% of the foreigners currently studying in the U.S. are either graduate or special students) have been covered in the poor country, whose training budget is already woefully inadequate for its burgeoning population. For every talented person who migrates, the less developed country subsidizes a richer people by the benefits of this investment which are ordinarily amortized over a lifetime of work. (Except, that is, for remunerations sent home to families and professional counsel or increments to general

knowledge contributed by the émigré which flow to the LDC often at zero cost.)

The migratory brain drain can be traced to a conflict between the objectives of our foreign assistance programs and expanding North American needs for specialized manpower, writes Cornell University's President James A. Perkins in Foreign Affairs. While development planners recognize that a bottleneck to progress in LDC's is often lack of trained professionals, our growing economy has an almost insatiable ability to gobble up people as fastas they are educated. Perkins' definition of the dilemma undoubtedly caused some consternation among scholarship grantors: "While on one hand we give laboratory equipment, train teachers, send our own teachers, build buildings--all on the very simple proposition that the...critical component of a modernizing society is its modernizing men--with the other hand we take away not only the raw materials, but the very people who have been so carefully trained to develop them."

Thus, it is tempting to attempt to explain IMTS in terms of "educational imperialism." A report circulated by the United Nations Special Fund and authored by Ehsan Naraghi, an Iranian sociologist, hinted that if the U.S. made no concerted effort to change the situation, it would continue sapping the talent of underdeveloped lands, possibly at an increasing

rate. The U.S. now has 700,000 engineers, Naraghi noted, and is training 30,000 a year. But his disconcerting projection is that 1.4 million will be needed by 1970. If the U.S. does not expand training programs for its citizens, this leaves a gap that can only be filled by foreigners, Naraghi deduces. A similarly vexing problem leading to identical conclusions prevails in medicine. Naraghi notes that American medical schools produce only 7,000 graduates annually but professional manpower needs of American hospitals are 14,000 a year. The amortized expense of developing ample facilities to educate our own citizens to fill this void, according to Dr. Kelly West of the University of Oklahoma, would be approximately $96 million a year--the cost of building and operating 12 new medical schools.

Economists offer a supplementary explanation for the brain drain phenomenon. Mobile labor resources tend to move to where wages and the accompanying package of perquisites--such as research funds, further training possibilities, intellectual environment, security, and social amenities--are highest. That professional people concentrate in the East (although the East does train more graduate students than it employs) and the West and move away from the South and, to a lesser extent, the

Midwest is the U.S. analog to this phenomenon.

Because of their U.S. training, engineers and managers look startingly alike, in Santiago, Rio, or New York, Professor Michael Chiappetta noted in the Nation recently. He claims that like training converts professionals into a "new breed of international men" and that, "these people are interchangeable because the system in which they work is universal." We will return to question the validity of his assertion that the system is universal, but there is no denying that high level talent from LDC's becomes increasingly mobile when it comes in contact with academia in the U.S.

Then, too, our legal system may assist rather than hinder professional mobility and, hence, IMTS. Although the 1965 immigration act phases out a national-origins quota system which had discriminated against poor countries, one of its legislative and public opinion selling points was the priority it gave to highly trained people.

For example, in arguing the merits of the proposed law before the Michigan Committee for Immigration in April 1965, Secretary Rusk said, "It is estimated that the new bill would increase the annual number of quota immigrants entering the labor force by less than 24,000 a year. This would not be a

significant quantity in a labor force estimated to reach 86 million by 1970. But qualitatively it might be of great significance by providing increased immigration for persons of good education, specialized experience, and exceptional abilities."

While noting that favoring professionals had been an important component of immigration policy since 1952, Secretary Rusk did not admit to the unresolved dilemma of domestic-versus-foreign policy which underlay his argument as he continued, "Let us remind ourselves that immigrants during the 1952-61 period included 14,000 physicians and surgeons, approximately 28,000 nurses, some 4,900 chemists, nearly 1,100 physicists...all of which were in short supply at the time of their admission." It is encouraging that Senator Kennedy, floor manager of the new immigration legislation, is now concerned with the brain drain loophole the 1965 law may have widened.

