

**PRESIDENT'S REVIEW &
ANNUAL REPORT
1970**

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¹ Beginning August 1970.

² Died July 1970.

³ Beginning December 1970.

⁴ Through November 1970.

⁵ Through December 1970.

⁶ Beginning February 1971.

⁷ Resigned October 1970.

⁸ Beginning October 1970.

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¹ Beginning August 1970.

² Died July 1970.

³ Beginning December 1970.

⁴ Beginning March 1970.

⁵ Beginning October 1970.

⁶ On assignment in Mexico.

⁷ Retired June 1970.

⁸ Beginning July 1970.

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¹ Beginning December 1970.

² Through November 1970.

³ Beginning February 1970.

⁴ Retired June 1970.

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⁶ Temporary appointment completed.

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RONALD B. MACKENZIE, M.D.⁷

¹ Through October 1970.

² Beginning July 1970.

³ Temporary appointment completed.

⁴ Beginning February 1970.

⁵ Through January 1970.

⁶ Through August 1970.

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¹ Resigned February 1970.

² Beginning September 1970.

³ Resigned August 1970.

⁴ Resigned May 1970.

⁵ Through June 1970.

⁶ Temporary appointment completed.

⁷ Through January 1970.

⁸ Beginning April 1970.

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DAVID R. MACKENZIE, PH.D.⁹

¹ Beginning February 1970.

² Through October 1970; retired December 1970.

³ Beginning November 1970.

⁴ Temporary appointment completed.

⁵ Through June 1970.

⁶ Beginning April 1970.

⁷ Resigned November 1970.

⁸ On assignment in California.

NIGERIA

Ibadan

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RICHARD BRADFIELD, PH.D.

¹ Beginning June 1970.

² Beginning February 1970.

³ Beginning August 1970.

⁴ Temporary appointment completed.

⁵ Retired June 1970.

⁶ On leave of absence beginning November 1970.

⁷ On assignment in Ceylon.

⁸ Through May 1970.

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Castries

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UNIVERSITY DEVELOPMENT—ADMINISTRATION

HENRY P. LANGE, JR.

¹ Beginning October 1970.

² Beginning March 1970.

³ Beginning September 1970.

⁴ On study leave beginning October 1970.

⁵ Beginning July 1970.

⁶ Temporary appointment completed.

⁷ Beginning June 1970.

⁸ Beginning December 1970.

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¹ Beginning July 1970.

² On leave of absence beginning July 1970.

THE PRESIDENT'S REVIEW

THE GREEN REVOLUTION IN PERSPECTIVE

The so-called Green Revolution had its beginnings in Mexico in the early 1940's. For 25 years, a handful of specialists worked closely with officials and scientists of the developing world to structure and put into effect national production programs that would drastically raise the quantity and quality of food crops available to exploding populations. During this long period of quiet and mostly uphill effort, little was heard from either the world press or the majority of development specialists who might have been expected to share an interest in work designed to ameliorate one of mankind's apocalyptic plagues.

Today, all this has changed. Professional interest in, and therefore press coverage of, the Green Revolution is keen and worldwide. Some discern a new age of plenty. The award in 1970 of the Nobel Peace Prize to Dr. Norman E. Borlaug, who as a staff member of this Foundation has devoted 27 years to the development and adoption of improved varieties of wheat, is one indication of the new hope. The recent award of the UNESCO Science Prize to two of the four international agricultural institutes founded by the Ford and Rockefeller Foundations—the International Rice Research Institute and the International Maize and Wheat Improvement Center—is another.

But to some, the Green Revolution appears to be fraught with potential dangers. This is not difficult to understand. Fundamental change evokes fundamental fears. But it is also true that such change often leaves behind those whose vested interests lie in the more traditional approaches and in analyses supporting the status quo.

In recent months, several well-known publications with national and international circulations have presented articles dealing with the possible hazards that the Green Revolution may bring to important parts of the world. This review will attempt to place in perspective some of the more disturbing and potentially misleading impressions that have gained circulation.

The thoughts expounded are different in significant ways, and one would be both unwise and unfair to generalize about them. Some predict that the Green Revolution will unleash a host of unforeseen economic disasters upon the developing nations and in the long run will create more problems than it solves. Others criticize it for raising false hopes about the world's capacity to feed itself in view of the fact that many national populations are doubling every 20 to 30 years. And still others question whether, in spite of the time, money, effort, and expertise that have been poured into the Green Revolution, it has the capability of making more than a tiny dent in the food/population problem.

Inasmuch as the purpose of this piece is to attempt to clarify some of the issues now being debated, perhaps at this point I should define the basic term. "The Green Revolution" is the phrase generally used to describe the spectacular increases that took place during the 1960's and are continuing today in the production of food grains in several regions of the world, particularly in India, the Philippines, Ceylon, West Pakistan, and Thailand. While a good many farming practices are involved, the basis of the Green Revolution is the development of new high-yielding seed varieties from which a farmer can produce three to four times as much grain on the same land.

Before taking up individually the specific criticisms that are being lodged against the Green Revolution, we should first of all take an unflinching and realistic look at the problem of world hunger, the alleviation of which is the primary objective of the Green Revolution.

The fact is that, according to the Third World Food Survey of the United Nations Food and Agriculture Organization (FAO), there are, in the less-developed countries today, a billion and a half hungry people. Some of these simply do not have enough to eat. Others eat enough, but suffer from hunger because their diet is deficient in protein, minerals, and vitamins. Dr. Richard L. Hall, chairman of the executive board for the Third International Congress of Food Science and Technology, held in Washington in August, 1970, has estimated that 10,000 people in the world die of malnutrition every day.*

Moreover, in some areas of the world the hunger problem is going to get worse rather than better unless the trend is changed, inasmuch as the places where there is not enough food, and where even that food is of low quality, are the very places with the highest birth rates. And this trend is likely to continue until the end of the century, pending the general acceptance by peoples and their governments of both the desirability and imperative need to stabilize populations.

We cannot be certain what man's mind will invent tomorrow, but thus far no way has been found to conquer hunger, in any of its forms, except by providing greater quantities of high-quality food. Agricultural production at its present rate will not accommodate all of the world's people over the next three decades. No authority challenges that statement. Production will have to be three to four times greater than it was in the fall of 1970 to do the job.

The Green Revolution has proved beyond a doubt that, with the aid of the new agricultural technologies and other necessary inputs, such vastly increased production can be achieved. Further, it has shown that these achievements are not limited to countries that already are technically advanced, but are possible also where subsistence agriculture has always been the prevailing practice.

Another important point should be made on the subject of hunger. We need not look exclusively to that future date when three to four times more productivity will be needed. Today, there are countries in which the greatest single need of the population is the rapid increase of food supplies. In those countries the issue is not whether feeding the people may cause certain temporary dislocation, but whether people are to have enough food to sustain life. The Green Revolution is now enabling many of these people to eat more.

SOME ACCOMPLISHMENTS TO DATE

In India, in 1967-68, only 18 percent of the wheat acreage was sown to the new dwarf wheats conceived for the Green Revolution—but these varieties produced 40 percent of India's total wheat crop. In 1968 the national average Indian wheat yield was 1,300 pounds per acre, a 62-percent increase over the average for 1962 to 1965.

In the state of Bihar, where famines have been endemic for hundreds of years, there are today districts where four-fifths of the wheat grown is of high-yielding

* *Chemical and Engineering News*, Vol. 43 (August 10, 1970), p. 36.

varieties and yields per acre have increased from 720 pounds to over 1,300 pounds.

The West Pakistanis planted the new dwarf wheat on 30 percent of their wheat acreage in the 1967-68 growing season. Traditionally a food importer, West Pakistan now is becoming self-sufficient in basic food grains, and if these trends continue it may become a net food exporter.

Figures from Turkey are similarly impressive. During the 1967-68 season, 425,000 acres were planted with the dwarf seed—which produced an average of 52 bushels an acre, compared with 22 bushels from the traditional local wheat varieties. While the total value of Turkey's increased production was more than \$23 million, the total cost to both the government and the farmer for seed, fertilizer, and other inputs was only \$18 million. And the near future is likely to bring even better results.

The new rice varieties have made it possible for Ceylon to increase its rice crop by 34 percent during the past two years.

As for the Philippines, it was a rice-importing country for most of the 20th century. For the past three years, however, it has not had to import any rice. This newly acquired freedom from importation has saved the Philippine Government millions of dollars a year in foreign exchange.

More food is needed in the world. The Green Revolution is producing some of it and has demonstrated the potential to produce more of it. No critic can, with logic, attack those truths.

SUMMARY OF CRITICISM

Let us now proceed to take up one by one the specific criticisms of the Green Revolution. They can be summarized as follows:

1. It is making the rich richer and the poor poorer.
2. It is the cause of severe unemployment in rural areas.
3. It is the primary reason for the mass migration of rural people to overcrowded cities.
4. It is causing oversupplies and gluts on Asian markets and thus causing the price of grain to fall.
5. It is generating within the developing nations a kind of euphoria that encourages leaders to view their soaring population growth rates with complacency.

DO SMALL FARMERS BENEFIT?

Probably the most frequently voiced criticism is the first—that the major effect of the Green Revolution has been to make the rich richer and the poor poorer. The more prosperous, progressive farmer with a sizable holding of land is usually the first in his village to plant the new seeds and adopt the new farming techniques. He is better educated, more aware of the services that are available to him, and probably has a wider circle of personal contacts extending beyond his own small village. He is more likely than his poorer neighbors to be in close communication with government and university extension agents who are knowledgeable about the seeds. Additionally, he is apt to have readier access to the cash or credit he needs to buy the necessary chemical fertilizers and insecticides. In both India and West Pakistan, he is more likely to have installed a tubewell

to provide the regular supply of water which the improved varieties require. And, inevitably, because his holdings are larger, his Green Revolution profits have been greater than those of the smaller farmer.

This does not mean, however, that the Green Revolution has benefited only the rich farmer. Even though the new technologies may be first introduced into a community by the larger landowner, the farmers with smaller holdings soon learn about them. It is impossible to hide fields with unusually high-yielding, healthy stands of grain from one's neighbors. The results of planting the new seed are there for everyone to see for himself. In this way, fields of the more prosperous farmers often serve as "demonstration plots" that give the poorer farmers an opportunity to observe at first hand the performance of the improved varieties before they themselves risk their own money, land, and time. The poor cannot afford to experiment; they must be given certainty. During successive growing seasons, however, more and more of the smaller farmers adopt the new technologies, with profit to themselves. In several regions of the Philippines, for example, after the new seeds were first brought in and planted by the major landowners, the use of the high-yielding varieties spread very rapidly to all parts of the region. In certain districts, the speed with which the improved seeds were adopted by the majority of farmers exceeded the speed at which even the comparatively well-educated United States farmers adopted the new hybrid seed corn several decades ago.* Today, over one-third of all the rice farmers in the Philippines have changed to the new varieties; this is all the more impressive in view of the fact that the average size of a Philippine rice farm is about five acres.

A recent unpublished report† of AID's Agricultural Economics Division in New Delhi addresses itself to the question: Are small farmers benefiting from the new technology? Its carefully documented conclusion is that the potential beneficiaries of the new technology would be about half of all of India's farms, or roughly 25 million farms. This can hardly be called a mere handful of farmers. The question remains, however, as to what proportion of beneficiary farms are small ones with less than five acres of land? Available evidence indicates that about 62 percent of the beneficiary farms are small ones; about 6 percent are large farms (with more than 25 acres of land per farm); and about 32 percent are medium-sized farms. Hence, the distribution of the potential beneficiaries of the new technology is weighted heavily in favor of the small farms.

FUNDAMENTAL CHANGE HIGHLIGHTS HISTORIC PROBLEMS

No authority has ever suggested that this transition would be a smooth one, for all authorities recognize the serious economic, social, and political imbalances that characterize rural life in the developing world. We are all aware of the economic inequalities, the ancient bitteresses among various social groups, the deep-rooted prejudices, the political injustices, and the religious animosities. And it is an historical fact that the introduction of technological change often

* Robert E. Huke and James Duncan, "Spatial Aspects of High-Yielding-Variety Diffusion," Dartmouth College, Hanover, N. H., 1970.

† "The Green Revolution in India: Achievements and Fourth Plan Prospects and Problems," Agricultural Economics Division, Office of Agricultural Development, U. S. Agency for International Development, New Delhi, 1970, p. 37.

has the effect of bringing long-dormant social ills to the surface and forcing them into greater public awareness. However, one cannot, in all fairness, place the blame for these ills on the technological innovation itself. The roots of these ills are long and predate the Green Revolution by many decades and even centuries. The most progressive national leaders are beginning to realize this. As they make vigorous efforts to increase food production, they are concurrently striving equally hard to help resolve other social and economic problems and to assure the dispersion of the benefits of the Green Revolution among all groups in the society.

A second criticism, and one we have touched upon in addressing the first, is that the Green Revolution is causing severe unemployment in rural areas. But rural unemployment can be laid to causes far more widespread and relevant than the Green Revolution, which has functioned only in limited areas. The Green Revolution cannot be made the scapegoat for the displacement of agricultural laborers and sharecroppers that has taken place for decades and is continuing in countless villages of the Third World today.

Population growth is a fundamental factor in rural unemployment. Between 1900 and 1960—in a mere 60 years—the rural population of the Third World countries *doubled*. That was not brought about by the Green Revolution. And during that period, land devoted to farming increased only slightly. Unemployment was the inevitable result. It has been estimated that the increase in numbers of people alone in this new decade will cause a 30-percent rise in the number of new jobs needed among the rural population—and present economic growth rates indicate that industry in these developing countries will be able to provide only 10 percent of that number.

This is a real problem and actions must be taken to cope with it. Unquestionably it is accentuated in some areas in these transitional times of the Green Revolution. But it is just as erroneous to suggest that the revolution is the primary cause of rural unemployment as to conclude that it can benefit only the rich. We must avoid the illogical thinking which advises that these vital efforts to supply required food to the world should be slowed, or ended, because of their secondary contribution to the unemployment problem.

A third charge being sounded, and one that is closely related to rural unemployment, is that the Green Revolution is the chief reason for the mass migration to the cities. Again defenders must be careful not to challenge the fact of the migration itself, which is indisputable. What must be disputed, once again, is the implication that the Green Revolution is the major cause. The lure of the city has been a constant factor in almost all societies since the onset of the Industrial Revolution, and even earlier. Rural unemployment is one factor in that migration; relief from ancient and restrictive social limitations, which always are more oppressive and inflexible in rural societies, is another; a third factor is the desire for better education, wider companionship, and more specialized job opportunities, all of which are usually not to be found in the traditional life of the villages. For all of these reasons, and for many others, the migration to the cities continues. It will accelerate, for men will not stay in rural communities where they cannot make a living.

But there is no evidence that the Green Revolution is playing a significant role

in the migration. Indeed, a case to the contrary can be made. The revolution in agriculture carries with it at least the *potential* of creating more jobs in rural areas, and thus helping to slow down the march to the cities. The new crop varieties require considerably more cultivation and care than do the traditional varieties. The land must be suitably prepared in advance. The seeds must be properly spaced when planted. Weeds and pests must be controlled. Precise amounts of water, fertilizers, and insecticides must be applied at the right time. Because of increased yields, more hands are required at harvest time. And when double- and multiple-cropping systems are adopted, the need for labor increases proportionately. All these requirements can have the effect of increasing, not diminishing, the need for agricultural workers. In some instances, a farmer may have to employ 10 to 20 percent more laborers than he did before the new seeds were introduced.

The success of the new varieties can also increase the farmers' demands for the services of seed distributors, food processors, fertilizer manufacturers and distributors, farm equipment distributors and repairmen, credit and banking personnel, and extension agents. And as farmers have more income they need more services not connected with the farm, such as those provided by local storekeepers and tradesmen. Additionally, the agricultural revolution helps create a demand for new roads to enable the increased quantities of farm produce to be transported to markets. The same is true in the construction of new irrigation facilities.

And, finally, there is another longer-term employment benefit. The farmer, with his increased cash income, can create a greater demand for a wide variety of consumer goods produced in urban areas. This means that more prosperous rural populations can increase employment opportunities for city populations.

If it is properly directed, and if the most is made of the opportunities it offers, the Green Revolution can *create* new jobs of all types. This is one of the challenges of its second phase.

MALDISTRIBUTION YES, GLUT NO

The fourth complaint cited earlier is that the Green Revolution is responsible for a glut on Asian grain markets. This allegation is simply not based on fact. According to the Third World Food Survey of the FAO, about 30 percent of the population in less-developed countries—between 300 and 500 million people—receive too few calories and are undernourished. And more than 190 million of them are still living in the countries of Asia where the revolution has had its greatest impact—India, Pakistan, Indonesia, and Southeast Asia. There is no Asian grain glut. What does confront us is a maldistribution problem in Asia—which, of course, is an entirely different issue.

There is another complaint against the Green Revolution that is closely linked to the one concerning market surpluses. It is said that the increased yields of the new varieties have the effect of depressing grain prices on the international market. This complaint, however, cannot be substantiated any more than the others. Most of the increased grain production is being utilized primarily to feed people in the countries where it is grown. In the case of rice, for example, 96 percent of the 200 million tons produced annually never enters into international trade; in other words, only 4 percent of the world's rice crop is exported. And,

in view of the population growth rates of virtually all the rice-growing countries, it will take a great deal of sustained effort to keep rice production going at a rate sufficient to take care of their own population increases during the next several decades.

THE RECOGNIZED NEED FOR POPULATION PROGRAMS

And, finally, some critics have accused the Green Revolution of tending to create complacency in the developing nations regarding their population problems. It is alleged that when national leaders see the dramatic increases in grain yields, they may consider their food/population equation solved and slacken their efforts to reduce national birth rates. But in actual fact, this is not what has happened. Leaders in India, Pakistan, and other countries have frequently expressed their conviction that the Green Revolution has bought for them a period of time during which to devise concrete plans to cope with the population explosion. Far from creating complacency, the Green Revolution has driven home with special force the hard truth that at the present rate of population increase, food supplies must increase by 80 percent by 1985 merely to avert famine.

SEVEN STEPS TO STABILITY

These difficulties, and others not here cited, are recognized. Most have been recognized from the outset. No sudden qualms have overtaken the Green Revolution; no novel set of circumstances has developed to overwhelm the planners. In all authoritative quarters, we find increased recognition of the supportive measures that must be taken by national governments, local communities, and private groups to sustain and extend the benefits of the agricultural revolution. They include:

1. Increased measures by governments to see that loanable funds are made available to small-scale farmers at interest rates comparable to those received by the large farmers.
2. Greater effort, through extension and research, to determine where and how the new technologic can best be adapted to small-farmer groups.
3. Wider, more intensive use of trained extension agents who know the rural people and can encourage and guide the smaller farmers during the entire season.
4. Positive policies to assure that in the transition from subsistence to market farming, the labor-intensive characteristics of the traditional production methods are retained.
5. Exertion of greater efforts to set up small industrial enterprises, service centers, and trading depots in towns and villages—thus providing more new non-agricultural jobs.
6. Improvement of intensive marketing and distribution facilities so that the increased food supplies will reach the people who need them, whether in rural areas or in cities.
7. Efforts to assure that the farmer is not penalized for his endeavors to increase production by wide fluctuations in the price he receives for his crop.

CONCLUSION

I trust it has been established in this brief perspective that the Green Revolution has accomplished its major objective. The Green Revolution has shown that much larger quantities of food can be produced in the very areas of the world where famines, hunger, and malnutrition have been endemic. Food-grain production and per-acre yields have risen to record heights and, for the most part, this food is being consumed by the people living in the countries where it is grown.

Again and again, the new seeds have shown that they have the capability of increasing production where other agricultural improvements have either failed or had little effect. In the Punjab region of West Pakistan, for example, the more progressive farmers had been installing new tubewells for several years before the Green Revolution. But at that time only the traditional varieties of grain were available to them. The increases in yield resulting from the new wells alone were very small and in many instances did not compensate the farmers for their additional inputs. However, with the introduction of the new varieties brought in by the Green Revolution, the yields of these same lands with the tubewells already installed began to increase spectacularly. In other places, before the new seeds were developed, the farmers had tried to increase their yields by buying more fertilizer and applying it to the traditional varieties. But the unimproved varieties often do not have the capability of responding to increased nutrition during cultivation, and the farmer frequently found that the expensive fertilizer did not net him any real gains in yield. When he planted the new varieties and used the additional fertilizer, he often found that his yields increased several fold.

There is now growing and conclusive evidence that the Green Revolution is having a constructive, positive, and long-term influence in ways other than increasing the quantities of food available. Recent surveys made in the state of Uttar Pradesh in India,* for example, have found that in many of the communities where the new seeds have been generally adopted, there are very obvious indications of expansion of both services and trade—more stores, more machinery distribution centers, etc. In the Philippines, resident observers report that more young people are going to school, more farmers have better roofs on their houses, and, in general, farmers and farm families are having an easier life as a result of the increased productivity of their land.

But the point that should be most emphasized about the Green Revolution is that it can be an unparalleled catalyst for beneficial change in backward agricultural areas. Some proponents argue that this might be its most important result, for it has helped dispel a myth that has historically shaped official agricultural policies.

For decade after decade the myth held that millions of farmers in large areas of the world—farmers steeped in generations of fatalism and apathy—are not and cannot be receptive to new ideas and therefore should be ignored in planning for national development. The myth has been accepted traditionally, not only by skeptical officials but all too often by the excluded farmers themselves.

* "Changing Agriculture and Rural Life in a Region of Northern India, A Study of Progressive Farmers in Northwestern Uttar Pradesh During 1967/8." Research Project, U.P. Agricultural University, Pantnagar, Vols. I and II.

But government leaders no longer accept the notion that proposals designed to help the poorest farmer are doomed to failure. Now there is proof that enables the farmer to raise his expectations of what agricultural life can offer. Until recently, the agricultural sector and rural populations had long been the poor relations of the industrial sector and urban populations. Rural people, whether farmers who owned sizable acreages of land which they cultivated or landless agricultural laborers, stood apart from their country's economic development, and their contribution to the total economy was almost negligible. Neglected by their governments, ignored by the industrial sector, and regarded with condescension by the city dwellers, these people were generally left to cope inadequately with food deficits in the face of vagaries of weather, erratic monsoons, pests, unproductive varieties, and archaic methods of land cultivation.