There are other institutional encouragements to the brain drain in the U.S. The requirement that holders of exchange visitor visas spend several years of residency outside the U.S. before entering into a permanent residency status may be waived at the request of high officials in U.S. government agencies--some of which are active recruiters of foreign talent. Universities also are not blameless. Several years

ago Pennsylvania State University found that a high proportion of its foreign students did not return and that Penn State was their biggest employer. Then, too, the issue has philosophical underpinnings. Always an advocate of freedom of choice, the U.S. is loathe to bar entry to those who qualify as émigrés and who express a desire to live here.

Political conditions in the LDC also have an influence on the extent of IMTS. In the unsettled and often even turbulent period from 1954 to 1963, the OAS showed that 11,200 Argentines immigrated to the U.S. Of these, 47 percent were technicians or professionally trained persons, 14.9 percent were high level administrators, and 38.1 percent were skilled laborers.

These data, of course, do not include the recent exodus, which reminds us that there are "push" as well as "pull" aspects to the migratory brain drain. No definitive count has been made of Argentina's professionals who left as a result of the recent military takeover and the subsequent declaration of Law 16,912 which abolished the autonomy of the university system--or who now refuse to return home. Neither has a satisfactory count been made of talented Brazilians who fled

(or were expelled) and took refuge in Chile, Mexico, Europe or the U.S. after the 1964 government upheaval.

Information on what have perhaps too glibly been implied to be the quantifiable aspects of the brain drain is difficult enough to gather and interpret, as Professor Herbert G. Grubel has pointed out in a late issue of Science. The Immigration and Naturalization Service has never received funding to allow it to summarize properly the data it has available, nor is there agreement on what statistical series would be definitive. At exactly what point of training does a person become sufficiently skilled or talented to be a net resource instead of just another consumer of scarce goods in an LDC? Who counts as a permanent talent loss? If only those with immigrant visas are enumerated, one overlooks the fact that some of these do plan to return home. Others with more temporary visa arrangements have no such intentions.

If it is assumed that exchange visitor status insures return home, one forgets that an uncounted number of these visa holders spend the several years they are required to spend outside of the U.S. waiting in third countries. Totalling "stocks" of talented émigrés at one point in time may lead to different conclusions than when in-and-out "flows" are

enumerated. And any emigrant is probably a potential returnee until his death--and if he goes home after acquiring substantial experience in another country, the benefits to his homeland may be greater (when compared to formal and on-the-job training costs) than if he returned immediately after completing his graduate education. This raises the question, how long after receipt of an advanced degree is one permitted to remain in another country before entering statistics as a "brain drain" debit at home?

Difficulties of data analysis aside, the sketchy and admittedly often non-parallel evidence at hand does show that there is a steady stream of talent migration, and several component currents make it up. In the absence of specific restrictions, net skill moves from the less to the more developed regions, whether within a country or internationally.

There are more specialists of all kinds from other Commonwealth countries working in Britain than British specialists working elsewhere in the Commonwealth, reports the United Nations. Tiny Togo has sent more physicians and professors to France than France has returned to provide technical assistance there. This tendency is fairly general throughout the French Community despite generous French aid to her past and present colonies. Charles V. Kidd, of the President's

Office of Science and Technology, notes that the 1,837 scientists from Latin America and 2,142 from Asia who migrated to the U.S. between 1957 and 1961 was many times more than the number of technicians provided on a temporary basis from the U.S.

Movement from the underdeveloped to the developed countries oversimplifies the brain drain issue. Although Professor John Shearer has shown that a higher proportion of total immigration from Latin America is skilled than that from Western Europe, relatively small differences in GNP may still mean substantial talent drains. During his visit in Paris late in 1966, Premier Kosygin complained that the U.S. is draining the best talent from Europe. United Nations data show that Europe draws from developing countries approximately what it loses to the U.S. For years Canadians have vociferously complained about their skilled expatriate countrymen who cross our northern boundary and never return. And the term "brain drain" was probably first used in Britain to describe movements of talent to the U.S. IMTS also occurs among LDC's, although no good counts of Paraguayans lost to Chile or Mexico, for example, seem to exist.

A close look at policy seems to indicate that there are some U.S.-based efforts to stem the migratory brain drain.

Foreign scholars who receive Agency for International Development funding pledge themselves to return to their homeland to work for at least two years. OAS scholarship recipients have a similar stipulation attached to their awards. The Ford Foundation recently announced a grant to the Association for Service to Indian Scholars and Technicians to help facilitate placement in India of nationals who have received training abroad and have lost contact with the job market at home.

Similarly, the Rockefeller Foundation and many university departments only accept students for graduate school financing who have positions waiting for them upon their return. The Graduate School of Johns Hopkins University has had a "promised-position" ruling for 10 years. One of the disadvantages of this policy is that it favors older students who may have passed the period when their capacity for concentrated study is greatest. On the other hand, they are probably more mature and thus have greater facility for separating the relevant from the irrelevant in the training they receive.

The chances of returning home for a student who has done all of his university work in the U.S. seem to be much less than for the student who has received only graduate training here. This has led many U.S. colleges as well as other scholarship

grantors to discourage foreign students at the undergraduate level. (Undergraduates as a percentage of total foreign students in the U.S. dropped from 58 in 1955 to 46 in 1965.) And some universities and scholarship grantors require that all students receiving university support come on exchange visitor visas, which are more difficult to convert into permission for permanent residency than are student visas.

These measures, however, do not touch self-supporting students, who make up about 40% of foreigners currently studying in the U.S. They, it has been shown, are less likely than funded scholars to return. For self-supported scholars especially, major re-attraction efforts must be made in LDC's. In 1958, India's Manpower Committee of the Cabinet, concerned with the mounting loss of high level manpower, set up a pool for temporary placement of well qualified scientific and technical returnees until they can be absorbed into suitable permanent positions. Greece, in cooperation with the Organization for Economic Cooperation and Development (OECD), offers a two-year repatriation contract if selected countrymen agree to participate in key aspects of the nation's development efforts.

Some anti-IMTS policies in LDC's are specific for sponsored students. In Colombia, at least, one organization grants scholarship funds for study in another country provided that the

selected recipient agrees to return to work back home for twice the period that he spent abroad. In Tanzania, which was left with many professional positions to fill after the termination of colonial status, a man cannot even apply for an overseas scholarship unless his training would better enable him to meet a manpower requirement. On completion of his instruction, the scholar promises to work for the government for anywhere from three to five years. This so-called "bonding," of course, is only morally enforceable (as are the restrictions built into other fellowships). There have even been efforts, notably by Kenya--less than successful to be sure--to stem IMTS by dispatching search teams to the U.S. to fetch back the would-be emigrants. It is doubtless only a matter of time until John LeCarré or a successor to Ian Fleming bases a novel on the forcible recapture of overseas talent, although to date the home countries seem mainly to be utilizing the carrot of pecuniary rewards rather than the stick of espionage and outright kidnapping. There have, however, been threats that some countries might request the extradition of bonded escapees so they can be tried in local courts.