Today, largely because of the overwhelming evidence that the adoption and spread of the new agricultural technologies can contribute so advantageously to overall national development, the governments of India, Pakistan, Turkey, and half a dozen other countries in Asia have adopted new agricultural policies and are allocating more of their national budget to agriculture. Instead of giving industry highest priority in national development strategy, the Indian Government has made agricultural development one of its primary goals. That government now commits sizable funds to strengthening the agricultural sector and, during the Fourth Five-Year Plan (1969-1974), agriculture will eventually receive directly a third of total government spending. Plans have been made to conduct an all-out campaign to introduce farmers to the new high-yield seeds, to lend five billion rupees to the small farmers through the national banking system, to provide greatly increased supplies of modern inputs like chemical fertilizers and pesticides (including the importation of more fertilizer and the expanded construction of local fertilizer plants), and to maintain incentive output prices for the increased food grains being grown by the farmers. Other governments, in varying degrees, have adopted similar practices, effecting an almost complete reversal of their previous agricultural policies. With the introduction of the technologies brought by the Green Revolution, the agricultural sector is now passing through the early stages of modernization and experiencing for the first time what is likely to be an integral part of national development plans.

As indicated earlier, the Green Revolution has captured the imagination of the farmer and provided him with an incentive as nothing seems to have been able to do in the past. When he sees for himself the increased harvests that may be his if he uses the new materials, he evinces an unexpected readiness to take chances with the new varieties by investing in the improved seeds, buying the essential chemical fertilizer and pesticides, and perhaps improving his water supply. He begins to experience a sense of involvement with his nation's progress and to participate actively in local programs. This direct involvement, as Clifton R. Wharton, Jr. has recently pointed out, "increased the competencies of rural people to deal with their problems thus making developmental efforts self-generating. Involvement gives the peasant an increased awareness of controlling his own destiny and eliminates the feeling of having plans imposed from outside."*

* *War on Hunger*, A report from The Agency for International Development, Vol. IV, No. 9 (September, 1970) p. 19.

In most of the developing nations, rural people have traditionally had little faith in their national governments. Government policies were usually regarded with suspicion and perhaps with good reason. Today, there is tangible evidence in some of these countries that, with the initiative now being taken by national governments to allocate more resources to the agricultural sector, the rural people are beginning to regard their government with more trust and confidence, to feel, to some degree at least, that it is *their* government. In this way, the Green Revolution can also be said to be contributing constructively toward political stability.

In conclusion, it should be pointed out that there is a major, and entirely un-predicted, benefit which has resulted from the debate that is going on over the Green Revolution. It has pinpointed for the general public what the men who created the revolutionary new seeds have always realized: No improved food variety, or no single new technology *by itself*, can solve the world food problem.

J. George Harrar, President



CONQUEST OF HUNGER

In over a quarter century of involvement in world agriculture, The Rockefeller Foundation has demonstrated that food production can be rapidly and substantially increased in areas of traditionally low crop yields. Widespread and rapid gains since 1965 in productivity of wheat and rice have permitted several Asian nations to eliminate dangerous grain deficits, at least temporarily. Even more important is the increasingly clear understanding that accelerated output of conventional agriculture is basic to most other progress by agrarian nations and that conventional agriculture, including subsistence farming, has a high potential for improvement.

A set of basic requisites for agricultural progress has been worked out in the course of the cooperative agricultural programs in developing areas initiated and supported by the Foundation. These include development and application of technology, training of personnel, strong governmental leadership and support, and aid from the technically advanced nations. This combination of factors has proven successful in countries from Central America to Southeast Asia to tropical Africa. But while the basic principles and techniques are known, the decision to apply them and the will to sustain their impetus depend on complex and often unpredictable social, economic, and political factors.

Technological limitations also exist in many aspects of crop and animal production. These require research on specific problems, often under local conditions peculiar to certain areas, seasons, or crops. Wheat technology, including varieties, still must be developed, for example, for vast dry or cold acreages of developing nations, and methods must be worked out for growing rice under upland conditions or in areas where flood waters are deep. Technology for crop and livestock production in the humid tropics is lacking, as are refined methods for fish farming in both fresh and salt waters.

These barriers, along with insufficient economic and political support and the difficulty of reaching millions of isolated farm families, have restricted the benefits of agricultural assistance programs to people living on the more accessible lands where water supply is favorable and, generally,

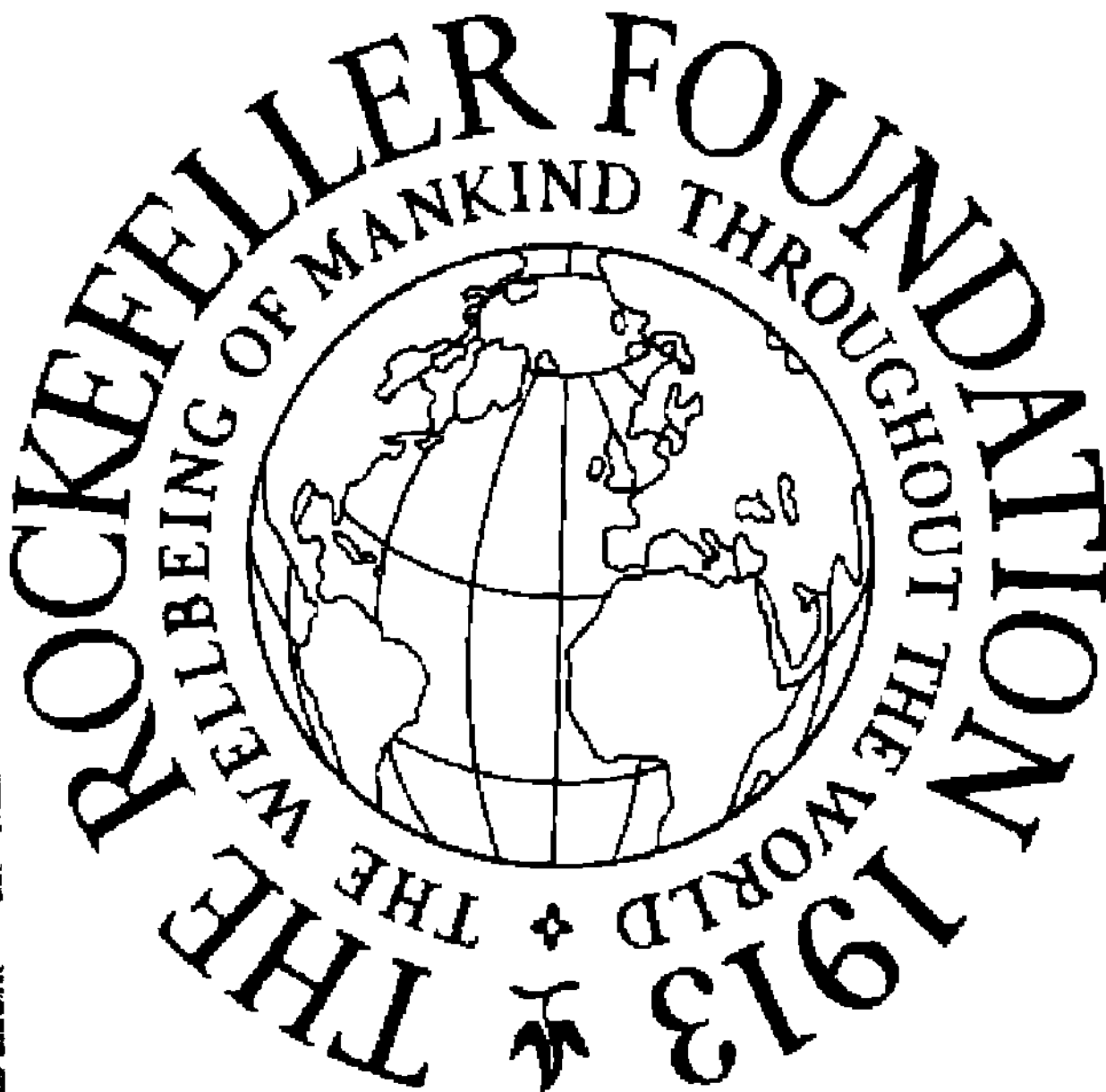
to the more prosperous farmers. It is therefore essential, in addition to attacking technical problems, to multiply strategies for reaching remote rural dwellers who cultivate small acreages and to help them enhance the quality of their lives.

Although advances in technology are increasing total food supplies, the hard core of the world hunger problem is malnutrition. Protein deficiency and related diseases are widespread in the developing countries; the chief victims are small children, who will carry the mark of physical deprivation and mental stunting into the next generation. Development of new mechanisms for increasing protein supplies is of the utmost urgency. Debilitating diseases, in particular schistosomiasis, likewise continue to inhibit the development of the full potential of rural populations.

Rockefeller Foundation priorities for the decade of the 1970's have been drawn up with a view to solving some of the major technological problems that block progress; extending the benefits of modern farming to the small landholder; improving the protein quality of available food supplies; and enlarging the training opportunities in agricultural and nutritional sciences in developing areas, particularly at the graduate level. The means for implementing these goals are those proven valid in the past: development of a network of international institutes; cooperation in regional research, training, and production programs; support for agricultural educational institutions; and support of selected research projects, chiefly in United States universities.

INTERNATIONAL INSTITUTES

During the 1960's the Ford and Rockefeller Foundations, in cooperation with local governments, pioneered in the development of a remarkably efficient vehicle for worldwide agricultural advance, the autonomous international research institute. A network of these centers, each managed by an independent board, has been created, starting with the International Rice Research Institute (IRRI) in 1962 and continuing with the International Maize and Wheat Improvement Center (CIMMYT) in 1966, the International Center of Tropical Agriculture (CIAT) in 1968,



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James Moomaw, a member of the Foundation's field staff, led a rice production program in Ceylon for two years; this year he was assigned to Nigeria's International Institute of Tropical Agriculture.

and the International Institute of Tropical Agriculture (IITA) also in 1968. These major centers assist and link together local and regional programs in agricultural research, training, and production in developing areas all over the world. In this network, the international institutes provide three major services: the solution of particularly difficult technical problems requiring high-level interdisciplinary research; training of leaders for national or regional institutions; and arrangement of cooperation among scientists of nations facing like problems.

The international centers work directly with national institutions and also cooperate with regional programs that serve more than one nation. Through linkages with universities and national research services in the technically advanced countries, the centers are able to funnel research findings in plant breeding, disease and pest control, agronomic practices, and the like to areas of greatest need.

The capital required to start up each of the four international centers was provided by contributions of land from local governments and grants from the Rockefeller and Ford Foundations, which have also contributed to operating costs. Support from other sources is expected to increase significantly, and other organizations have begun to underwrite operating costs as well as to support special projects under contract arrangements. These include the United States Agency for International Development, the W. K. Kellogg Foundation, the Canadian International Development Agency, and the Inter-American Development Bank.

IRRI: The International Rice Research Institute has provided outstanding leadership over the past eight years in raising rice production in Asia, chiefly through solution of production problems and training of personnel at all levels from research scientist to county agent. It has also developed an important research and training program on multiple cropping, based on use of various short-cycle crops between crops of the new rice varieties, which can be planted at any season of the year and harvested within about four months.

This year a Ph.D.-level program was designed

jointly by IRRI and the Indian Agricultural Research Institute (IARI) with support from The Rockefeller Foundation. Candidates from India as well as from other Asian nations will spend two years doing thesis research at IRRI in addition to their academic work at the Graduate School of IARI. This program is expected to spearhead further international cooperation in high-level training involving the international centers and graduate institutions in developing countries.

CIMMYT: Since its establishment in 1966, the Center has made substantial contributions to world agriculture. Its high-yielding, semi-dwarf wheats, with built-in insensitivity to day length, have been widely planted by 19 nations and are now in use on some 18.3 million acres outside Mexico. CIMMYT now has contracts to provide technical assistance in four other countries.

CIMMYT's corn program also covers a great many countries. It includes assistance to Central America, Brazil, Argentina, Pakistan, the United Arab Republic, and East Africa, and indirect assistance to many other nations. Corn improvement at CIMMYT is focused on development of high-yielding varieties for a wide range of ecological conditions, from the humid tropics to the cool highlands. Improved varieties and hybrids are being sought in a wide range of grain types and colors to meet different usages and widely varying consumer preferences. Corn types that grow well in the hot tropics are also being sought.

CIMMYT has been a pioneer in the development of high-lysine corn, based on the opaque-2 and floury-2 genes, which control the amino-acid composition of corn kernels. This year it received a grant of over \$1.5 million from the United Nations Development Programme for assistance with spreading the production of high-lysine corn in other nations.

With Foundation support, CIMMYT this year began improvement of its base facilities at three experimental stations on land made available by the Mexican Government. In addition, a grant was made by the Foundation for the purchase of land for a high-altitude station for work on corn, wheat, triticale, and potatoes.

CIAT: The International Center of Tropical Agriculture in Palmira, Colombia, has initiated



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Richard Bradfield, a distinguished soil scientist and former Rockefeller Foundation trustee, is developing in the Philippines multiple-cropping schemes that could revolutionize tropical agriculture.

programs in several tropical crops as well as in livestock improvement and management. In cooperation with the Colombian Institute of Agriculture (ICA), it is working at middle- and low-altitude stations on local crop and animal production problems. This year grants were made by the Foundation for construction and equipment for its headquarters facilities at Palmira and for equipment for the animal health laboratory at Turipana, where research and training are being expanded in cooperation with ICA. A number of grants were made by the Foundation this year to strengthen ICA's research, training, and extension capabilities.

The cooperative work between ICA and CIAT on high-lysine corn is one of the most promising projects under way in the field of nutrition in Latin America. A grant was made to the Colombian Institute of Family Welfare this year for a study of the value of opaque-2 corn in foods prepared for home consumption. The Institute is conducting a nationwide campaign to introduce this high-quality-protein corn into the national diet all over the country.

IITA: Construction on IITA's facilities at Ibadan, Nigeria, has been proceeding on schedule. Development of buildings, campus, and field station is well under way, and 20 staff members are in residence, initiating work in plant breeding, agronomy, soil science, plant pathology, entomology, and nematology.

The scope of IITA's research program is defined geographically as covering the regions between the northern and southern desert belts, particularly those lower than 2,000 feet above sea level, with humid climates more than half the year. It is focusing work on the main problems that block agricultural progress in these regions and on development of technology adapted to specific localities. Special emphasis is given to food crops, in particular those that supply protein, since malnutrition is a major problem in most of the countries concerned.

Long-term objectives of IITA include development of farming systems that will increase yields per acre—including multiple cropping and continuous cultivation—as well as new methods of managing soils, weeds, pests, and diseases. Crop

research is being concentrated on improvement of grain legumes and root crops and on production of corn and rice types with higher yield and better protein content.

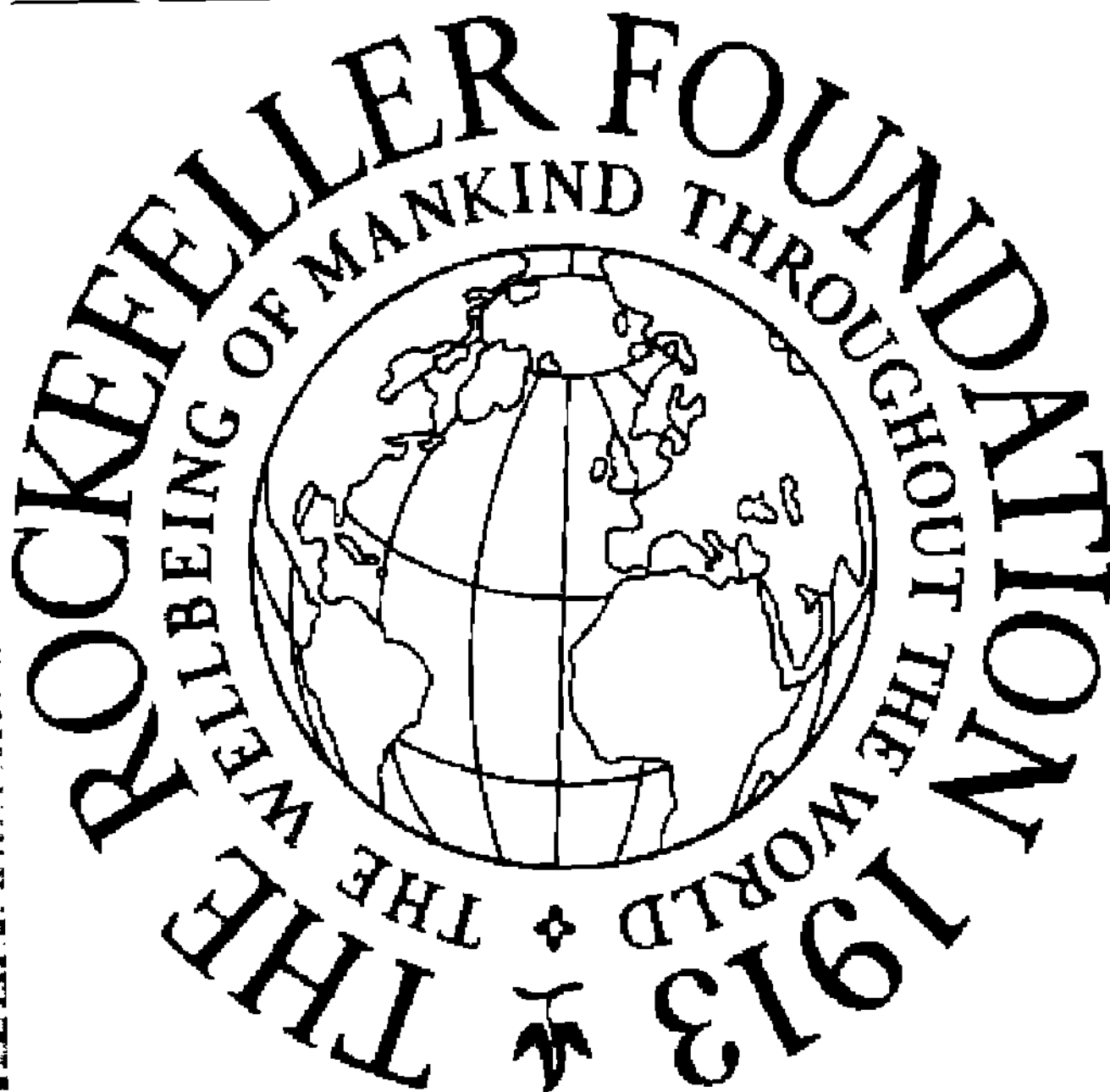
Training of personnel is also being undertaken, and cooperative ties with IRRI, CIMMYT, and CIAT are being formed, as are contacts with Nigerian institutions, in particular the nearby University of Ibadan.

AID TO SMALL FARMERS

The consolidation of this international network and extension of its influence and assistance to national and regional programs have had a significant impact on world food production. Provision of ever greater net quantities of food, however, will not solve the hunger-population problem. The great majority of farmers in remote areas in the developing countries have not yet benefited from the agricultural revolution; their population growth rates continue to be among the highest in the world and their farm productivity the lowest. Migration to already overburdened urban areas has compounded the difficulties of cities without alleviating those of rural districts.

To improve the quality of life and to slow down population growth in rural areas are among the most urgent tasks facing developing nations today. Subsistence farmers comprise between 50 and 80 percent of the population of agrarian nations, and a large percentage of them live almost wholly outside the money economy. They are hard to reach, hard to organize, and often hard to persuade. Every conceivable effort must now be made to bring these masses of people into the mainstream of economic life so that they can both contribute to and benefit from economic and social advance.

The first step is to make small farms more productive, so that agricultural areas can themselves begin to generate the wealth needed to bring in the basic requisites for effective progress, including public health and family planning programs and better educational, transportation, and communications facilities. Experience with assistance in the more accessible agricultural regions has shown that, given adequate



Photograph Excised Here

Jack Harlan heads the University of Illinois Crop Evolution Laboratory, where young scientists assist in highly sophisticated investigations of the origins and evolution of cultivated plants.

incentives, tradition-bound farmers with little education can and will adopt new ways, that the beginnings of prosperity and the concrete expectation of a better life are powerful catalysts for change—and a first step in bringing about changed attitudes toward fertility and family limitation.

One of the more successful attempts to work out effective means of aiding small farmers was the Puebla Project, started in 1967 by CIMMYT in cooperation with Mexican state and federal officials and funded in part by The Rockefeller Foundation. In three years the Project has successfully overcome the initial barriers of communication and technological limitations and shown that with proper management practices and a modicum of inputs, the yields on small farms can be substantially increased. From an original pilot group of 141 farmers cultivating an average of one and a quarter acres each in 1968, the Project has grown to include 6,000 farmers. By 1970 some 3,000 farmers had doubled their former yields, with an increase in net income of about 7,300,000 pesos (\$600,000).

A similar program aimed at helping the small farmer was started on a modest scale in El Salvador by Father José Romeo Maeda in 1956 with only 50 families. It became immediately so successful that it soon attracted local interest, and in 1969, with a grant from The Rockefeller Foundation, the program was expanded to include a center for seed multiplication and a training program for project workers. The Ministry of Agriculture is also providing assistance, and training for project leaders is being made available to other interested countries of Central America.

To generate still wider interest in this type of effort, two international conferences were held at CIMMYT this year, bringing together leaders of agricultural and economic development to consider how strategies like those used in the Puebla Project and Father José Romeo Maeda's village cooperatives in El Salvador might be adapted in other areas. Representatives of 15 Latin American nations and policy-level delegates from about 20 international development agencies attended the sessions.