All of these efforts have only been moderately successful and the brain drain is continuing. LDC's and developed countries

alike must seek more effective policies to measure and to check it. Certainly trying to halt training of foreign scholars in the U.S. would be impossible; any attempt would counsel ultimate despair--numbers of universities in underdeveloped countries are startlingly disproportionate to educated manpower needs. Major emphasis in LDC's must be on impressing students with the importance of service to their homeland before foreign study begins and on financing ample and imaginative institutions to meet society's needs which stand ready to employ returnees. These institutions must provide a challenging intellectual and professional climate and be more or less insulated from political influence and subterfuge. And more study of policy alternatives to cope with the matter is imperative. Why are some countries notably more successful than others in re-attracting their native sons after they have been educated abroad? Could LDC's demand indemnification payments if their citizens become émigrés? Could our foreign aid program be geared so that Countries would be remunerated where a solid case of talent-loss to the U.S. could be made? (If we pay for imports, why do we not pay for trained human resources that we receive?) How can employment policies in LDC's be liberalized so that trained professionals with varied political beliefs can be accommodated?

What criteria should be used to determine who should return and who may stay?

The Brain Drain Internal to LDC's

But discussants at a conclave of the nature Senator Kennedy proposes must recognize that the migratory brain drain is usually only the culmination of an educational process in LDC's that all too frequently tends to be excessively wasteful of nascent talent at every step of the educational ladder. And when one considers all of these leakages, it becomes almost impossible to calculate the loss to a developing country that one talented émigré represents.

Immediately upon becoming literate, a person in an LDC may be regarded as taking on some value as a productive resource--at least he is able to understand (and presumably respond to) more economical forms of communication than the spoken word. The Population Reference Bureau recently reported that the literate man is an even scarcer commodity than previously assumed: a global total of 750 million--equal to half of the adult population of Africa, Latin America, and non-Communist Asia--have received no schooling at all. While by absolute count the numbers of people who have had some education are increasing, as population burgeons the number of the

world's illiterates has also grown in the last six years by 200 million.

Thus, the Malthusian phenomenon can appropriately be adapted to read: population tends to outrun society's ability to educate it. Although universal primary education is one long-run answer, in the short run building enough schools and educating enough teachers is simply too expensive. And to suggest alternatives, one must turn to the educational structure itself, which seems wasteful of trained human resources in many LDC's.

Taking Latin America as an example (and recognizing that generalizations over the region are hazardous and that Latin America is not representative of the entire underdeveloped world), the insufficiency of resources available for educational purposes combined with an extremely class-conscious society has led to the establishment of a school system in which there is a substantial leave-rate from all grades. The United Nations claims that in the free public elementary schools, "practically all rural children and the great majority of children from the urban lower classes drop out of school before completing a six-year primary course."

"Free" is a deceptive term, since although no tuition is required, transportation, uniform, and book charges are usually borne by students. Since workers can barely scrape together resources enough to provide their families with food, dropout may be the only answer.

Nonetheless, individual inability to meet school expenses seems secondary to more powerful allocators of educational benefits. Emanating from the government, influences are brought to bear to attempt to relieve the pressures on scarce school facilities and teachers--and, not incidentally, maintain the upper reaches of the school system for the élite. They are implemented by administering year-end tests on which failure is high. The majority of dropouts and failures are ill equipped by whatever primary education they are able to obtain for even the unskilled jobs which must be their lot: curriculum in the grades is largely unrelated to the background of students, and "learning" is accomplished largely by memorization of lessons which are parroted back to a teacher.

Of those fortunate enough to complete primary school, getting into secondary school becomes mainly a function of ability to pay tuition. In Colombia, for example, 82% of the secondary

education facilities are in private hands. These schools are, not unexpectedly, managed as businesses and a student who defaults on tuition is quietly but quickly dropped. Even these schools are in short supply and increasing demands on scarce facilities are too often met by diluting standards and shortening hours. There has been little change in the basic curriculum, however, which is designed largely to prepare students for university entrance. Again, the high fail-rates at every grade from 7 to 12 coupled with an education of a classical nature spins flunk-outs into society as occupational misfits. While the number of vocational and technical schools has burgeoned since the early 1950's there are few controls over their standards and students often prefer to take their chances with a more prestigious route that may lead them to the university.