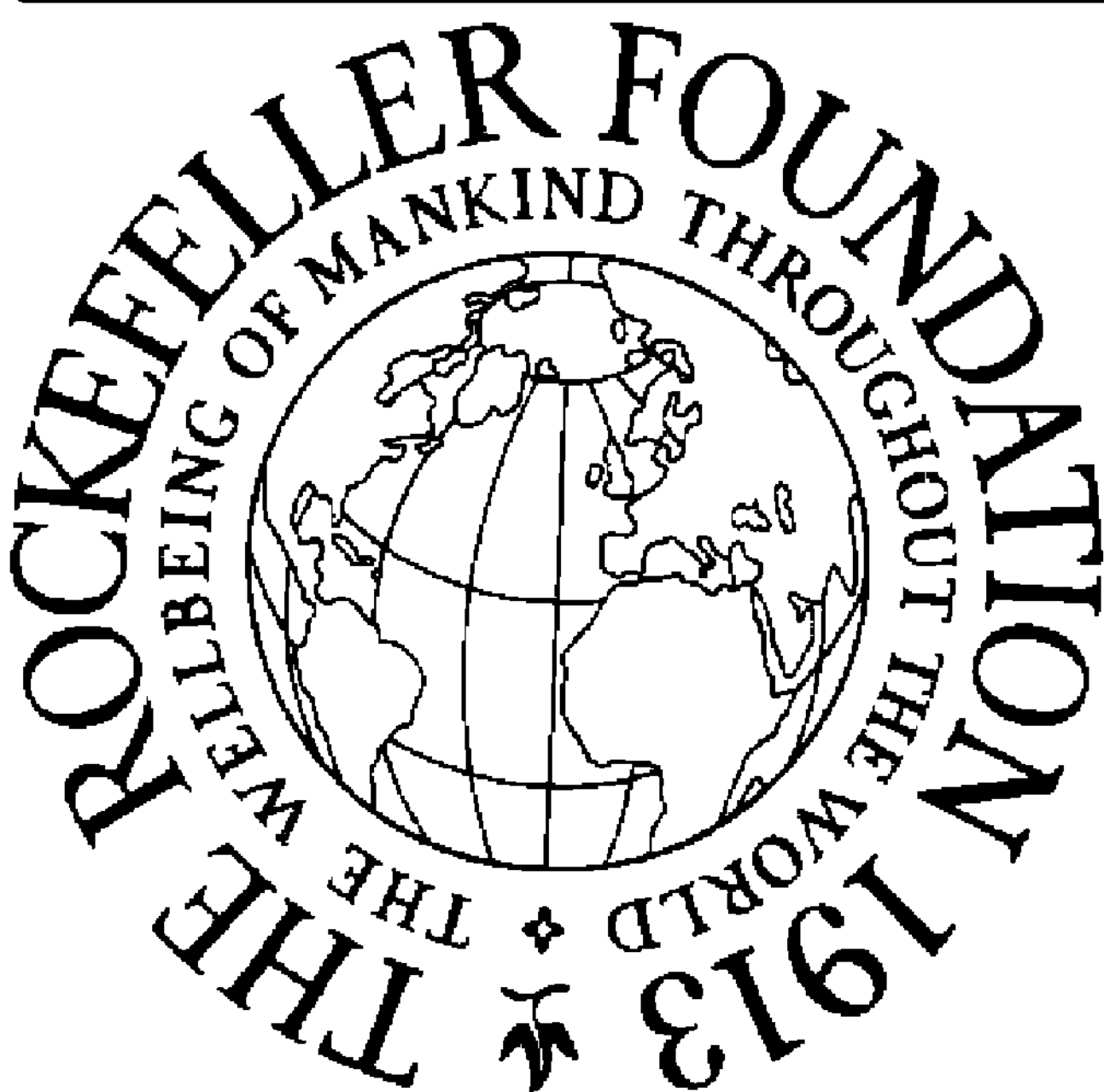
REGIONAL PROGRAMS

In spite of the promising developments of recent years, in large areas of the world scarcity is still more familiar than plenty. Spreading still further the benefits of the technological advances in the major cereal crops continues to be an important component of the Foundation's efforts in the field of agriculture. A regional program for wheat improvement in the Middle East and North Africa was recently set in motion, with headquarters in Turkey. Wheat occupies half the total cultivated acreage in that part of the world, but per-acre yields are low by Western standards. The program will include breeding of adapted varieties of both spring and winter wheat for various ecological conditions, training for wheat scientists from cooperating countries, and advice and assistance in the development of local research and production programs. A Rockefeller Foundation staff member has been appointed co-director of the program, which is largely supported by Turkey, and the Foundation is providing modest supplementary support, and funds for specialized equipment not available in the country.

In addition, a grant was made this year to Oregon State University for cooperation in the Middle Eastern wheat program. Training for wheat scientists at Oregon State is planned, as well as exchange of scientific technology and genetic materials, in cooperation with CIMMYT. The grant will enable the University to expand its research in wheat and to provide a full-time agronomist and short-term consultants for the program in Turkey.

Another regional effort that has international implications is the sorghum improvement program in Serere, Uganda, which has had Rockefeller Foundation support since 1960. Sorghum is an important food crop in Africa and parts of Asia. Improved varieties and hybrids with high nutritive value have been developed over the past decade, as well as breeding systems that open possibilities for further improvement. A grant was made this year by the Foundation to strengthen the sorghum research and cooperative production programs at Serere.

The Foundation's Indian Agricultural Program, established at the request of the Indian Govern-



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Ivan Buddenhagen is a plant pathologist studying the bacterial blight of rice at the University of Hawaii, in cooperation with the International Rice Research Institute.

ment in 1957, has been instrumental in the improvement of major cereal crops in India and in the widely publicized production programs that resulted in high yields of wheat, corn, and rice in many parts of the country. The Foundation's program this year continued assistance with the improvement of rice, corn, wheat, sorghum, and the millets and with strengthening of research and educational programs at selected state agricultural universities and at the Indian Agricultural Research Institute in New Delhi. Thirteen Foundation field staff members were assigned to India during 1970. In addition, funds were made available for equipment for a laboratory for pesticides research at IARI and for the purchase of farm equipment needed for the improvement of experimental-farm facilities for the All-India Coordinated Crop Improvement Schemes and IARI.

AGRICULTURAL EDUCATION

An important aspect of the programs of the four major international institutes is training of scientists, technologists, communications specialists, and field workers. Each institute is located near a university or college to facilitate cooperative activities in the fields of science, agriculture, engineering, and other related disciplines: IRRI with the College of Agriculture of the University of the Philippines; CIMMYT with the Mexican National School of Agriculture and its Graduate School; CIAT with the University of Valle and the National University's Faculty of Agronomy at Palmira; IITA with the University of Ibadan. These ties have proven to be mutually beneficial in the routine research and educational programs of the institutions involved; in addition the Foundation seeks areas in which special support for cooperative programs may aid in improving agricultural education or in solving regional problems.

This year, for example, a grant was made to the Colombian National University's Faculty of Agronomy at Palmira for basic equipment for irrigation and drainage field facilities for use in advanced agricultural engineering courses. The studies are part of a cooperative educational program with the University of Valle, where the Foundation has helped build a strong program in this field. The experimental demonstration

unit will be the only one of its kind in an agricultural school in Colombia.

Foundation support is also given to key agricultural educational institutions in developing countries to broaden the base for scientific and technical training. Since 1950 the Agrarian University in Peru has received support totaling \$1.5 million. Recent emphasis has been on the development of agricultural economics and rural sociology, two fields of key importance for the development of Peru's agricultural potential. A grant made this year by the Foundation is aiding the University to strengthen its M.S. programs and to develop problem-oriented research.

The Graduate School of the Mexican National School of Agriculture has also received Foundation support since its establishment in 1958. Last year, with Foundation aid, it instituted the first Ph.D. program in agricultural sciences ever offered in Latin America, a development of the first importance for the training of specialists at the top level for all the Spanish-speaking countries of this hemisphere. This year the Foundation continued to contribute to the operating costs of the Graduate School.

IRRI's educational outreach at the Ph.D. level will be considerably strengthened by the program in cooperation with the Indian Agricultural Research Institute previously described.

The Foundation continues to award scholarships and fellowships for advanced training abroad to outstanding young agricultural scientists from developing countries. In 1970 such awards were given to 35 candidates.

GENERATION AND APPLICATION OF NEW SCIENTIFIC DISCOVERIES

While much of its work toward the conquest of hunger is focused on applying known techniques to increasing food production, The Rockefeller Foundation also attempts to keep abreast of new scientific breakthroughs which might be significant for future developments. More importantly, it makes an effort to anticipate scientific developments of potential usefulness and to assist the most able researchers.

The Foundation has arranged working conferences of world scientists on such topics as in-



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Carl Hodges' experimental system of totally enclosed greenhouses linked to a desalinization plant, developed in the United States and Mexico, is now being used in Abu Dhabi, on the Arabian Gulf.

crease of protein content of cereal grains through plant breeding; the technological basis for rural and urban rodent control; prospects for creation of new man-made species of plants; status of research on African animal diseases; use of atomic and other power for desalting sea water for industrial and agricultural use in arid lands; utilization of new advances of cell culture in plant hybridization; and African rangeland and wild-life management.

Foundation grants are made to United States universities where scientists are engaged in fundamental research, both to support their work and to enable them to collaborate with other institutions working on similar questions. Particular attention is given to establishment of ties between United States institutions and the four international centers for joint attacks on specific problems.

Basic research has been supported in plant physiology, genetics, and other disciplines, which will enhance man's ability to develop—that is to engineer biologically—plant types or even new crop species that are efficient in converting light energy and nutrients to harvestable product, and that have good ecological adaptation and inherent resistance to diseases and insect pests.

Attention continues to focus on techniques to provide greater crop resistance to drought and to cold and frost. Effective control measures are being sought for internationally destructive animal diseases, such as East Coast fever and trypanosomiasis, which affect ruminant animals in Africa, and for plant diseases such as shootfly of sorghum, downy mildew of corn, and rice blight. New approaches are needed, from the standpoints of both economic food production and quality of the environment, to production and protection of crops without resort to the use of persistent, toxic chemicals.

Two grants made this year continue Foundation support to a cooperative project of the University of Arizona and the University of Sonora, Mexico, to develop a maximum-productivity, minimum-pollution, enclosed agricultural system, and to carry on research on techniques for determining maximum yield ceilings for major crops. The self-contained power-water-food production unit

developed by University of Arizona engineers, and first built and tested at Puerto Peñasco under University of Sonora auspices, was designed to provide the basic necessities for coastal desert communities. It uses diesel power to desalt sea water and pumps fresh water and carbon dioxide into enclosed plastic greenhouses, where food crops can be grown; the controlled-environment conditions in the greenhouses are especially well suited for experimentation in plant growth.

The University of Arizona, which has a similar plant at Tucson, is now planning to adapt this technology for use in inland areas, including urban centers. The scientists believe that instead of sea water, blowdown water from municipal power plants might be used, thereby reducing thermal pollution and decreasing loads on local sewage facilities. Further, in the process of recovering carbon dioxide from waste gases, other contaminants could be eliminated. Pesticides are seldom needed, because the crops are enclosed, and chemical fertilizer seepage is minimal.

IMPROVED NUTRITION

Protein malnutrition is one of the most complex aspects of the hunger problem. Even where people have enough to eat, young children die of malnutrition and related diseases because of a lack of well-balanced protein. The problem is complicated by food traditions that reserve protein-rich, prestige foods for high-status, adult members of the community, who need them least. Development of protein foods for preschool children and education in the fundamentals of nutrition are therefore of the greatest importance.

The Foundation has placed emphasis on development of new lines of cereals with improved levels of protein and balance of amino acids and on support of studies on the effect of protein deficiency on physical growth and mental development of children.

The studies on cereal grains have been productive in corn and promise to give results in rice and wheat. In the wake of Rockefeller Foundation support for these programs, significant funds are now being obtained from the National Institutes of Health, the U. S. Agency for International Development, and the United



Photograph Excised Here

Richard Hageman is developing, at the University of Illinois, techniques for the early identification of efficient metabolic systems in cereal plants, as a means of breeding higher-yielding varieties.

Nations Development Programme to sustain and enlarge the scope of these studies, for the most part at Foundation-sponsored centers.

Studies of malnutrition in children were supported by the Foundation this year at the University of Chile and the Ramathibodi Faculty of Medicine in Bangkok; studies of the effect of supplementation of the diet of women during pregnancy and lactation were supported at the Joint Commission on Rural Reconstruction, Taiwan. In addition, funds were made available for development of the Anemia and Malnutrition Center of the University of Chiang Mai in Thailand. The Foundation-supported programs in delivery of health care to rural communities, which are under way at the University of the Philippines and the Ramathibodi Faculty of Medicine in connection with the Foundation's University Development programs, are organizing mothers' classes that include instruction in nutrition.

An important potential source of low-cost protein, particularly in Southeast Asia, is pond-reared fish. Foundation-supported efforts in the field of marine biology have yielded very promising results in the past two years, particularly in Taiwan and Hawaii. Hybrid fish (*Tilapia*) have been developed which yield five to ten times as much per acre as the older breeds, and progress has been made in induction of spawning in mullet and rearing of larval fish. The Foundation has provided support for the development of experimental ponds and for research and training programs at the Taiwan Fisheries Research Institute and the Oceanic Institute in Hawaii. Training in marine biology and fishery management is offered at both centers.

SCHISTOSOMIASIS

This debilitating parasitic disease, which is endemic in rural areas of the tropics and subtropics, is under investigation by Foundation scientists on the island of St. Lucia. The disease is connected with lack of sanitary facilities and the presence of certain freshwater snails and is contracted from water infected with the parasitic worm. Three approaches to controlling it are possible: molluscaciding, mass chemotherapy, and improvement of sanitation. Foundation teams are

trying all three methods, singly and in combination. The effects will be tested periodically in three valleys on the island. The study is expected to point to means of controlling schistosomiasis in other areas of the world where it constitutes a public health problem and impedes agricultural development.

Research to backstop this field program has been supported at a number of university laboratories in the United States. This year a grant to the University of Waterloo, Ontario, supported studies aimed at identifying the factors responsible for the absence of the snail vectors on St. Vincent, an island close to St. Lucia.

TOWARD IMPROVED ECONOMIC POLICY

Most of the less-developed countries are predominantly agricultural; they have high growth rates of both population and labor force and a scarcity of capital. Unemployment is widespread and may be increasing. Problems of providing adequate food, jobs, housing, and health services are closely interrelated and are increasingly acute, as is that of absorbing a rapidly expanding labor force. It is increasingly urgent that each nation have a sound strategy for developing its agriculture. Further, the relative scarcity of capital for industrialization suggests adoption of policies concerning taxes, exchange rates, and prices that provide incentives to producers in the economy, particularly agricultural, to make use of labor-intensive, capital-saving production methods, for broadly based income expansion.

Relevant social science research is of vital importance to the process of continually increasing the productivity of the resources, both human and material, in the developing countries. The Foundation-sponsored agricultural research centers, as well as the University Development centers, are engaged in studies relating to local economic and developmental problems that can guide policy makers in these matters. Individual projects of outstanding merit also occasionally receive funds from the Foundation. A grant made this year to the University of Minnesota, for example, will enable Dr. Yujiro Hayami and Professor Vernon W. Ruttan to make a study of economic development and food demand.

GRANTS AND PROGRAMS APPROVED IN 1970

INTERNATIONAL

INTERNATIONAL RESEARCH INSTITUTES

International Rice Research Institute, Philippines		\$ 750,000
Staff on assignment	\$ 247,000	
Supporting grants	503,000	
International Maize and Wheat Improvement Center, Mexico		962,000
Staff on assignment	354,300	
Supporting grants	607,700	
International Center of Tropical Agriculture, Colombia		680,000
Staff on assignment	319,500	
Supporting grants	360,500	
International Institute of Tropical Agriculture, Nigeria		534,450
Staff on assignment	58,400	
Supporting grants	476,050	
Total		<u>\$2,926,450</u>

ROCKEFELLER FOUNDATION International Programs:

Special Cooperative Projects

Indian Agricultural Program		181,300
Staff on assignment	181,300	
Ecuador Project		27,400
Staff on assignment	19,700	
Project support	7,700	
Middle Eastern Wheat Program		58,310
Staff on assignment	58,310	
Institutional Leadership		94,200
Staff on assignment	89,400	
Project support	4,800	
Consultants and staff on special assignment		52,200
Postdoctoral internships		90,900
Schistosomiasis research and control project, St. Lucia		306,440
Staff on assignment	159,700	
Project support	146,740	
<i>Publications</i>		<u>71,650</u>
Total		<u>\$ 882,400</u>

ADDITIONAL EXPENSES of a conference on East African rangelands, held at the Villa Serbelloni Conference and Study Center in 1968; \$815;

PURCHASE of 100 copies of Christensen and Kaufman's book *Grain Storage: The Role of Fungi in Quality Loss*, to be distributed to libraries of research and educational institutions in developing nations; \$525;

BRAZIL

INSTITUTE OF BIOLOGY OF THE SECRETARIAT OF AGRICULTURE of the State of São Paulo; purchase of repair parts for temperature-control equipment for the greenhouse, for use under the direction of Dr. Karl M. Silberschmidt, Section of Plant Physiology; \$1,000;

CANADA

UNIVERSITY OF WATERLOO: for studies to be carried out under the direction of Professor A. D. Harrison on selected Caribbean islands, particularly St. Vincent, to document the absence of the snail vectors of schistosomiasis and fascioliasis and to determine the factor or factors responsible; \$137,240 through August, 1973;

CHILE

UNIVERSITY OF CHILE: research on protein malnutrition in infants and preschool children, under the direction of Dr. Fernando Mönckeberg; \$15,000;

COLOMBIA

COLOMBIAN INSTITUTE OF AGRICULTURE (ICA):

Field and laboratory equipment and chemical products for programs in the fields of entomology, plant physiology, legumes, plant pathology, sorghum and corn, soils, and fruit crops; \$37,190;

For the purchase of equipment, mainly for publications, needed to expand and improve the services of the National Center of Communications at the Tibaitatá Experiment Station; \$26,600;

Support for the second year of a project to collect, classify, and preserve potato germplasm indigenous to the Andean region; \$22,150;

Support of the graduate program in plant pathology; \$17,745;

To engage a library consultant and to allow an architect and librarian to review plans and operation of libraries in the United States and Mexico; \$10,250;

For the purchase of supplies and for contractual services and local travel for short-term consultants; \$10,000;

Transportation facilities for members of the staff; \$10,000;

Library supplies and equipment; \$8,500;

Field and laboratory apparatus to develop the research and service activities of the Agricultural Engineering Department at several ICA experiment stations; \$7,700;

Support of attendance at international meetings and short-term study for ICA staff members; \$7,660;

To enable two members of the library staff to attend a short course at the Inter-American Institute of Agricultural Sciences in Turrialba, Costa Rica; \$3,000;

To enable an animal disease specialist to spend six weeks in Colombia consulting and advising the ICA poultry program; \$2,750;

To enable a member of the library staff to attend a course in agricultural science at the Inter-American Institute of Agricultural Sciences in Turrialba, Costa Rica; \$1,260;

Additional support for David J. Lee as librarian, and purchase of missing issues of periodicals for the library from the United States Book Exchange in Washington, D. C.; \$1,271;

To enable a consultant to advise on the services of its Soil Testing Laboratory; \$750;

COLOMBIAN INSTITUTE OF FAMILY WELFARE: toward the costs of a study of the value of opaque-2 corn as a protein source in human nutrition; \$8,000;

INTERNATIONAL CENTER OF TROPICAL AGRICULTURE (CIAT): see *International, above*;

Construction of its station operations building and installation of its telephone system; \$227,222;

Construction of special field facilities at its headquarters; \$202,525;

For the purchase of vehicles for its headquarters facilities; \$80,000;

For the purchase of equipment for its headquarters facilities; \$75,000;

Equipment for the animal health research and training laboratory at Turipana; \$65,000;

For the purchase of equipment for the Turipana station; \$40,000;

For the purchase of equipment for the Veterinary Medicine Laboratory at Turipana; \$39,000;

For the purchase of library materials for its headquarters facilities; \$30,000;

For the purchase of equipment for the ICA feed-mixing and crop-processing plant at Palmira; \$17,500;

NATIONAL UNIVERSITY OF COLOMBIA: for use by its Faculty of Agronomy at Palmira for the purchase of equipment for the Department of Irrigation and Drainage; \$30,000 for a two-year period;

COSTA RICA

INTER-AMERICAN INSTITUTE OF AGRICULTURAL SCIENCES: toward the costs of improving and extending the services of the permanent secretariat of the Inter-American Association of Agricultural Librarians and Documentalists; \$18,000;

ECUADOR

NATIONAL AGRICULTURAL RESEARCH INSTITUTE: toward the development of experiment stations, and strengthening of research and training programs in crop and animal improvement; \$94,500;

ROCKEFELLER FOUNDATION International Program in Agricultural Sciences: Ecuadorian Cooperative Project; *see International, above*;

ETHIOPIA

HAILE SELASSIE I UNIVERSITY: toward the costs of providing a malacologist, technical assistance, and supplies to the schistosomiasis research program in the Institute of Pathobiology; \$14,000;

INDIA

ROCKEFELLER FOUNDATION International Program in Agricultural Sciences: Indian Program; *see International, above*;

Administrative and operating costs of the Indian Agricultural Program and support of projects at the Indian Agricultural Research Institute and in maize, rice, wheat, and sorghum improvement; \$350,600;

Purchase by the Foundation's Indian Agricultural Program of equipment and supplies to establish the Pesticides Residues Laboratory at the Indian Agricultural Research Institute, New Delhi; \$60,000;

JAMAICA

UNIVERSITY OF THE WEST INDIES: to enable Peter Dalton, Research and Control Department, St. Lucia, to continue his studies of water usage and exposure of population to schistosomiasis, and to complete requirements for his Ph.D. degree; \$7,500;

KENYA

EAST AFRICAN AGRICULTURE AND FORESTRY RESEARCH ORGANIZATION: toward the costs of a program for improvement of the yield, grain quality, and protein value of the sorghum crop; \$120,000;

EAST AFRICAN COMMUNITY: for use by the East African Agriculture and Forestry Research Organization for an expanded information resources and services program; 84,537 East African shillings (about \$12,100);

MEXICO

INTERNATIONAL MAIZE AND WHEAT IMPROVEMENT CENTER (CIMMYT): *see International, above*;

Construction of offices, laboratories, dormitories, apartments, and greenhouse facilities at its headquarters site; \$1,295,115;

Installation of utilities; \$286,371;

For the development of, and equipment for, its experiment stations at Poza Rica, Tlaltizapan, and Toluca; \$251,000;

Furniture purchase and shipping for its headquarters; \$186,471;

Site preparation and building plans for its headquarters facilities; \$185,865;

Toward the cost of construction of a seed storage and processing building at its headquarters site; \$183,455;

For construction costs at its experiment stations at Poza Rica, Tlaltizapan, and Toluca; \$180,000;

Toward the installation of general services for its headquarters facilities; \$100,000;

For the purchase of 38 hectares of land in the Valley of Toluca to be used in connection with the international wheat and potato work; \$96,000;

Support of a program for the promotion of increased production of maize in an area of high population density in the state of Puebla; \$89,110;

Toward costs of an accelerated potato production program in West Pakistan and an in-service training program in Mexico; \$55,945;

Water supply and irrigation system for its headquarters facilities; \$37,800;

Toward costs of two conferences on the Puebla Project; \$24,600;

Operating costs of the Protein Quality Laboratory; \$20,500;

Research project on daylength insensitivity in wheat; \$15,000;

Toward the costs of technical cooperation in the wheat improvement program for the Near East and North Africa; \$15,000;

Toward the expenses of meetings of the Wheat and Maize Germplasm Resources Committees; \$13,800;

Toward the cost of an investigation of plant factors contributing to efficient grain production in maize; \$10,000;

To enable two Middle Eastern agricultural scientists to undertake a training program in wheat breeding at CIMMYT; \$9,000;

Toward costs of completing bibliographies on corn and wheat; \$8,500;

Compilation of a list of Latin American agricultural science journals; \$6,500;

For use by the experiment station at Toluca, in cooperation with the International Potato Program; \$5,000;

To enable Dr. Gonzalo Granados to work in Thailand on maize insect problems; \$2,160;

LATIN AMERICAN ASSOCIATION OF HIGHER AGRICULTURAL EDUCATION: in support of the Fourth Latin American Conference on Higher Agricultural Education, held in San José, Costa Rica; \$7,500;

NATIONAL SCHOOL OF AGRICULTURE:

For use by the Graduate School toward its general operating costs; \$70,000;

University of Wisconsin; to enable Dr. Richard D. Powers to continue his assignment in the Department of Agricultural Communications at the Graduate School of the National School of Agriculture; \$25,000;

UNIVERSITY OF SONORA: in support of research on maximum-productivity, minimum-pollution, enclosed agricultural systems and on techniques for determining maximum crop yields, to be conducted in cooperation with the University of Arizona; \$179,500 through September, 1974;

NIGERIA

INTERNATIONAL INSTITUTE OF TROPICAL AGRICULTURE (IITA): *see International, above;*

PERU

AGRARIAN UNIVERSITY: toward the costs of a program of research and teaching in agricultural economics and rural sociology, to be conducted in cooperation with North Carolina State University; \$90,000 through June, 1973;

PHILIPPINES

INTERNATIONAL RICE RESEARCH INSTITUTE (IRRI): *see International, above*;

Toward the development of a joint Ph.D. training program with the Indian Agricultural Research Institute, New Delhi; \$15,000;

ST. LUCIA

ROCKEFELLER FOUNDATION cooperative projects in schistosomiasis research and control; *see International, above*;

UNIVERSITY OF VALLE, Colombia: to enable Jorge A. Saravia, Division of Engineering, to provide technical assistance in the design and construction of small water systems to the Research and Control Department, St. Lucia; \$7,060;

TAIWAN (NATIONAL REPUBLIC OF CHINA)

JOINT COMMISSION ON RURAL RECONSTRUCTION:

Development by the Taiwan Fisheries Research Institute of a research program in fish-pond ecology and management; \$75,000;

Study of the effect of protein supplementation of the diet of chronically undernourished women during pregnancy and lactation; \$25,000;

For a continuation of the study of downy mildew of corn by members of the Corn Research Center; \$5,500;

THAILAND

MAHIDOL UNIVERSITY: applied nutrition research program in the Department of Biochemistry, Faculty of Science; \$12,000;

ROCKEFELLER FOUNDATION International Program in Nutritional Sciences: study of nutritional status and mental development in Thai children, to be conducted at the Ramathibodi Faculty of Medicine, Bangkok; \$6,000;

TURKEY

ROCKEFELLER FOUNDATION International Program in Agricultural Sciences: Middle Eastern Wheat Program; *see International, above*;

Toward costs of initiating and developing a regional program of wheat improvement in the Near East and North Africa; \$25,000;

Salaries, equipment and supplies, and other operating expenses of the program; \$24,600;

UGANDA

MAKERERE UNIVERSITY: toward a conference of deans of university faculties of agriculture in English-speaking sub-Saharan Africa; \$13,000;

UNITED STATES

AGRIBUSINESS COUNCIL, New York: toward its operating expenses; \$25,000;

AGRICULTURAL RESEARCH SERVICE OF THE UNITED STATES DEPARTMENT OF AGRICULTURE, Washington, D.C.: in support of a pulse seed increase program; \$15,000;

COLUMBIA UNIVERSITY, New York: for the use of the Lamont-Doherty Geological Observatory in conducting the artificial upwelling project on St. Croix and in the Pacific; \$25,000;

CORNELL UNIVERSITY, New York:

For use by the Department of Plant Breeding and Biometry of the New York State College of Agriculture in support of a research project on cold tolerance in maize; \$14,000;

Toward the cost of an investigation of a diffusible substance in certain species of snails which serves as a stimulant to miracidia of schistosomes, under the direction of Drs. Thomas Eisner and Jerrold Meinwald, Division of Biological Sciences; \$10,000;

HARVARD UNIVERSITY, Massachusetts: for use by its Graduate School of Business Administration toward the costs of its International Agribusiness Coordination Project; \$6,000;

ILLINOIS STATE UNIVERSITY: toward the cost of studies of *Ribeiroia marini* as a possible biological control agent in snails infected with *Schistosoma mansoni*, under the direction of Dr. Harry W. Huizinga, assistant professor of parasitology; \$6,000;

INSTITUTE OF FOOD TECHNOLOGISTS, Washington, D.C.: toward expenses of the Third International Congress of Food Science and Technology; \$25,000;

INSTITUTE OF INTERNATIONAL EDUCATION, New York: toward support of a study of graduate agricultural education in Latin America, sponsored by the Council on Higher Education in the American Republics; \$20,900;

IOWA STATE UNIVERSITY: for use by the Department of Agronomy toward support of a research project on intergeneric plant crosses involving maize and sorghum; \$15,000;

JOHNS HOPKINS UNIVERSITY, Maryland: toward the cost of research on chemotherapy of experimental schistosomiasis, to be conducted by Dr. Ernest Bueding, professor of pathobiology, School of Hygiene and Public Health; \$15,000;

NATIONAL ACADEMY OF SCIENCES, Washington, D.C.: for use by its Agricultural Board toward the identification and exploration of agriculture-related problems important to human welfare; \$28,270 for a two-year period;

OCEANIC FOUNDATION, Hawaii:

Toward the costs of the fish biochemistry program of its Oceanic Institute; \$50,000;

For the research program of its Brackish-Water Fish Culture Laboratory; \$50,000;

OREGON STATE UNIVERSITY: to enable it to participate in a cooperative program of research and training in wheat improvement for the Near East and North Africa; \$289,000 for a three-year period;

ROCKEFELLER UNIVERSITY, New York: toward the costs of research in the use of an immuno-electroadsorption method in the diagnosis of *Schistosoma mansoni* in man, under the direction of Professor Alexandre Rothen; \$9,300;

SAINT LOUIS UNIVERSITY, Missouri: for construction of the Anemia and Malnutrition Research Center, University of Chiang Mai, Thailand; \$31,500;

SMITHSONIAN INSTITUTION, Washington, D.C.: toward costs of studies in the oceanography of Indonesian waters; \$12,000;

UNIVERSITY OF ARIZONA: in support of research on maximum-productivity, minimum-pollution, enclosed agricultural systems and on techniques for determining maximum crop yields, to be conducted in cooperation with the University of Sonora, Mexico; \$454,300 through September, 1974;

UNIVERSITY OF CALIFORNIA:

Davis

To enable Dr. Charles M. Rick to collect and evaluate native germplasm and to study the ecology of the tomato species; \$5,775;

Riverside

For use by the Department of Soils and Plant Nutrition in a project on the study of soil environmental conditions in wheat production; \$12,500;

UNIVERSITY OF HAWAII:

For use by the College of Tropical Agriculture for the continuation of studies on bacterial blight of rice; \$14,000;

For use by its College of Tropical Agriculture and the Institute for Technical Interchange, East-West Center, in support of the Second International Symposium for Tropical Root and Tuber Crops; \$8,000;

UNIVERSITY OF ILLINOIS:

To enable Dr. R. H. Hageman to lead a project on biochemical criteria as a guide to breeding cereal crops; \$25,000;

For use by the Crop Evolution Laboratory of the Department of Agronomy for partial support of a long-range project to collect and maintain sorghum germplasm; \$12,000;

UNIVERSITY OF MINNESOTA:

For use by the Department of Agronomy and Plant Genetics to expand and accelerate its research in crop physiology of small grains; \$25,000;

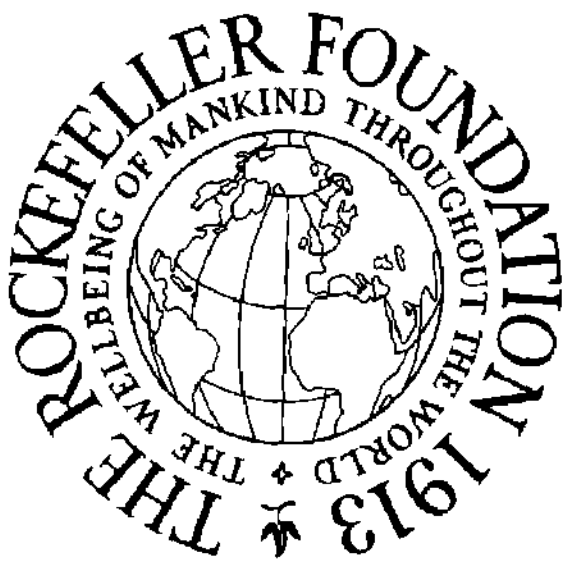
For use by its Department of Agricultural Economics toward the costs of research, to be directed by Dr. Yujiro Hayami and Professor Vernon W. Ruttan, on economic development and food demand; \$7,500;

UNIVERSITY OF NORTH CAROLINA, Chapel Hill: for expenses of an International Conference on Rodent Control Research held at the Villa Serbelloni Conference and Study Center; \$12,750;

UNIVERSITY OF WASHINGTON: for use by its College of Fisheries for the further development of a program for the training of staff members from the School of Fisheries of the Catholic University of Valparaíso, Chile; \$5,000;

UNIVERSITY OF WISCONSIN, Madison: in support of research on "Microeconomic Decisions and the Long-Run Development of Agriculture" directed by Professor Richard H. Day, Department of Economics; \$4,800;

VANDERBILT UNIVERSITY, Tennessee: for costs of a study of the metabolism of Vitamin E; \$3,000.



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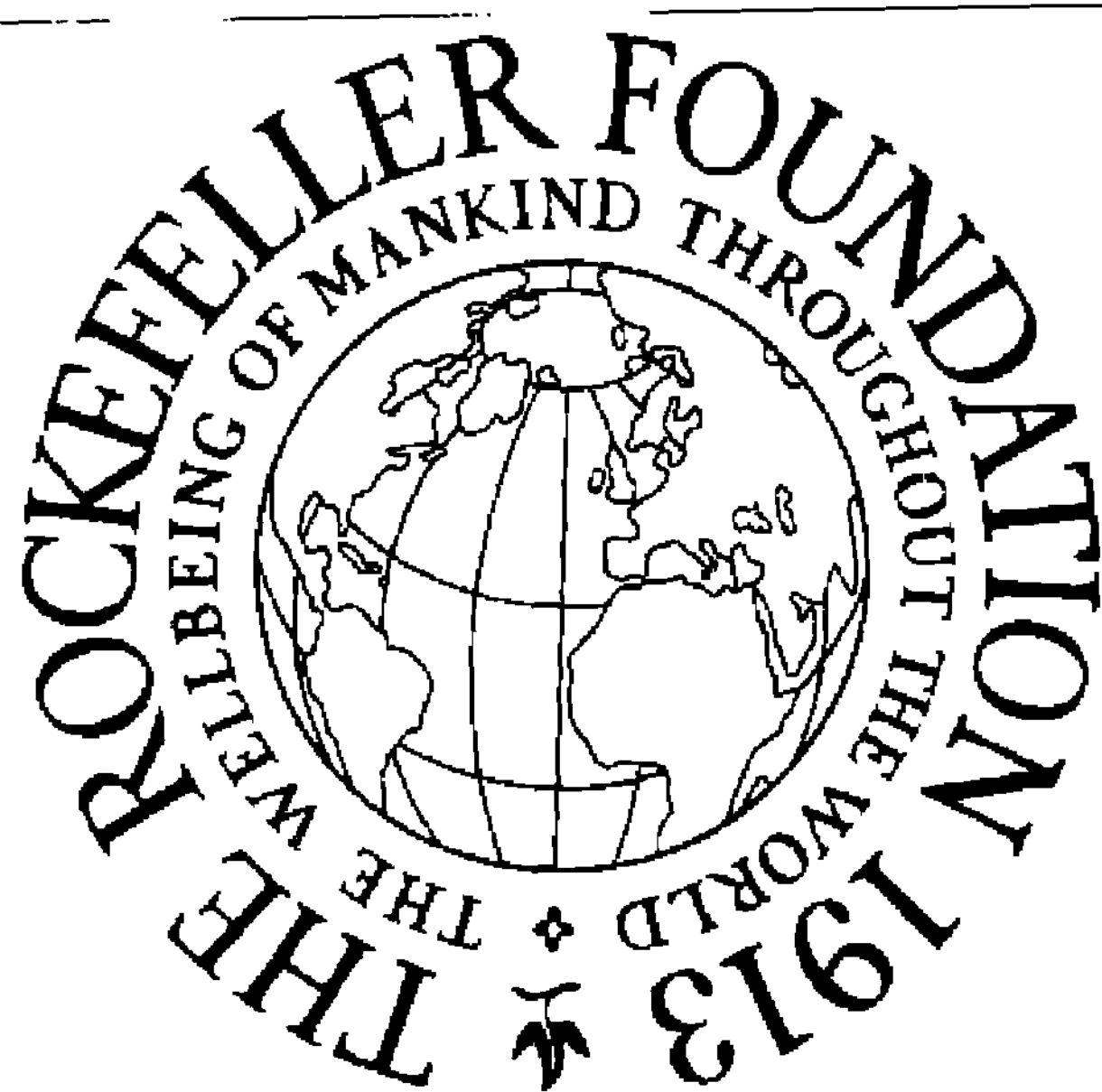


In Nigeria, a new international agricultural center is gearing itself to regional development.

Work-in-Progress

THE INTERNATIONAL INSTITUTE OF TROPICAL AGRICULTURE

In April of this year, the Ford and Rockefeller Foundations participated in the dedication of the International Institute of Tropical Agriculture in Ibadan, Nigeria. Maj. Gen. Yakubu Gowon (left), Nigerian Head of State, dedicated the Institute; chairing the ceremonies was the late Dr. Will M. Myers (standing with Maj. Gen. Gowon), one of IITA's chief developers and at the time chairman of its board of trustees. Like the other international institutes, IITA will function as an independent research and training center devoted to raising yields of major food crops in underproducing areas. It will focus on the humid tropics, which today are the last great reserve of land that, given new knowledge and materials, might be turned into an important source of food crops and animals. Construction on buildings and campus is proceeding on schedule; above, right, is the engineering services building. On the 2,400-acre site made available by the Nigerian Gov-

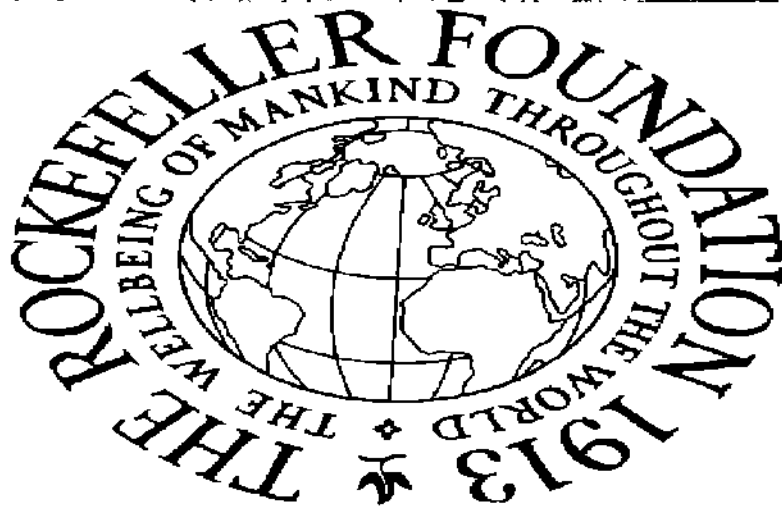


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ernment, IITA has developed its own water and power sources. Experimental plots are being laid out, and some have already been put to use. The first trial plantings of corn produced yields estimated to be among the highest on record in West Africa—some 2.6 tons per acre. (An average farm in Iowa yields about 2 tons.) Twenty senior staff members are already in residence: Above, center, inspecting seedlings, are Dr. Royse Murphy, visiting scientist in plant breeding, and Dr. H. Arthur Lamey, plant pathologist. Full operation of the Institute, slated for 1972-73, calls for more than 30 senior scientists and a total supporting staff of about 400. Operating costs for the Institute are being shared equally by the Ford and Rockefeller Foundations, the U. S. Agency for International Development, and the Canadian International Development Agency. Capital costs are being met in the main by the Ford Foundation.



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Work-in-Progress

THE INDIAN AGRICULTURAL PROGRAM

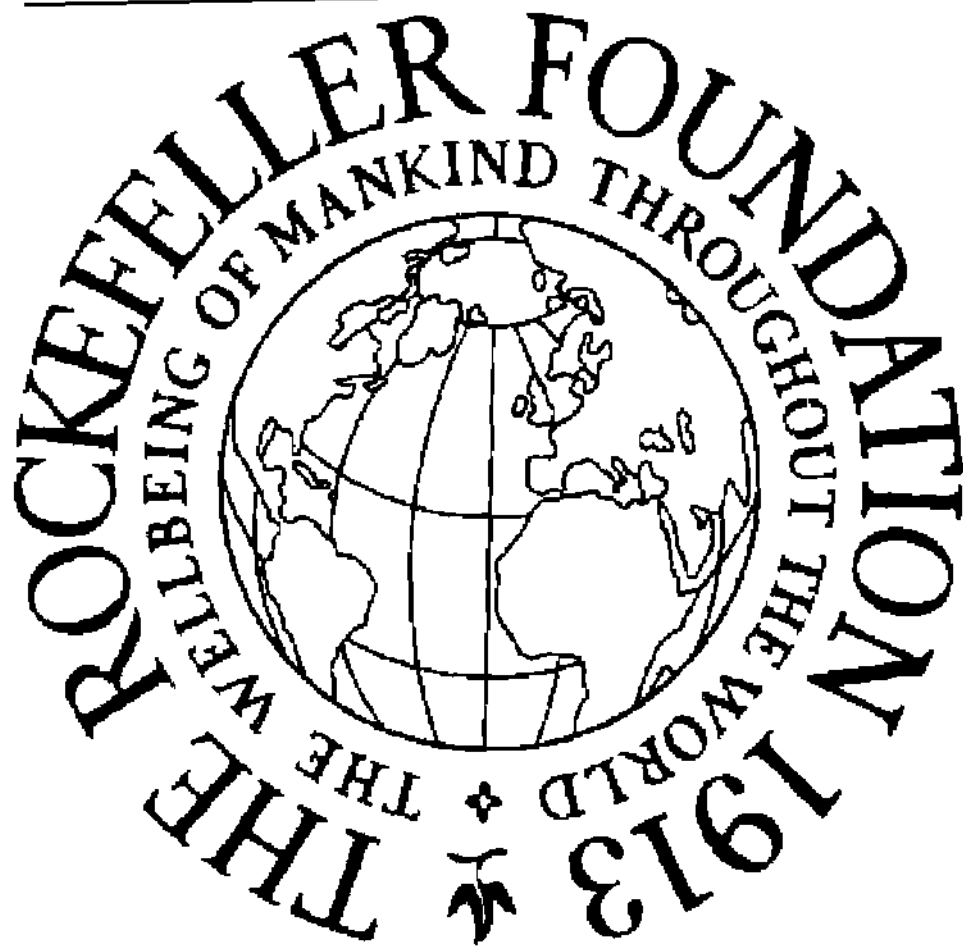
Five years ago India faced enormous uncertainties in food production; today India produces unprecedented levels of the major cereal grains. Since 1954 The Rockefeller Foundation has been close to the center of crop improvement work in India. That year Foundation scientists were invited to look over the possibilities for raising production levels of corn, and their proposals led to the establishment in 1957 of a long-term cooperative program in agriculture. First corn, then wheat, sorghum, and the millets came under scrutiny; a rice program followed in 1966. For each of these grains an all-India coordinated crop improvement scheme was organized, with a Foundation scientist serving as joint coordinator, and other field staff members working with Indian colleagues on key problems. Geneticists evaluated the grain varieties that were being grown by farmers and brought in promising breeding materials from other countries, notably wheat from Mexico and



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Indian and Rockefeller Foundation scientists have spearheaded substantial gains in wheat, rice, corn, and sorghum production within national programs.

rice from the Philippines. Research at widely scattered experimental stations developed new strains for India's different climates, seasons, and growing conditions—a mammoth undertaking for even one crop. Agronomists worked out optimal planting, fertilizing, irrigating, and other farming practices for the recommended varieties; plant pathologists and entomologists concentrated on disease and pest control. And, in a daring move in the mid-sixties, the Government made the crucial decision to promote the new high-yielding varieties in all-out production programs in the areas of highest opportunity. Teaching and research to the doctoral level were developed at the Indian Agricultural Research Institute, and ten new state agricultural universities were founded. Indian political leaders know that there is still much to be done, but vigorous agricultural development is an essential first step toward overall social and economic progress.