Despite the increase in facilities for higher learning since World War II, another vast weeding-out process takes place at the university entrance level. For example, in Colombia 16,000 secondary school graduates applied to universities in 1958 and only 9,000 could be accepted. One can scarcely help being concerned with the waste of resources this implies, considering the vast investment that had already been made in the 7,000 who were culled. Besides, the 7,000

represent many more who failed along the way. But since their education was designed along classical lines, almost solely as university preparation, the bulk of them do not have training which would help them fill a development need at the middle management level--perhaps the most neglected echelon in the work force of LDC's.

As for those who are admitted, a caveat must be posited. If we accept the premise that those who are trained at the college level bear the responsibility of assisting in their country's development, we must remember that some students who finally gain university entrance carry with them a philosophy which is inimical to change. In Latin America, little democratic equalization occurs in the process of education--the chances of a pupil from the lower social class making his way to the university (and, hence, of achieving a middle-class status) are slim indeed. The university-educated member of the middle-class--on whose counterpart development in the U.S. and Western Europe so heavily depended--may cling tenaciously to his acceptable niche rather than spearheading the change in the establishment which progress may well require. To those accustomed to reading about the Latin university as a "hotbed of revolutionary ferment," his may seem a perversion of facts.

However, Camillo Torres, the late Colombian intellectual and activist, pointed out that there is little homogeneity within the university community:

"Student discontent varies during the period of study. If we graph degrees of nonconformity, we see a curve which is low at the beginning of study, because at that time the students are not yet acquainted with many new ideas, nor have they entered the culture of student nonconformity. In the second year, as they learn more and become more confident, they adopt more attitudes of rebellion. The third year is probably that of the greatest discontent, but afterwards it declines . . . principally because in his last years /a student begins/ to worry about a place in the existing structures. He begins to pay attention to the professionals who can advance his career . . . to find a way to place himself, once he leaves the university, at a level which will be high in terms of accepted social values."

True development, it seems, must find its roots in academic training coupled with tempered discontent in the status quo. While by no means universal (the growth of the "New Left" in Latin America seems to portend some change), there is an unseemly willingness of the liberal-minded university-trained

in Latin America to be co-opted by the establishment. And this phenomenon must be considered as part of the brain drain.

Returnees and the Brain Drain

From universities in LDC's, top scholars each year come in increasing numbers to the U.S. for advanced training. It is when this education is complete that IMTS occurs, but during and after a U.S. education, there may be other subtle losses in brain power. One must count, for example, as at least partial investment losses to LDC's (since the homeland does not recoup all benefits), the professionals who study here and who make their way to international agencies such as UNESCO, ILO, WHO, FAO, and ECLA in the United Nations complex. Because salaries are high and admission to these organizations is based on a population formula, such employment is more attractive and more accessible to a trained person from a poor country with a high population than, say, a U.S. native with comparable training.

Yet another facet of this knotty problem is reported in the Saturday Review, by Crane Haussamen, Permanent U.S. Minister to UNESCO. In describing a case for which he implies at least some generality, he tells of looking up a former fellowship

grantee in his home country who graduated with honors from one of our best Eastern universities. Haussamen tells of his visit, "After I had sat awhile in his air-conditioned office, listened to several phone conversations . . . and exchanged a few words with him, I became uncomfortably aware that here was a prosperous and influential man who thrived by cheating his own government on economic development projects. To my dismay he explained frankly, with a tinge of sadness, that his present course of action was the only one left to him since he had not obtained a top official position on his return from the United States."

Then, too, we must consider those who return to work that might be described as "in the public interest," but whose training in the U.S. may have been something less than appropriate for needs at home.

For these aspects of the brain drain one may return to a statement quoted earlier: "these people are interchangeable because the system in which they work is universal." If the system is universal, people may indeed be converted into interchangeable parts.