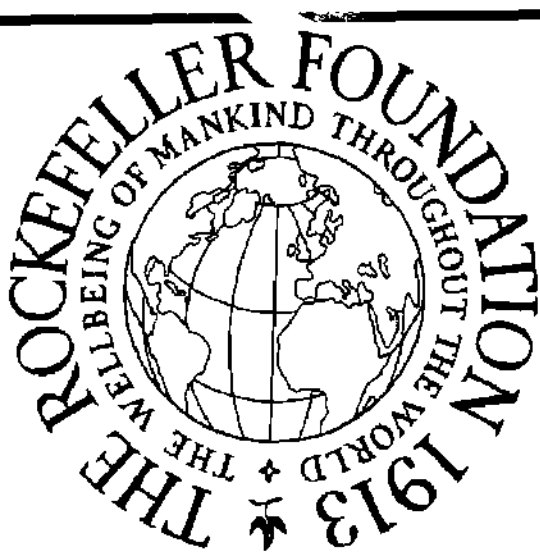
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For El Salvador's small farmers, agricultural cooperatives organized by Father José Romeo Maeda (near right) are the means for a better life on the land.

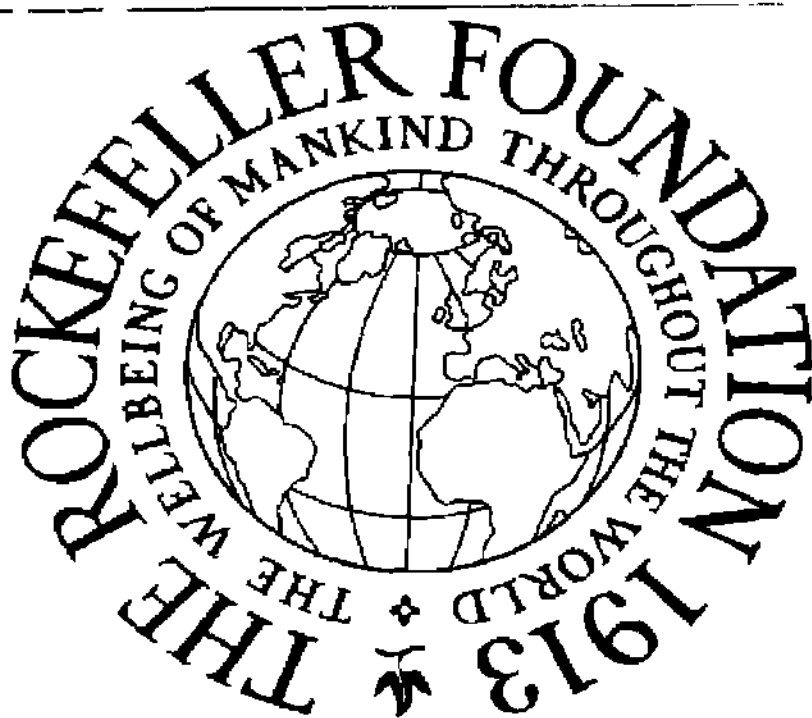
Work-in-Progress

EL SALVADOR'S SMALL FARMERS ORGANIZE

El Salvador (see map) is a country of mostly hills and mountains. Good farming land, planted to cotton, coffee, sugar cane, and other plantation crops and owned by a very few families, is limited to the coastal strip. The majority of El Salvador's entire population are subsistence farmers, pushed onto hills so steep that land has had to be cultivated by hand. Most of these farmers own three to six acres, thinly planted to corn, that often do not yield enough for the family to feed itself. Yet it need not be so. In El Salvador a determined priest, Father José Romeo Maeda (above, with shoat) has shown that even the poorer land can support a life worth living. In 1956 Father Maeda organized, with 50 families, El Salvador's first farmers' cooperative. The members scraped together \$280 to buy fertilizer, and Father Maeda obtained high-yielding seed corn from J. M. Argueta, El Salvador's chief corn breeder, who maintains close and friendly relationships with CIMMYT in Mexico. Argueta, a self-taught breeder, had developed high-yielding varieties, but had no way of getting them to farmers. Father Maeda had the farmers,



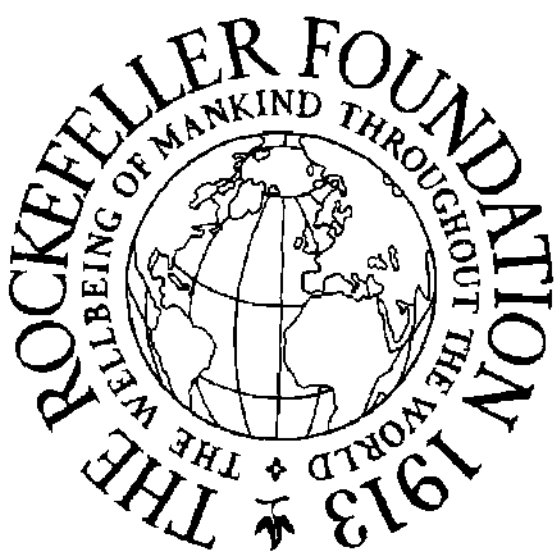
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but nothing to offer them. Together they traveled the country telling farmers about new varieties, how to obtain and manage them, and how to form cooperatives to pool the all-important credit. "You must help yourselves," Father Maeda told his usually skeptical audiences. "No one is going to do it for you." Deliberately, he made converts, not by words but by showing farmers fields two and three times as productive as their own, obtained by neighbors joined in a cooperative. Today Father Maeda's experiment has grown into a federation of 64 cooperatives with many more applications each year than can be accepted. More than 10,000 farmers avail themselves of a quarter-million-dollar credit fund. They are not only doubling and trebling their corn yield but learning ways of growing beans, rice, sorghum, and citrus fruit. The federation itself is branching out into animal husbandry, a seed farm, and, importantly, into an organized training program. All this has been achieved by farmers considered too hopeless for commercial credit or official attention, on land too poor for anyone else to covet.



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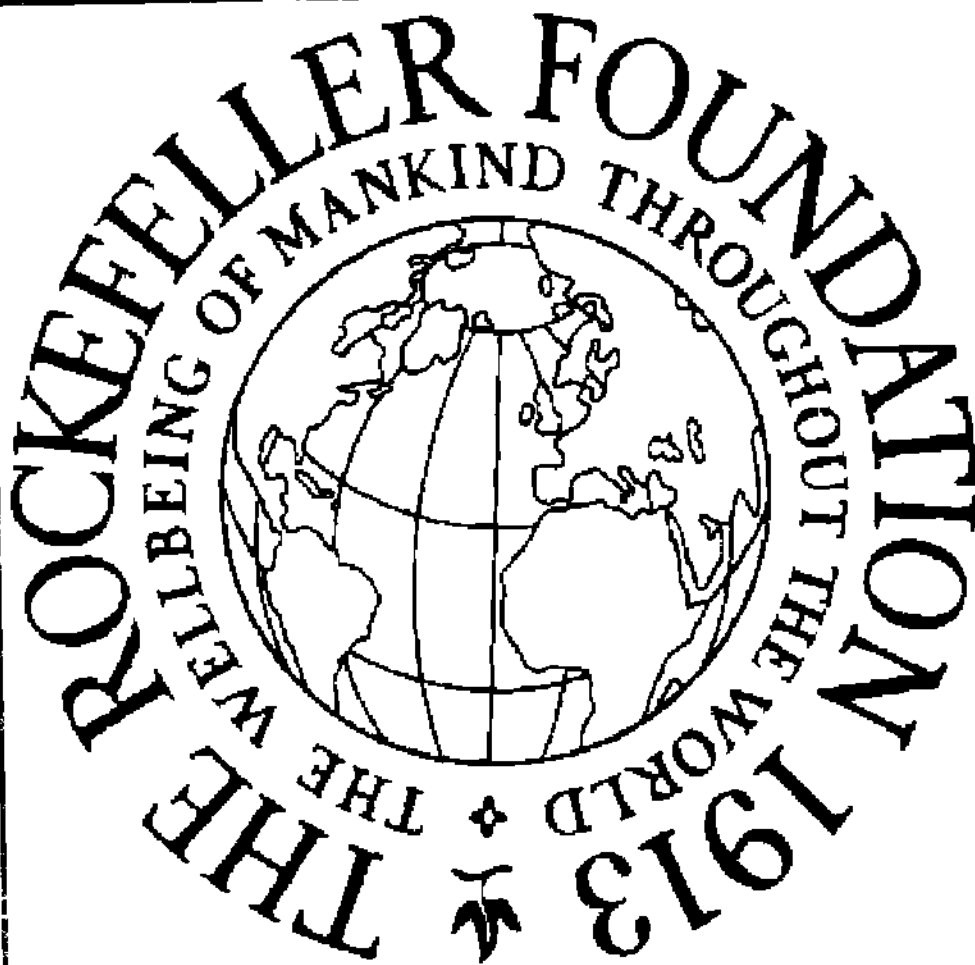


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Work-in-Progress

THE COLOMBIAN INSTITUTE OF AGRICULTURE

Colombia, like most of Latin America, produces less food than it needs. With one of the fastest-growing populations in the world, Colombia urgently needed a boost from modern technology—better crop varieties and superior livestock breeds, more trained agricultural scientists, and an efficient mechanism for channeling seeds, fertilizers, and basic know-how to the farmers. This was the job assigned to the Colombian Institute of Agriculture (ICA) in 1962, when it was created as an independent agency, linked to the Ministry of Agriculture, to launch a coordinated national effort of research, education, and extension. ICA's establishment followed 12 years of cooperative work in agriculture between The Rockefeller Foundation and the Office of Special Research, an autonomous unit created as a base for the program. Corn and wheat improvement, launched in 1950 under the direction of Foundation scientists, was followed by research on other food crops—beans, rice, potatoes, barley, root crops—as well as on forage crops for livestock improvement. Under ICA's auspices, these research programs were gradually taken over by Co-



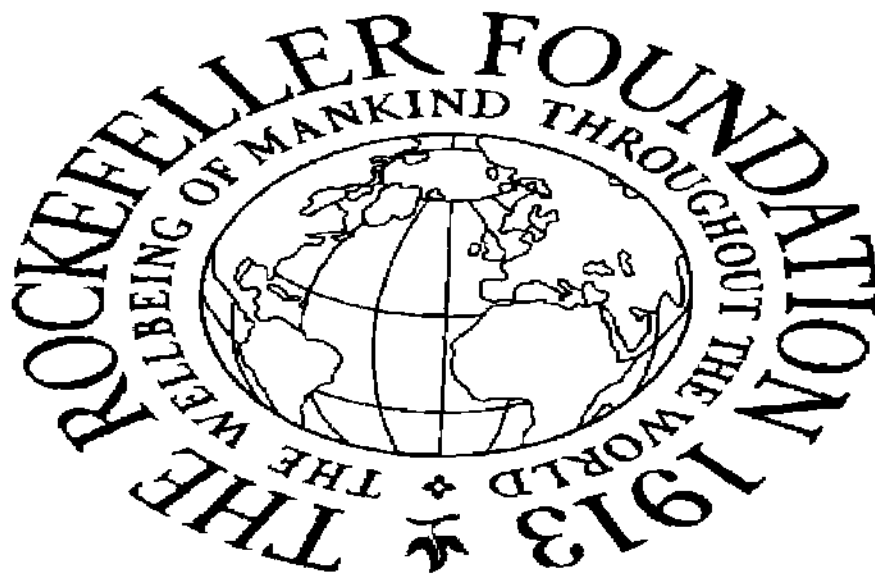
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In Colombia, a national, autonomous research, training, and extension organization contributes to progress in food-crop and animal production.

Colombian scientists, many of whom had studied in the United States on Foundation scholarships. A modern experiment station, Tibaitatá, was built near Bogotá, and several regional stations and substations were developed in strategic ecological zones around the country. ICA's creation meant a radical change for agricultural education. A graduate school was founded at Tibaitatá, and training in the agricultural sciences and veterinary medicine was reorganized as a cooperative project with the National University. This collaboration was something of an organizational triumph, involving joint professorships, joint nomination of deans, and joint coordinating and consulting committees. Teaching, centered in the University, was buttressed by practical research at ICA stations, and both fed into the national extension service. The Foundation has all but phased out its cooperative research program with ICA, although it still provides substantial financial support. With strong backing from the Colombian Government and with funds from U. S. private and public organizations, ICA is taking on growing development responsibilities.



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Work-in-Progress

HIGH-LYSINE CORN

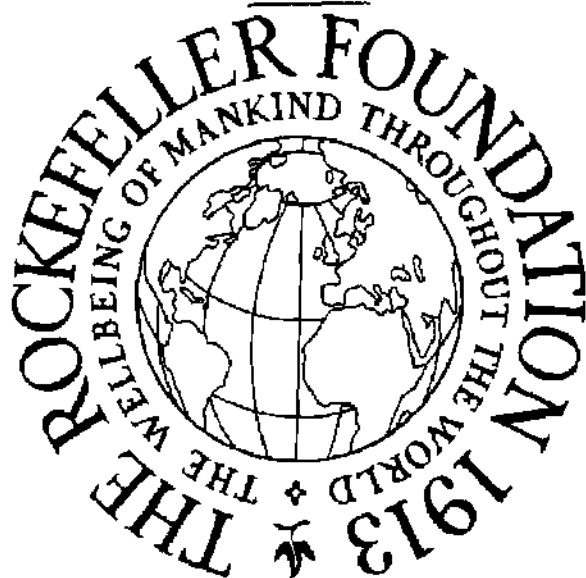
High-lysine corn is now fulfilling the promise that first stirred excitement in 1964, when research at Purdue University demonstrated that a mutant gene called opaque-2 alters the protein make-up of corn kernels, making them roughly equivalent in nutritive value to milk solids. Nutritionists who had been grappling with protein malnutrition problems in developing countries saw in this discovery a short-cut past the dietary traditions that often blocked their efforts: corn-eating people could go right on eating corn; the protein quality they needed would be bred into it in the cornfield. Scientists at CIMMYT and CIAT (above), both supported by the Ford and Rockefeller Foundations and U. S. AID, as well as at other centers, are working to incorporate the opaque-2 gene—plus another protein-regulating mutant called floury-2—into hybrids with other desirable traits such as high-yielding ability, disease and pest resistance, good color and sturdy appearance, and the cooking and milling qualities people are used to. Feeding trials with ani-



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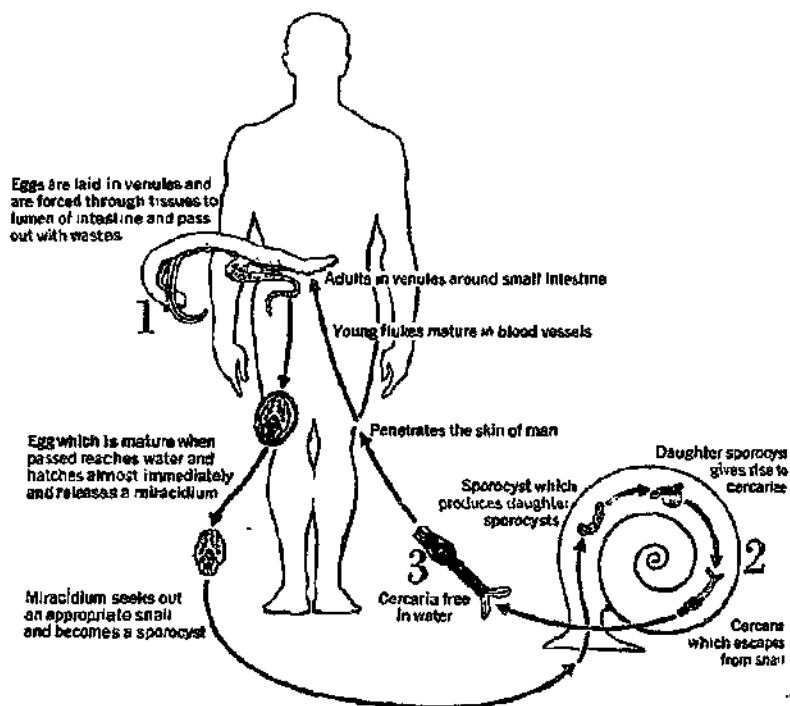
This little girl was dying of malnutrition; a new protein-rich corn, on which Latin American scientists did extensive research and field work, led to her full recovery.

mals have given spectacular results. First rats, then swine and poultry, broke growth records for corn-diet trials. A crop of opaque-2 corn was harvested in Colombia in January, 1967, and later that year a doctor in Cali (far left) announced the cure of a six-year-old boy suffering from protein starvation (kwashiorkor) through a treatment using this corn as the protein source. A national campaign to promote use of the protein-rich corn has been launched. To speed research on high-lysine corn and to encourage its use in protein-deficient areas of the world, the United Nations Development Programme is now financing a three-year research, training, and extension project at CIMMYT, at a cost of over \$1.6 million. Agronomists from corn-growing countries are being taught how to set up and run national production programs, and CIMMYT's network of cooperating organizations in these areas are being enlisted in local research and extension work. Pilot projects are being set up in Latin American countries.



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Schistosoma Life Cycle



On the Caribbean island of St. Lucia, scientists are seeking ways to control schistosomiasis, a water-borne disease that permanently damages the liver and other vital organs.

Work-in-Progress

THE UNCONQUERED PLAGUE

Over 200 million people in rural areas of the tropics suffer from the chronic, disabling disease called schistosomiasis. Caused by water-borne parasitic worms, or schistosomes, which destroy the tissues of bladder, intestinal tract, kidneys, lungs, liver, and other organs, schistosomiasis slowly cripples its victims; and—since infection is almost unavoidable where the common water supply is infested—it can sap the productive energies of entire populations and seriously retard agricultural development. Schistosomiasis is a poor man's disease, linked to the lack of sanitary facilities and the absence of a clean water supply. In rural areas, eggs of the parasite are carried by human wastes into irrigation ditches, rivers, or ponds. There the flukes mature in the bodies of freshwater snails before being discharged again into the water to seek an animal or human host. The parasites enter the human body through the skin; simply wading in a stream can invite infection. Three approaches to controlling schistosomiasis are thus feasible: curing a large enough number of human victims to prevent reinfestation of communal waters; providing rural communities with pure water and teaching people to stay out of polluted ponds and streams (coastal beach resorts are not affected); and ridding the water courses of the host snails.



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Since 1966, Foundation researchers, in cooperation with the island's Government, have been laying the groundwork for an all-out effort, aimed not only at bringing schistosomiasis under control on St. Lucia, but at designing measures that can be realistically applied in other developing countries. Teams of scientists, including an anthropologist, and technicians have been collecting base-line data through public health surveys, observation of working and living patterns, studies of water sources and community water use, investigation of the vector snails, and related research. Two well-coordinated programs are now in operation in the valleys chosen as research sites: in Riche Fond Valley, sanitary engineers have brought to villagers clean drinking water, shower and laundry facilities, and a children's swimming pool; and in Cul-de-Sac Valley, biological teams are working to rid streams and swamps of snails, using a newly developed chemical compound. Meanwhile further testing of the most promising drugs is taking place before mass treatment of schistosomiasis victims is undertaken. Data gathered in this campaign will be analyzed for use in the design of strategies that may eventually lead toward the control of a disease that inhibits the social and economic development of many parts of the world.

PROBLEMS OF POPULATION

Mounting population pressures are at the root of many of the world problems that will stand out in high relief during the 1970's. In the developing nations, population growth threatens to absorb much of the benefit of economic progress; hard-pressed governments may find themselves on a treadmill of trying to keep pace with multiplying human needs, with prospects of raising living standards becoming more and more remote. In our own country, population growth is becoming a direct threat to the quality of life. It contributes to the deterioration of our environment, the depletion of natural resources, breakdowns in essential services, and the rapid disappearance of many of the amenities of life. The need to slow down growth rates is now generally acknowledged, but in spite of very substantial progress in the population field throughout the world in the last ten years, the net effect in terms of reduction of birth rates has been disappointing. In calling for intensified efforts in every aspect of population work, experts in the field are placing renewed emphasis on the need to develop more efficient contraceptive technology. Also emerging as crucial is the search for an overview relating population questions to economic, social, and environmental problems. The Foundation has made recent grants in both these areas, while continuing to support research, training, and action programs in family planning both at home and abroad.

RESEARCH IN REPRODUCTIVE BIOLOGY

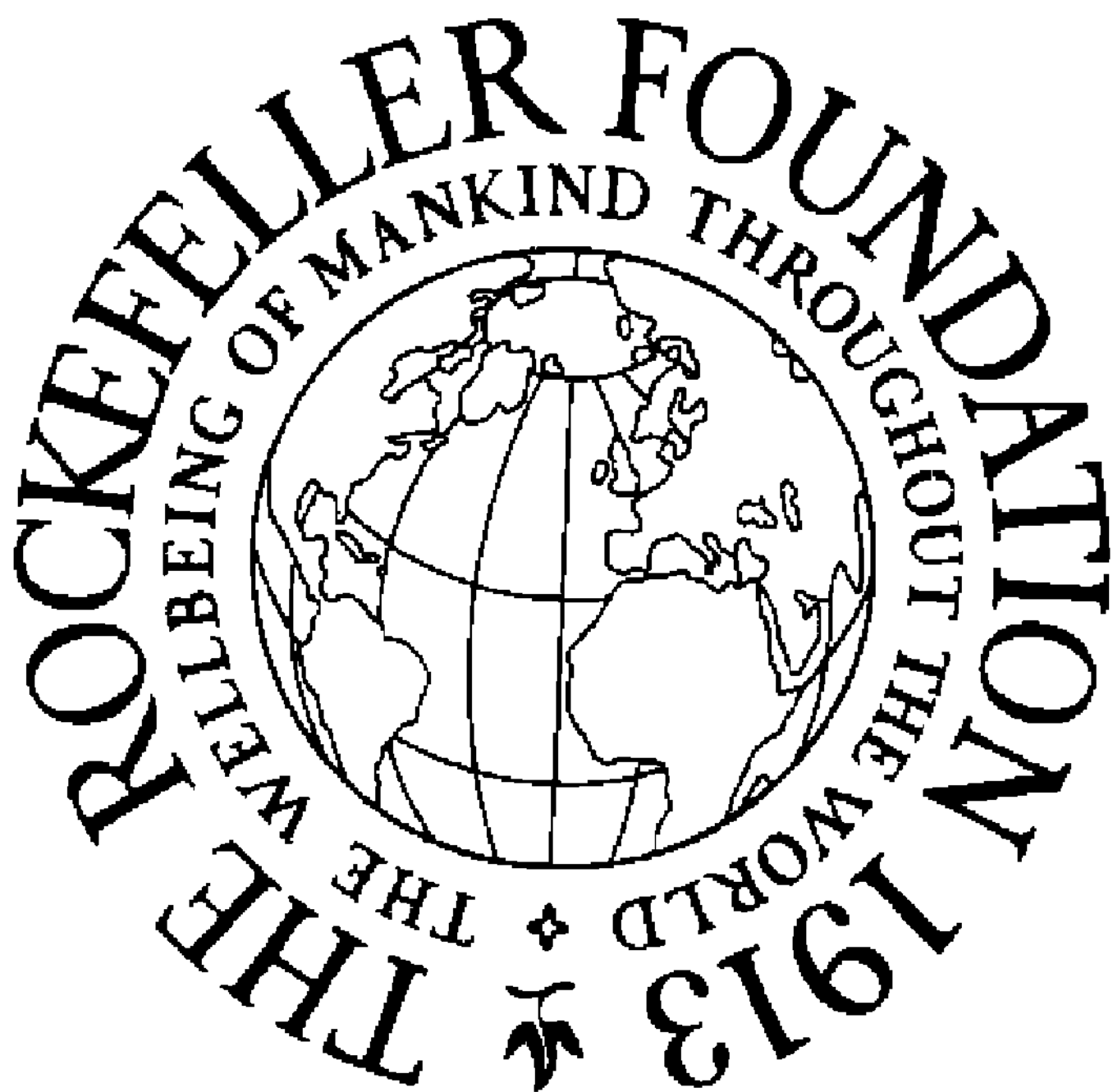
The high hopes held for the steroid pill and the plastic intrauterine device when they first came into widespread use in the 1960's have not been entirely fulfilled. Their usefulness has been impaired by medical drawbacks as well as by complications in acceptance, and both are relatively difficult to administer on a mass scale. In spite of the very real value of these methods and the success that has been achieved with them in some localities, population experts now believe that real progress in lowering birth rates depends on the development of better contraceptive technology. They call for an intensive all-out research effort, starting with a return to basic reproductive biology.

The pill was the culmination of a long period of research in endocrinology and synthetic steroid organic chemistry. The solution to problems associated with these fields coincided with an upsurge of interest in molecular biology. The result has been a relative neglect of reproductive biology, the failure to open new avenues of investigation, and some degree of isolation of this discipline from modern scientific thought and techniques. The extent of the neglect can be gauged by a look at research budgets: authorities in the field estimate that about \$30 million a year, exclusive of amounts spent by drug companies, is invested in research in reproductive biology and contraceptive technology in the developed countries; the need is calculated to be close to \$150 million.

The Foundation is approaching the need to stimulate research in several ways; one is to support new groups working in the field. Major grants were made this year to the University of California at San Diego for its new Division of Reproductive Biology and to Columbia University for studies in the Department of Human Genetics and Development; last year similar grants went to the Salk Institute for Biological Studies in San Diego, and to the University of North Carolina, Chapel Hill, to launch major research programs in reproductive biology. Harvard University received support last year for expansion of its new Laboratory of Human Reproduction and Reproductive Biology, and this year a grant was made to Yale University for the construction and renovation of facilities for an expanded program in reproductive biology and family planning. These six grants total \$7,612,500.

In addition to the several centers receiving aid to establish or expand programs in reproductive biology, the Rockefeller University received a grant of \$9.7 million to develop a major coordinated research program over the next ten years. The University plans to unify and expand the research already under way in this area and to channel new and ongoing projects toward the problems of population control. A strong predoctoral and postdoctoral training program is planned to prepare competent young scientists for entrance into this field.

Research at these centers will be focused on



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Dr. Donald Swartz, director of obstetrics and gynecology at the Harlem Hospital Center, leads education and action programs for one of New York City's most densely crowded neighborhoods.

certain little-understood aspects of fertility, conception, and early embryonic development. The problems stemming from use of the pill are believed to be due to the fact that it interferes with the upper hormonal feed-back loop regulating the reproductive cycle—the hypothalamic-pituitary-ovarian axis, which since it controls many vital metabolic and homeostatic mechanisms, could be expected to have a spillover into undesired side effects. Attention is now being given to the lower hormonal circuit—the ovarian-tubal-uterine axis, which may be susceptible to interference without producing generalized metabolic effects.

There are also gaps in our knowledge of the early stages of conception, such as tubal motility, gametogenesis, corpus luteum function, fertilizing capacity of spermatozoa, and the process of fertilization itself. More detailed knowledge of these and similar mechanisms may lead to the development of means of interfering in a specific and localized way with one or more steps in this complex chain. The Foundation seeks to support new kinds of institutions that place strong emphasis on problem solving and that are structured to allow multidisciplinary research to be focused on these questions.

In addition to major institutional grants, a special program of advanced research fellowships was instituted last year to support individual projects in reproductive biology. The awards are designed to attract talented investigators to this field as well as to support projects which have exceptional merit.

SOCIAL SCIENCE RESEARCH

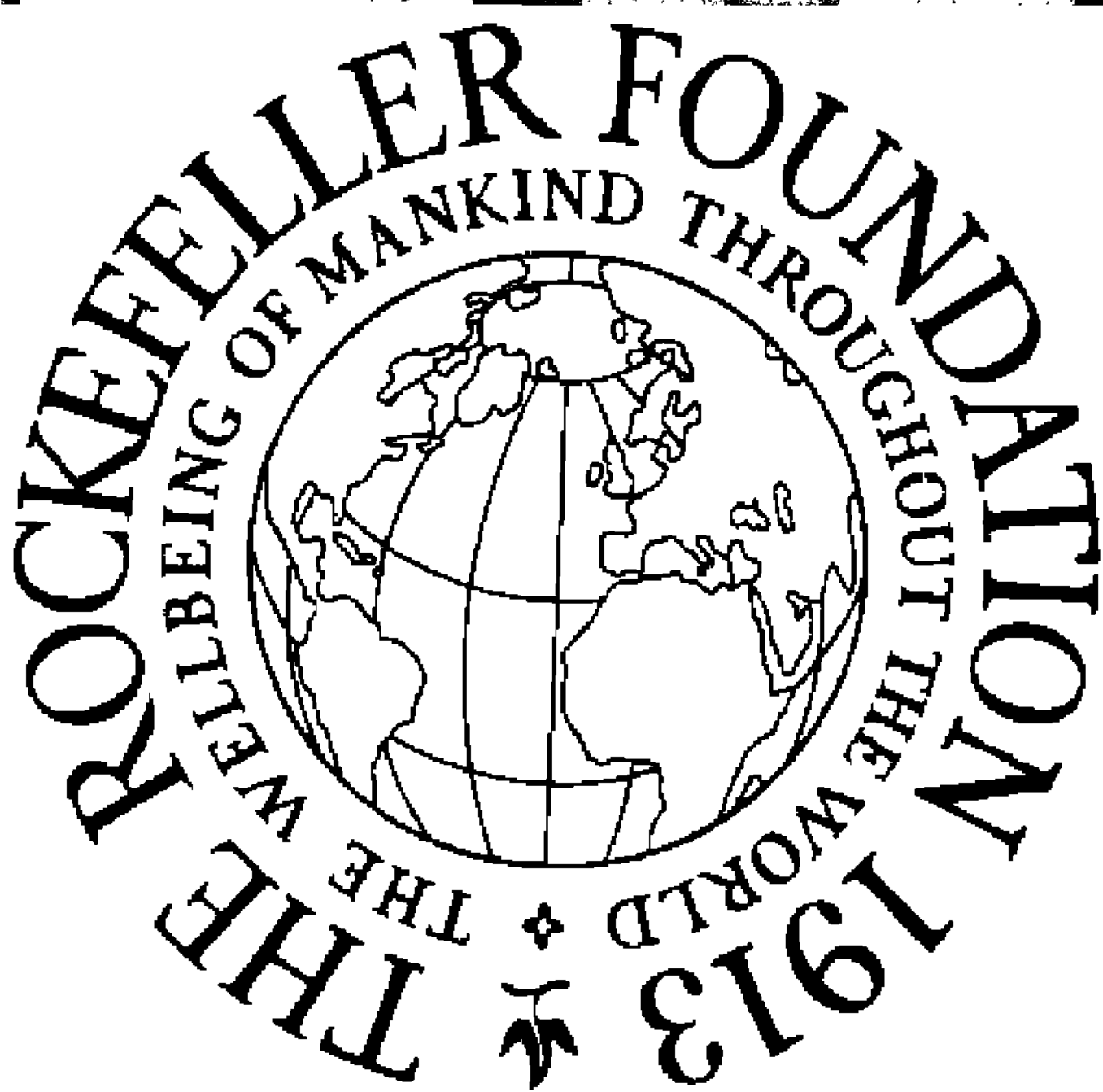
The biomedical sciences alone will not solve the population problem; the social sciences are indispensable at every step in the design and conduct of effective programs of population analysis and control. At a practical level, the success of population work depends on creation of effective administrative and educational techniques, on communications and extension methods adapted to local attitudes and customs. Overall policy must be based on demographers' projections; social psychologists and anthropologists must analyze the human attitudes involved in understanding and acceptance of fertility control; sociolo-

gists and economists are needed to evaluate the effects of population patterns on overall development. Programs in progress must be continually adjusted to meet changing attitudes and needs.

On a more theoretical plane, the social sciences are addressing themselves to the interlocking problems of overpopulation, economic development, and environmental quality. As these approach crisis proportions, a sound scientific base is needed as a guide for action. Much more research is needed on the political, ethical, and educational problems involved in attaining a zero rate of population growth, as well as on the effects it would have on societies and nations. Studies are needed on the interrelationships of population size, levels of technological development, utilization of natural resources, and efficiencies of technological processes as they affect the quality of the environment and the maximum tolerable population.

Social science research and training are being supported by the Foundation at several centers. This year demographic studies, primarily for candidates from Asia and Africa, were supported at the London School of Economics and Political Science, and Princeton University's Office of Population Research, long a leader in the field of demographic research and training, received a grant to expand its programs. Support also went to the Population Studies Center at the University of Michigan, which has an active program of teaching and research in the population dynamics of developing countries, with special emphasis on Asia. A grant to Yale University will permit the Economic Growth Center to strengthen work in economic demography.

A long-range project on the economics of population and family decision-making was launched at the University of Chicago; under the direction of Professor Marc Nerlove, investigators will study the economic factors influencing individual choices that affect population growth—costs of additional children in the family, female participation in the labor force, employment opportunities, survival rates of children, patterns of marriage and family organization, social welfare and social security provisions, availability of housing and of consumer goods.



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Lorraine Cleveland is the director of family planning and population education for the American Friends Service Committee in Philadelphia.

New approaches to communicating information on fertility control and population matters to poorly educated, economically disadvantaged people are being supported at various centers. In 1970 a grant was made to the University of North Carolina to enable the Carolina Population Center to test the effectiveness of a mass media campaign for increasing enrollment in family planning programs being sponsored in 12 major cities by the Department of Health, Education, and Welfare.

An innovative teaching technique is being tested at the Harlem Hospital Center, an affiliate of Columbia University's College of Physicians and Surgeons: an electronic teaching device is used to permit individualized instruction and viewer participation through a closed- or open-circuit television system. The hospital received Foundation funds to evaluate the usefulness of this new method, as compared with conventional classroom teaching, for promoting acceptance of family planning among its patients.

Grants made last year continue to support communications and information programs being conducted by the Population Reference Bureau and the International Planned Parenthood Federation-Western Hemisphere Region. Both efforts are aimed at designing communications and educational techniques adapted to the Caribbean area and Latin America.

UNIVERSITY POPULATION CENTERS

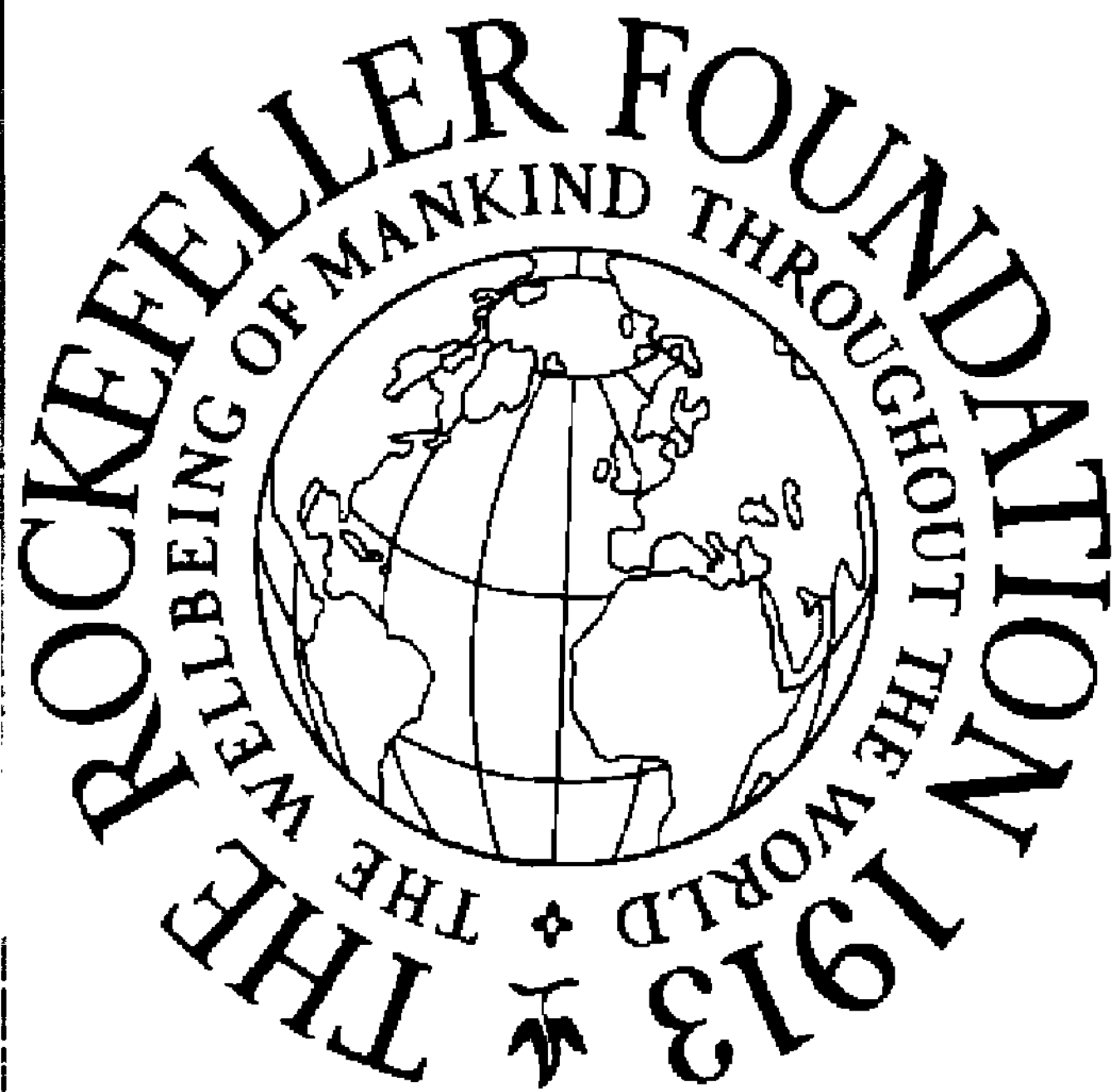
A focal point for Foundation support of population work has been the university: its role is strategic at several levels. Research and teaching in all the population-related sciences are of primary importance; integrated programs that introduce population concepts into relevant courses can develop informed opinion; public educational projects under university auspices can build general community awareness. Strong programs in medical schools are stimulating greater professional interest in population as a field of specialization, and several medical faculties and teaching hospitals are operating family planning clinics that serve local residents while offering training for students of medicine, nursing, public health, and social work.

Over the past five years, seven United States universities as well as several universities abroad have received Foundation grants to establish population centers coordinating teaching and research in a wide range of population-related fields; the Population Council, a similar center, has also received support. In the United States, population units have been built up at Baylor, Case Western Reserve, Cornell, and Tulane Universities; and at the Universities of Chicago, North Carolina, and Washington. This year Georgetown University in Washington, D. C., received a grant to strengthen the work of its Center for Population Research, which has a distinguished program of teaching and research in reproductive biology and a series of family planning clinics serving the poor of the area.

Overseas counterparts include the Center for Economic and Demographic Studies at El Colegio de México, the Center for Population and Social Research at Mahidol University in Thailand, the population programs of Hacettepe University in Turkey, and the work of the University Center for Population Studies (CUIP) at the University of Valle in Colombia. These agencies, in concert with others, such as the several United Nations Regional Demographic Centers, represent an extremely valuable resource for worldwide research and teaching in population and for the training of professional workers in many fields.

FAMILY PLANNING PROGRAMS

Parallel with the development of contraceptive technology has grown up the concept of family planning as a fundamental human right, which allows parents to exercise responsible choice in the decision to have a child. In the developed countries, the well-to-do have for several decades availed themselves of the right to plan their families, but the poor have neglected to take up this option. In the developing world, the same pattern obtains, but there the indigent and uneducated are the majority of the population and are more difficult to reach. Associated with the higher birth rates among the poor in every part of the world are high rates of maternal and infant mortality, higher incidence of illegitimacy and induced abortion, widespread malnutrition and



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David Glass, one of Europe's foremost demographers, is directing an expanded training program at the London School of Economics, primarily for young specialists from the developing world.

disease, and a self-perpetuating cycle of social and economic deprivation.

Despite the drawbacks of existing methods of birth control, great progress could be made if the people currently deprived of access to family planning services were provided with information about the economic, health, and other benefits of family limitation and given contraceptive instruction and materials. The problem is to develop delivery services that are both capable of reaching the people in need and realistic with regard to financial and professional manpower requirements. Some family planning programs have already had demonstrated success in reducing birth rates and numbers of induced abortions and in improving maternal health and infant survival.

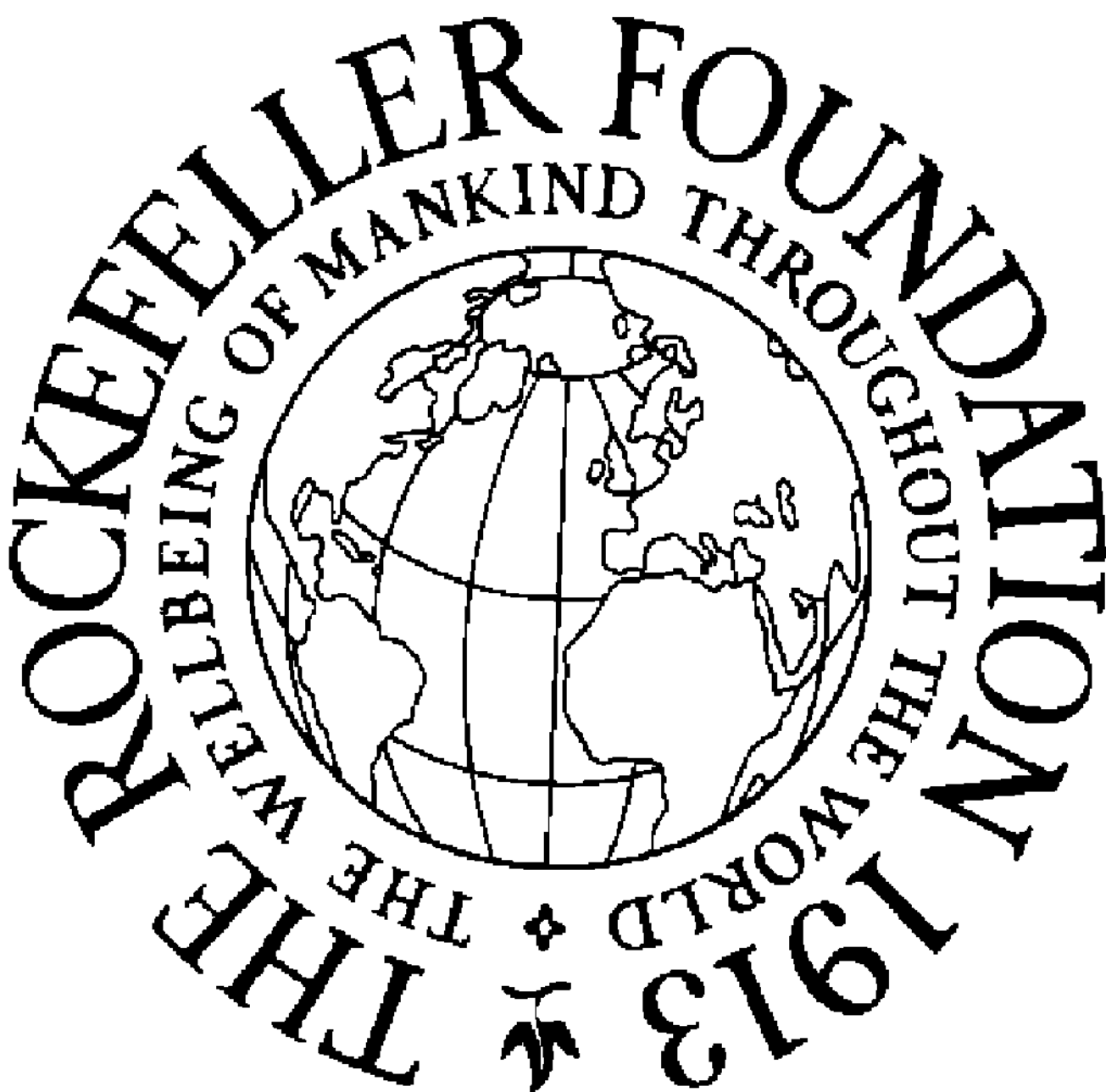
Two notably successful programs that have received Foundation support are the Louisiana Family Planning Program of Tulane University and the program of the Department of Preventive Medicine at the University of Chile. Tulane's programs, which have attracted nationwide attention, received a second grant from the Foundation this year. Initially centered in New Orleans, the program gradually expanded to cover the entire state. Its success in attracting growing numbers of patients and the high rate of continuance of those already in the program reflect exceptionally effective organization and follow-up procedures. These are expected to be helpful as a model for other family planning programs.