While universality in the physical and biological sciences is certainly more true than in the social sciences, in one very

important sense it is erroneous in both. While all academic fields have certain assumed or proven truths, priorities for training and research (advanced degrees, are to a greater or lesser degree, research degrees) within disciplines must vary from one country to another. It appears that some departments within many U.S. universities--which now find themselves engaged more heavily in training foreign scholars than ever before in history--do not always judge these priorities adequately.

Geared to training U.S. students, professors have had few funds to prepare themselves to work on international research problems and gain needed experience overseas. As the influx of foreign students grows, faculty members admit to more or less stumbling into new foreign area responsibilities for which they feel inadequately prepared. Then again, a U.S. professor teaching a course with a preponderance of students from North America may feel he cannot alter the material to fit the minority. And in term papers or original research where the professor could tailor assignments more adequately to student needs, he may feel the need and the pressure to require students to delve into investigation in his specific fields of interest--not those of his students. To alter

instruction or even individual assignments might lower the "standards" of his discipline, he may argue.

And there are practical realities to be faced: a professor's research funds (from which graduate students must be supported) are often granted so as to circumscribe work to a very specialized area. What is more, a university teacher has limited time and, for a variety of reasons--inadequate initial training, language hesitancy, or cultural factors--foreign students usually require a disproportionate amount of this precious commodity which must be allocated to its best uses among an ever-growing student body.

Thus, the pressing problems to be solved in the process of development are all too often only lightly touched upon by the U.S. graduate education received by foreign students from LDC's. And although students learn the "universals" of their discipline they sometimes learn the non-universals as if they also were catholic truth.

It is inappropriate to fix "blame" on professors, many of whom strive valiantly to help foreign students acquire a meaningful education here but who have never received the necessary funding for international preparation themselves. And there are some professors who, by virtue of their sheer

empathy or extensive overseas research and subsequent study (often made possible through growing government or foundation support), work extremely effectively with foreign scholars. In other fields, a knowledge of the milieu simply is not vital and good instruction proceeds regardless.

Another problem, which returns us to the issue of priorities, is the startlingly disproportionate number of foreign students who work on basic problems--answers to which interest the entire community of scholars in a discipline--as opposed to applied problems--whose solution is quite specific to the home country but often (especially in social science) constitutes the foundations on which its program of basic research must be built.

Part of the basic-versus-applied issue is rooted not in our institutions, but in the university system of the less developed country itself: students may well arrive at our shores with little respect for work on applied problems, an attitude subsequently reinforced by study here. Too often universities in LDC's have little contact with the community and the problems it faces. In agriculture, for example, no extension service closely links the colleges of agriculture to the wider public. (If extension services exist, they are

invariably arms of the ministry of agriculture.) Colleges of agriculture in the U.S. have, in certain respects, been forced into engaging in a great deal of applied research simply because extension men returned to campus with pressing questions from the field. From applied problems, many researchers have been led gradually but logically into basic problems as they seek ever higher levels of abstration and broader generality for their findings.

If their experience in the U.S. convinces foreign students that work on applied problems is needed at home, their exposure to the onus often placed on a professional who works on applied problems in the U.S. may bias them against these issues. If not, their exposure to a preponderance of basic work may mean that they do not learn how to define the broader and compelling types of researchable applied problems that their countries face. In sum, a U.S. graduate education sometimes trains people <u>out</u> of important applied research problems. And institutes to which these scholars are expected to return may contribute to this tendency by copying the differentials of a U.S. salary schedule for professional work rather than remunerating well those whose work most nearly contributes to a local development need.

This is not to say that U.S. training should in any way discourage the truly outstanding scholars from doing basic work. Einstein and Fermi--whose pioneering work benefits all mankind and for whom this country could offer substantial overhead economies--can hardly be considered as "brain drains." The millions involved in building an atomic accelerator for an outstanding physicist, for example, simply are not available in Western Europe--let alone in LDC's. Nor does this fail to recognize that any good medical school elsewhere in the world may need several top notch biomedical researchers concerned with basic problems--simply to create the necessary élan and attract returning scholars.