A model for the developing world was provided by the work of Dr. Benjamín Viel of the University of Chile. His family planning programs in urban slums and in poor rural districts have received support from the Foundation totaling close to half a million dollars.

The University of Mississippi received a grant this year in support of a family planning project that offers free contraceptive services to indigent women and at the same time offers training to nurse-midwives and auxiliary family planning workers. The project is part of a comprehensive, Federal Government-supported plan, operating in five rural counties in Mississippi, in which jobs and job-training in health-related skills and professions are dovetailed with an overall medical care program for the poor.

Two major grants made in the past continue to support assistance with the organization and administration of family planning centers: one is the training project for administrative and auxiliary non-medical workers being carried out by Planned Parenthood of New York City, and the other, a program of advisory and technical services offered by the Center for Family Planning Program Development of the Planned Parenthood Federation of America.

In its support of family planning training and action programs, the Foundation seeks to link contraceptive services with maternal and infant care. In developing areas, this is often done through experimental projects in the delivery of comprehensive health care to the community and through rural development projects. The concern of the Foundation with delivery of health services both at home and abroad is discussed elsewhere (page 151); the programs being supported, particularly in the inner cities, have implications for equal opportunity as well as for population control; in the developing world both population and public health programs are allied with the Foundation's efforts in university development (see pages 57-81).



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Muro Nerlove, a University of Chicago economist, is studying the ways in which families in the developing world make decisions as to how many children they want to have.

GRANTS APPROVED IN 1970

INTERNATIONAL

EXPENSES of a conference on population growth and economic development, organized by The Rockefeller Foundation at the Villa Serbelloni Conference and Study Center; \$3,700;

CHILE

UNIVERSITY OF CHILE: toward the costs of research and action programs in family planning under the direction of Dr. Benjamín Viel of the Department of Preventive Medicine; \$50,000;

COLOMBIA

UNIVERSITY OF VALLE: population studies under the auspices of the University Committee for Population Studies (CUIP); \$80,000;

INDONESIA

UNIVERSITY OF INDONESIA: for equipment and operating costs of the teaching program in family planning in the Faculty of Medicine; \$14,000;

JAMAICA

ASSOCIATION OF CARIBBEAN UNIVERSITIES AND RESEARCH INSTITUTES: toward the costs of a conference on the university and health services, with particular emphasis on population and nutrition, held in Cali, Colombia; \$7,000;

UNITED KINGDOM

LONDON SCHOOL OF ECONOMICS AND POLITICAL SCIENCE: for use toward the cost of expanding its demographic training program under the direction of Professor David V. Glass; \$65,000 through September, 1974;

UNITED STATES

ASSOCIATION OF AMERICAN MEDICAL COLLEGES, Washington, D.C.: toward the costs of a conference on the teaching and practice of family health held in Kampala, Uganda, convened by the Association of Medical Schools in Africa; \$7,000;

COLUMBIA UNIVERSITY, New York:

For research in reproductive biology, under the direction of Dr. Paul Marks, in the Department of Human Genetics and Development of the College of Physicians and Surgeons; \$500,000 for a five-year period;

For research on the effectiveness of a new method for education and motivation in family planning, under the direction of Dr. Donald Swartz, at the Harlem Hospital Center; \$250,000 for a two-year period;

GEORGETOWN UNIVERSITY, Washington, D.C.: for the development of family planning services and research in reproductive biology; \$210,000 for a five-year period;

GORDON RESEARCH CONFERENCES, New Hampshire: toward the costs of an international conference on lysosomes held in Andover; \$3,500;

HARVARD UNIVERSITY, Massachusetts:

Toward costs of population and family planning studies to be carried out in India by its Center for Population Studies; \$31,000;

For a study, to be carried out in Chile under the auspices of its School of Public Health, of methods of provision of family planning services by rural health centers; \$25,000;

INSTITUTE OF SOCIETY, ETHICS AND THE LIFE SCIENCES, New York: support of studies of the social and ethical issues raised by advances in the life sciences; \$15,000;

PRINCETON UNIVERSITY, New Jersey: for use by the Office of Population Research toward the cost of expanding its training and research program in the field of population; \$90,000;

RESEARCH FOUNDATION OF THE STATE UNIVERSITY OF NEW YORK: to enable nurse-midwives to undertake training in family planning at the Downstate Medical Center of the State University in Brooklyn; \$2,500;

ROCKEFELLER UNIVERSITY, New York: toward the development of a coordinated research program in reproductive biology; \$9,700,000 for a ten-year period;

TULANE UNIVERSITY, Louisiana: for a research, teaching, and demonstration family planning program in Louisiana under the direction of Dr. Joseph D. Beasley; \$500,000 through March, 1973;

UNIVERSITY OF CALIFORNIA, San Diego: for the development of training and research in reproductive biology under the direction of Dr. Kenneth J. Ryan; \$1,500,000 for a five-year period;

UNIVERSITY OF CHICAGO, Illinois: toward the costs of a program of research and training, under the direction of Professor Marc Nerlove, on the economics of population and family decision-making; \$190,000 for a six-year period;

UNIVERSITY OF MICHIGAN:

Toward the costs of the research, training, and technical assistance program of the Population Studies Center, with special emphasis on its work in population dynamics in developing countries; \$500,000;

For use by the Population Studies Center toward support of a postdoctoral research associate; \$15,000;

UNIVERSITY OF MISSISSIPPI:

Toward the costs of a family planning program, to be carried out in rural counties in the Mississippi Delta by its Medical Center at Jackson; \$66,000;

Toward the costs of an urban family planning program to be carried out by its Medical Center at Jackson; \$10,000;

UNIVERSITY OF NORTH CAROLINA: toward the costs of a study by its Carolina Population Center of the effectiveness of a mass media informational program on acceptance of family planning; \$85,000;

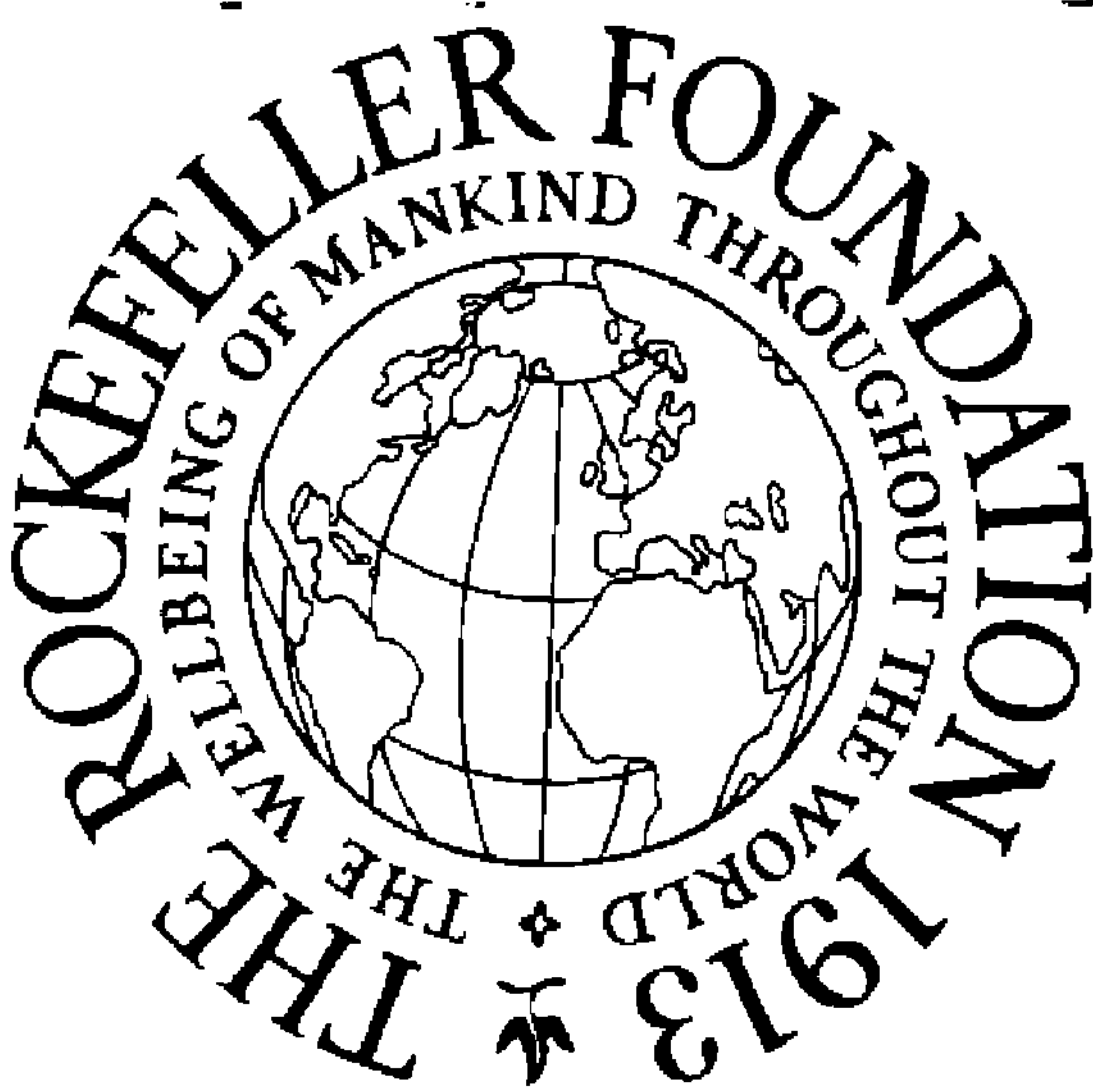
UNIVERSITY OF WISCONSIN: for use toward the costs of data preparation for continuing research on fertility, family planning, and population growth in the United States; \$10,000;

YALE UNIVERSITY, Connecticut:

For the construction and renovation of facilities for an expanded research program in reproductive biology and family planning; \$862,500;

Toward the costs of a program of research, in its Economic Growth Center, on relationships between economic development and population growth; \$200,000 for a ten-year period;

Development of an educational and training program in family planning under the direction of the Department of Obstetrics and Gynecology, School of Medicine; \$10,000.

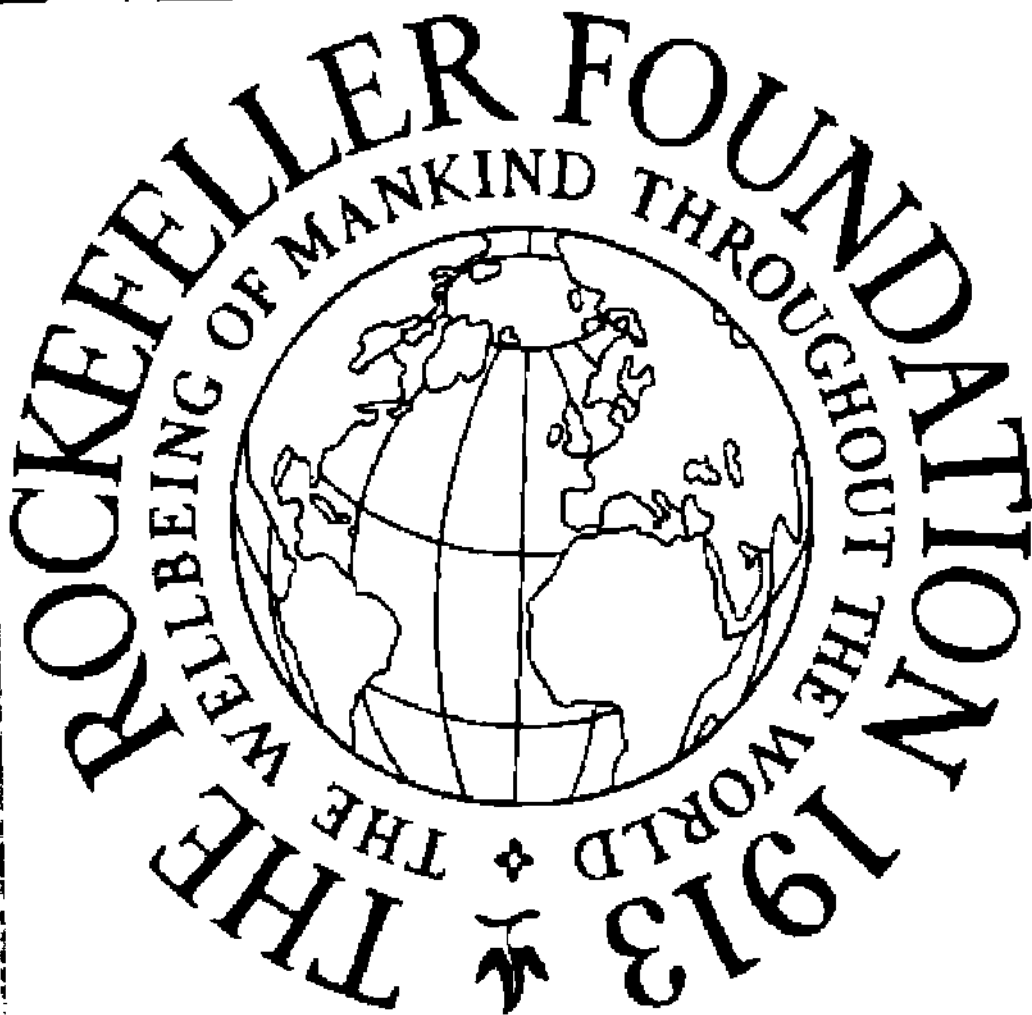


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Work-in-Progress

THE MISSISSIPPI DELTA PROGRAM

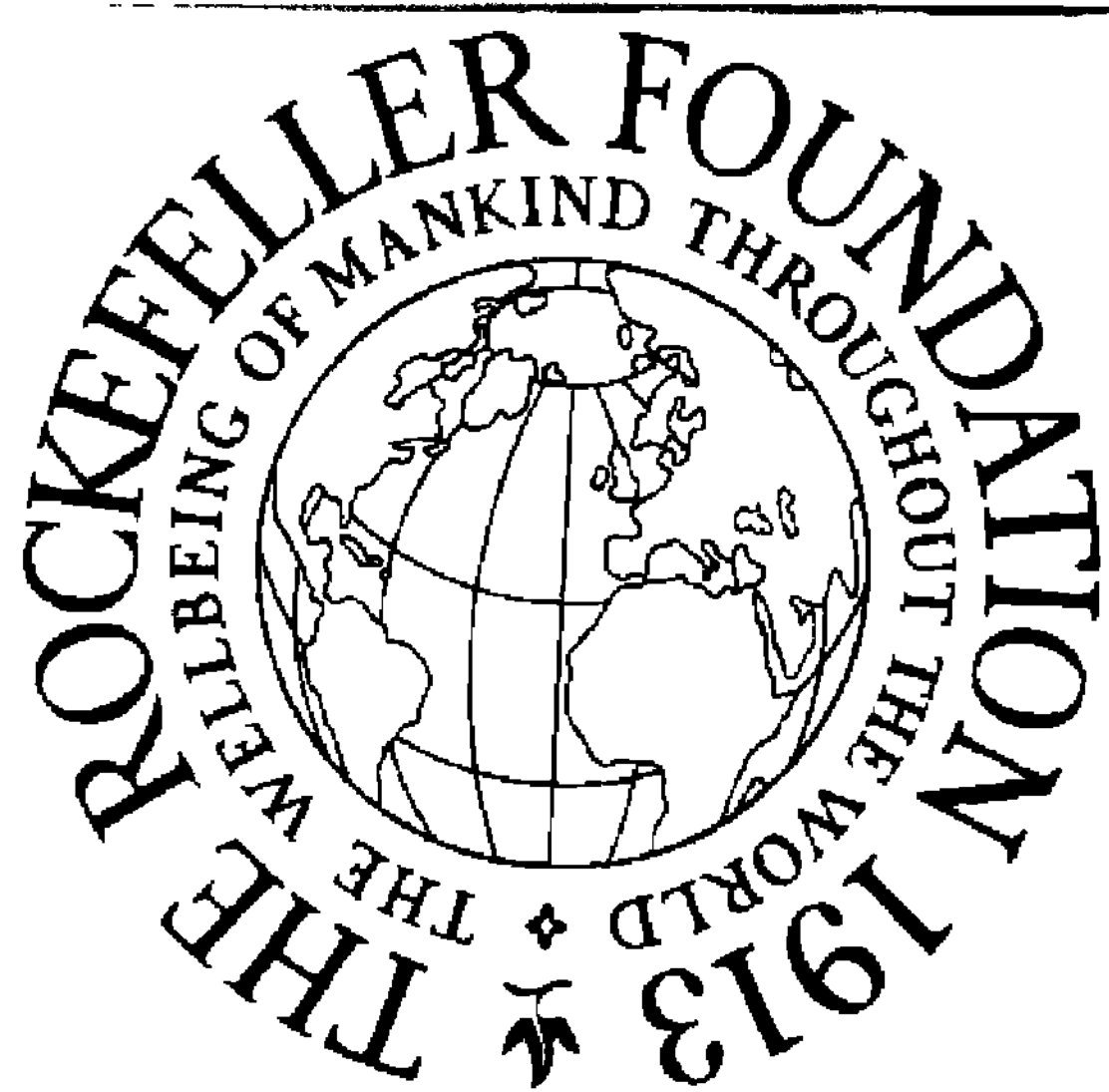
In the flat, sun-drenched fields of the Mississippi Delta, families with eight and ten children live in two- or three-room shacks. The birth rate here is double the national average; infant mortality is the highest in the United States. All parents are concerned about caring for the children they have. They are also deeply concerned about not having additional children. In 1969 a Mississippi state committee drew up a master plan for improving the economic life and health of the people who live in five of these Delta counties. A major component of the plan is a program of maternal and infant care, administered by the University of Mississippi through its Department of Obstetrics and Gynecology. With Rockefeller Foundation support, a family-planning project was added to this program, and several hundred women received free contraceptive services during the project's first year of operation. The five-county program is essentially one of infant and maternal care, in cooperation with county health departments: family-planning services are included in this overall context. Patients are given a complete physical



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Family-planning projects are carried out in five Mississippi Delta rural counties as part of a larger maternal and child health-care program.

examination on entering the program, and are referred to other clinics for specialized care if necessary. A nutritionist is on hand to work with the local welfare department and the local OEO agencies to help obtain an adequate diet for needy families. Patients with family problems are referred to the appropriate social agency for help. A major reason for the project's success has been the help and support of the Delta people themselves. Health councils made up of people from the area itself spread the word to women on outlying farms. The councils have been of particular help in providing transportation to and from the clinics—a basic necessity in a rural area such as this. Another outstanding success has been the use of nurse-midwives—who have demonstrated a particular ability to talk to young mothers with sympathy and tact. The doctors at the University of Mississippi who are coordinating the program have high praise for these women—for their skill in counseling, patient-education, general support, and home-visit follow-ups.

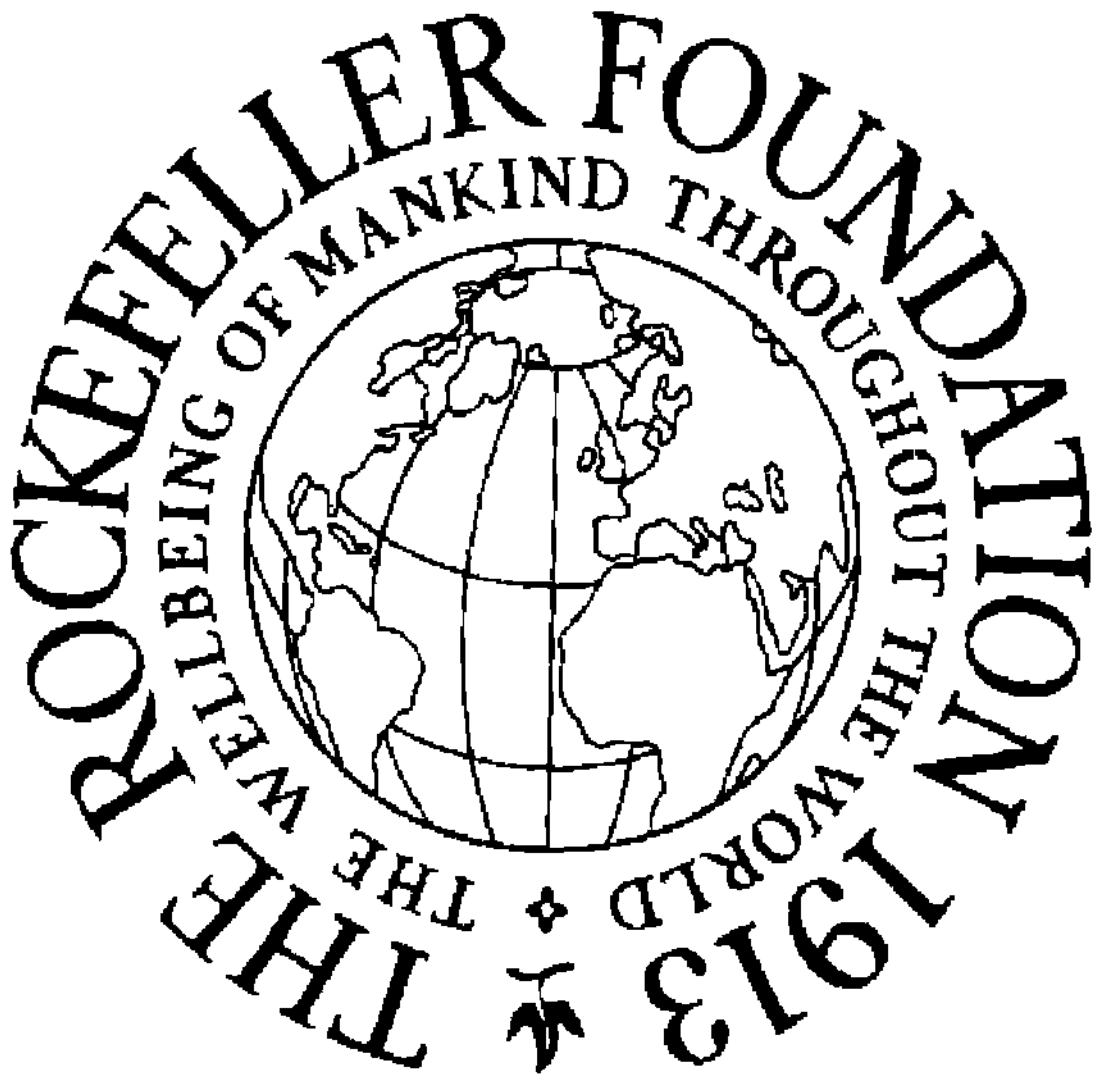


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Work-in-Progress

SAN DIEGO'S DIVISION OF REPRODUCTIVE BIOLOGY

In the search for a means to curb exploding populations, high hopes are pinned on the cell biologist. Out of his laboratory may come the master key to the control of human fertility that up to now has eluded scientists. Recent advances in contraceptive technology have had little effect on world population growth, which continues unchecked at 2 percent per year, a rate that will double the population in 35 years' time. There are all kinds of barriers to the acceptance of family planning: communication gaps, administrative snarls, economic difficulties—but the real trouble, say authorities, is that improved contraceptive methods are needed. In order to achieve them, scientists must take a closer look at reproductive biology—cell biology and physiology—to come up with a really practical means for controlling human fertility on a mass scale. The need is for strong research centers in reproductive biology, staffed by competent specialists focusing on basic research. One such center is now being created by the University of California at San



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At the University of California, Dr. Kenneth J. Ryan leads a highly skilled group of investigators in basic research in reproductive biology toward improved contraceptive technology.