But we must recognize that most foreign (as well as U.S.) students are not at the apex of their disciplines and should probably not pretend to be. That applied issues are neglected causes wasteful gaps in scientific knowledge which may make basic work premature and even inapplicable. More important, if a goal of science is to serve mankind, the scientist must focus on its most pressing contemporary problems. If not, his abstractions will simply not correspond to reality--nor will he have fulfilled his moral responsibilities.

With our funds, facilities and inclinations, as well as their predisposition, foreign scholars all too often gravitate quite naturally to the "pure" or basic aspects of their field. Upon completing doctoral research they return home, with a wish (natural enough) to maintain and expand upon these interests. Sometimes they even obtain grants here for basic investigation at home which further assures continuity of these pursuits.

While the efforts of the scientist in Latin America who is working on DNA or RNA must not be discouraged, we must ask: Should not a cadre of highly trained professionals also work on problems of nutrition--which seldom attract adequate professional attention--in countries where the majority of the population is badly nourished?

Throughout the underdeveloped world, but especially in India, one may find soils specialists working on problems of pure mineralogy. An inescapable question (to which the Rockefeller Foundation has responded so effectively through the years in its applied work in Mexico and elsewhere) must be: Should not a larger group of well-trained professionals also be experimenting with plant responses to certain available fertilizers in countries in which food supply is

dropping dramatically behind population growth? (Professor John Montgomery has written of an Indian agronomist who continually wrote to his American college campus requesting soil samples so that he could continue his doctoral research. It apparently did not occur to this scientist to alter his research design to allow for the use of local soils in his investigation. Furthermore, he apparently felt no moral compulsion to make such an adjustment.)

Some economists are so taken with the current pioneering emphasis on model building, systems analysis, and game theory that they attempt, for example, to explain the intricate workings of their own economies with transplanted models of doubtful applicability using unsure statistics and unproven functions. Again, one must raise a question: At this stage of development, should not at least some economists spend their expertise on improving statistics and understanding the rural micro-economy with its large subsistence or semi-subsistence sectors which are less glamorous (but no less challenging) and nearly unexplored areas of endeavor.

There is no need for contemporary research in LDC's to move from applied to basic areas in a progression exactly

like the one followed in the U.S. in an earlier era. Fortunately, the backlog of accomplished research in developed countries makes it possible for some of these techniques to be transferred to LDC's at low or even zero cost. But this is not to say that sophisticated methodology and theoretical constructs always attack the most important problems or that they are always applicable. Especially in the social sciences, their aptness must be shown and not merely assumed as borrowed concepts are carefully and methodically fitted to the new culture.

If U.S. universities are to continue to educate foreign students in increasing numbers, as they will, one would hope that more professors would be able to obtain foreign experience--to give them better understanding of the priority problems confronted by the country in question. Their presence on foreign soil inescapably exposes them to the cultural milieu and, with a little seeking, to the most important local problems of their discipline.

Upon his return to the U.S., a professor will undoubtedly be better equipped to instruct and advise foreign students. And while teaching and doing research in a foreign country he may be able to recruit scholars most appropriate

for U.S. study and enrich the academic program of the host institutions--and maybe even stimulate it to more social consciousness and make it more intellectually attractive for natives upon their return from U.S. study. As such, he will be doing his part to stem the brain drain. This is one good reason to call for prompt funding of the International Education Act (PL 89-698) which passed Congress last term and which, among its provisions, would support more such training for faculty members.

Haussamen expresses the situation succinctly as he attempts to delineate the central educational functions LDC's want and need when they send students to the U.S.: "Although grateful for our efforts, they need teaching that illuminates their own ancestral struggles, not ours; programs oriented toward their economic and political problems, not ours; education, in short, that launches students into the mainstream of their own nations' future, not ours."