Diego, a forward-planning institution where flexible administrative structures in the basic and clinical sciences are used to lay the groundwork for interdisciplinary studies and streamlined curricula. Dr. Kenneth J. Ryan (above), until recently head of the outstanding training and research program at Case Western Reserve, has recently been named director of San Diego's new unit, the Division of Reproductive Biology, which The Rockefeller Foundation is backing with \$1.5 million for the next five years. Also on the staff are Dr. Kurt Benirschke (far left), a leading specialist in primate reproduction and pathology, Dr. Howard Judd (left, bottom), and Dr. Frederick Najtolin (left, top), who are studying various aspects of steroids. In addition to conducting research, staff members will teach undergraduate courses and guide graduate and post-doctoral students. Collaboration with researchers at the nearby Salk Institute for Biological Studies is also planned.

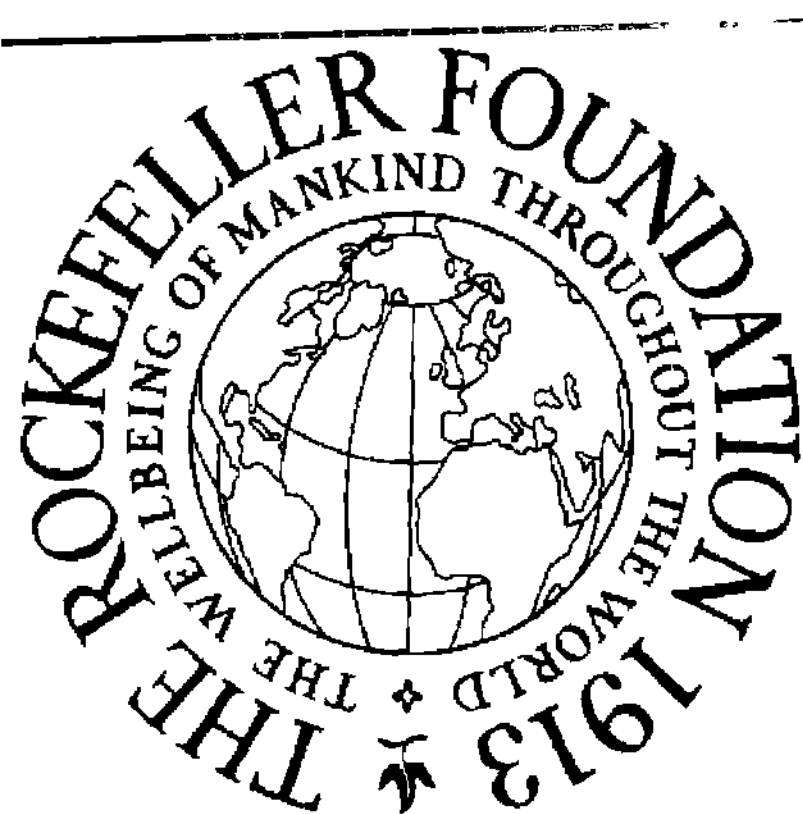


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Work-in-Progress

POPULATION STUDIES AT GEORGETOWN UNIVERSITY

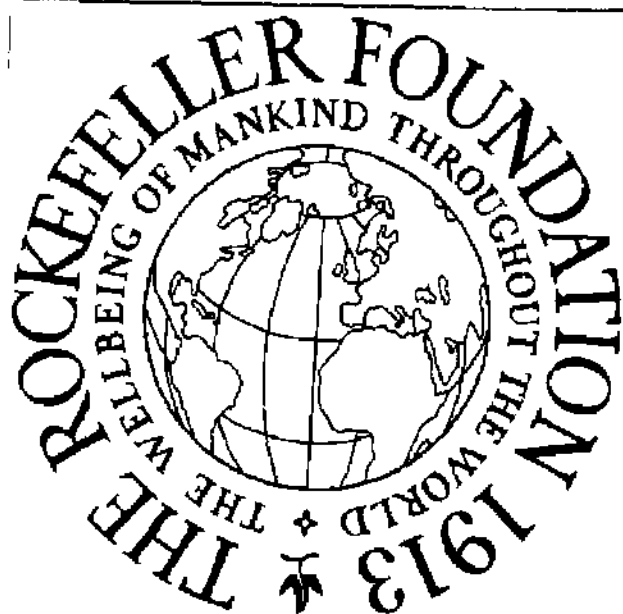
Georgetown University in Washington, D. C., has made a major commitment to research, training, and service in population studies and family planning. Its Center for Population Research, established in 1962, was one of the first university centers of its kind in the country. In 1966 the Department of Obstetrics and Gynecology of the School of Medicine, under the chairmanship of Dr. Paul D. Bruns, began expansion of its staff and its research program. Dr. André E. Hellegers (above), an authority in fetal physiology, came from Johns Hopkins to direct research and program development. Close relations were established with the basic science departments and with the Center for Population Research. A program in genetics was introduced, with courses in both the School of Medicine and the School of Arts and Sciences. Members of the Department of Philosophy and the School of Law were engaged in research and teaching in aspects of the ethics of contraception and the responsibility of government in family planning. In early



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Dr. André E. Hellegers and his associates are developing an action program and an interdisciplinary center in population studies at Georgetown University.

1968 the first University postpartum family-planning clinic was organized—an addition to a rhythm clinic that had been serving the Washington Archdiocese for several years. Together these elements constituted the basis for an integrated, university-wide program encompassing a number of disciplines and reaching out to serve the community. Clinics offer family-planning services to residents and provide training for obstetrical interns. Georgetown's teaching programs include an M.A. course in demography, and advanced training related to human reproduction in several science departments as well as the School of Medicine. A basic course in population has been introduced for first-year medical students, and an NIH-supported postdoctoral research program trains obstetrician-gynecologists for academic careers. An undergraduate course dealing with sex education in the context of ethics has proven very successful. A general textbook on human reproduction is being prepared.



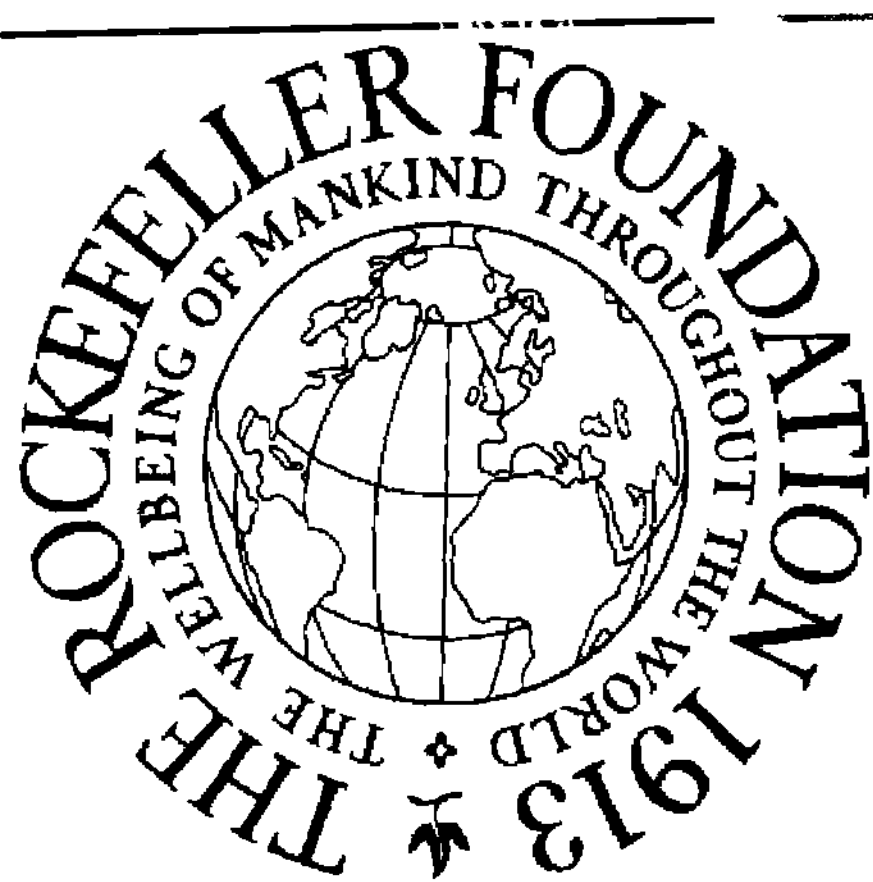
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Professor Ronald Freedman (far right) heads a university center that specializes in a social-sciences approach to the vastly complex field of population studies.

Work-in-Progress

THE UNIVERSITY OF MICHIGAN POPULATION STUDIES CENTER

Since its establishment in 1961, the University of Michigan Population Studies Center, under the direction of Professor Ronald Freedman, has become one of the leading university centers in the field of demography. At a time when population dynamics is of high importance to every nation, the Center is providing doctoral training in demography to foreign and American students, while simultaneously conducting extensive research, much of which involves collaborative work with organizations in developing nations. The Center's largest continuing commitment has been in Taiwan, where for nearly ten years it has been studying the interaction of social and economic change, the national family-planning/population program, and the changing demographic rates. This research has required close consultation with the Chinese and the training of key Chinese staff members. Other major research projects are currently being carried out in Malaysia, Hong Kong, and Turkey. Members of the Center's staff have served as consultants to population programs in Korea, Taiwan, Malaysia, Turkey, Pakistan, India, Kenya,



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Hong Kong, Singapore, Thailand, and Indonesia. Some have been engaged as consultants or staff members of agencies such as the U.N. Population Division, the Population Council, and the East Asian Association of Population Programs. Each year between 30 and 40 graduate students—a quarter to a third of them from developing countries—enroll in the Center's academic and research training program. Many of the foreign students work toward M.A. or Ph.D. degrees; others spend three to twelve months in non-degree programs and in-service experience relevant to their work at home. Of particular significance is the training and experience that all foreign students receive as research apprentices on the Center's research projects in their own or similar countries. The Center concentrates mainly on a limited number of countries, particularly in Asia, where it can develop close working relationships, but it has also trained some students from European and Latin American countries. Graduates now hold key positions in indigenous, international, or private organizations concerned with demography.

UNIVERSITY DEVELOPMENT

Nations facing grave developmental problems have often lacked the resources in men and materials to build their universities into strong modern centers of learning and research, capable of contributing to social and economic progress. Until recently many countries continued to rely on foreign training for their leaders and scholars and often on expatriate staff for their universities. In the early 1960's The Rockefeller Foundation saw an opportunity to help create, in a few selected institutions in the developing world, indigenous centers of excellence that could act as catalysts for economic, social, and cultural development while educating a new generation of scholars and leaders. Over the past seven years the main centers of Foundation effort have been the University of Valle, in Cali, Colombia; the University of Ibadan in Nigeria; the University of the Philippines; a complex of universities in Bangkok, Thailand; and the three former colleges of the University of East Africa, which this year assumed independent status as the University of Nairobi in Kenya; Makerere University in Kampala, Uganda; and the University of Dar es Salaam in Tanzania.

PRIORITIES

Development of leadership and knowledge took top priority in the Foundation's programs; the focus was on training for indigenous scientists, technicians, and humanists and on the creation of a scientific base from which to attack the complex problems of social and economic development. Existing knowledge had to be adapted to local situations, and problem-oriented research undertaken on questions for which the developed world had no answers — in areas such as crop and animal disease, public health needs, and economic growth patterns. While concentrating its attention on the essential community of scholars and the development of relevant knowledge, the Foundation encouraged each institution to broaden its base of support; funds for buildings and other needs were often more easily obtainable from government or international sources on the basis of the strengthened academic and research programs and the commitment to institutional change and growth.

PRINCIPLES

Certain principles to guide all the programs were laid down at the start: long-term financial support; interdisciplinary focus; concentration on disciplines and departments that were already relatively strong; backing for forceful and imaginative leaders. Other general directions took shape as the programs evolved: a trend toward establishment of regional postgraduate training centers; encouragement of cooperation with international research institutes; stress on mutual reinforcement between university programs and programs under other sponsorship dealing with population problems, public health, agriculture, nutrition, or economic planning, particularly where the Foundation is active in these fields. Part of the University Development Program's success has been due to flexibility — a continuing evaluation and adaptation — exercised within a stable framework of assured long-term aid linked with continuity of administration and of purpose.

PROCEDURES

The cornerstone was the Foundation's fellowship and scholarship program. The Foundation looked for institutions and departments headed by men of energy and vision, and sought to reinforce these units by offering opportunities for advanced training abroad to promising young faculty members and talented graduate students in a variety of disciplines, who were nominated by the various institutions. Rockefeller Foundation scholars and fellows appointed under the University Development Program since 1963 number 691. The first to return are now senior members of their departments; some are deans or heads of specialized institutes; each year more return from abroad to take up junior posts and start their academic careers. It is commonly said that ten years are needed to develop a young Ph.D. graduate into a mature scholar; this time-gap problem has been partially bridged in the developing universities by a broadly based program of visiting professors, scholars, research aides, and consultants appointed at the request of the overseas institutions.

For its visiting faculty programs in the several centers, the Foundation tapped a number of



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John McCamant, an economist, served as visiting professor at the University of Valle in Colombia, on leave from the University of Denver's Graduate School of International Studies.

sources, including its own professional staff. In most cases a resident Foundation staff member on long-term assignment served as teacher and researcher at each university, to coordinate the Foundation's work in various fields and to provide stability of Foundation administration throughout the program as well as continuity in liaison with university leaders. Special field staff members were also recruited for specific positions on short- and long-term assignments; other visiting faculty members were supported as requested by the cooperating universities through special arrangements with their home institutions; and finally, 22 grants were made to universities and colleges in the United States, Canada, and the United Kingdom to enable faculty members to accept assignments from the institutions receiving overall developmental support from the Foundation.

These several approaches succeeded in recruiting dedicated scholars, senior men as well as junior, who had a special interest in developing countries, and who brought the benefit of their professional experience and specialized knowledge to newly formed departments and to established institutions committed to renewal. Visiting faculty members taught courses, advised students, helped with curriculum revision and development of teaching aids; they assisted with the centralization and streamlining of administrative and fiscal procedures; they helped design research projects and graduate study programs. Alert to the possibilities of interdisciplinary cooperation, they helped break down academic barriers and introduce new concepts in education. (Introduction of comprehensive community health training in medical education was a major innovation; others included integration of population studies on a university-wide basis and the initiation of cooperative programs between academic faculties and government research farms and extension departments.)

The Foundation also provided financial support for selected teaching and research projects, focusing on regional and local problems. Libraries were built up and librarians trained; experimental farms were developed and laboratories built and equipped; language laboratories, a computer center, even some student and faculty

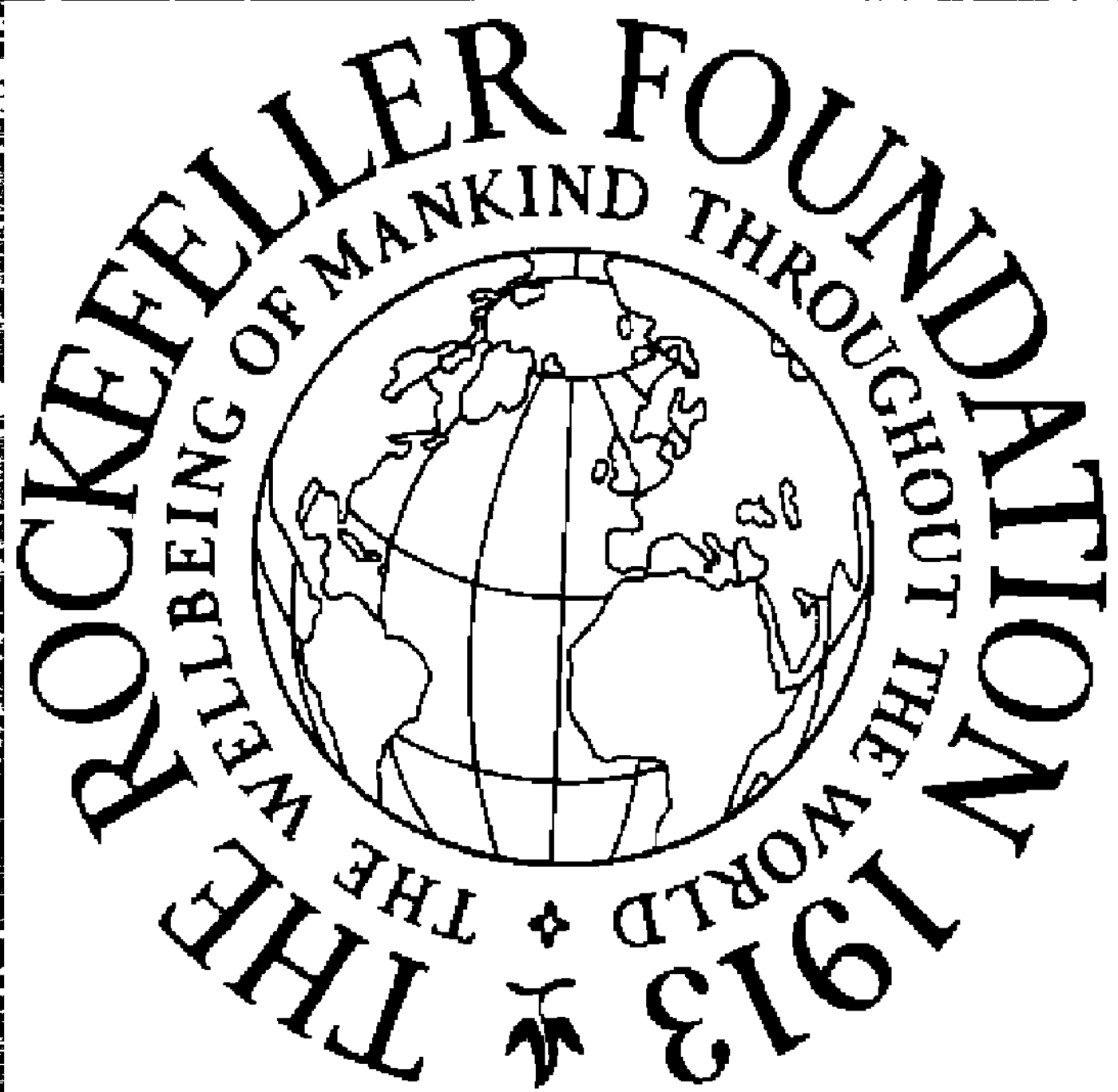
housing, received support. The Foundation's representatives in the various overseas institutions worked with university leaders to channel Foundation support to areas having highest priority; they followed developments to determine which programs were strong enough to continue without Foundation aid and which needed long-term buttressing; they were on a constant lookout for new areas offering opportunities for development.

1970: A TURNING POINT

In this way a number of outstanding programs have come into being and are beginning to assume regional importance, particularly at the level of graduate education and research. Notable are the Division of Health Sciences at the University of Valle; the Faculty of Veterinary Science, the Department of Economics, and the Institute for Development Studies at the University of Nairobi; the Makerere University Faculty of Agriculture; and the School of Economics at the University of the Philippines. Units of similar caliber at other centers could also be cited.

These centers of regional strength have grown up in part because of the emphasis in the 1960's on overall university development. With the return of a steadily growing number of faculty members from study abroad, and with the emergence of strong Master's and Ph.D. degree programs, many of the original goals of the Foundation's programs as defined in 1963 are now in sight. The need for visiting faculty will diminish, as will the need to send scholars abroad to study for advanced degrees. High-level research programs in a number of fields are well under way, and major university departments and institutes are now beginning to serve as resource centers for agencies engaged in local developmental projects.

The Foundation's University Development Program is therefore entering a new phase in which it will increasingly stress postgraduate teaching and research; creation of university-wide, interdisciplinary programs; and cooperation with non-university agencies, such as the international agricultural research institutes. Ultimately, this trend may lead to the establishment of cooperative networks across broad geographical regions, in which the universities and their affiliates would link of



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Peter Diamond, now back at the Massachusetts Institute of Technology, did research in economics for a year at the University of Nairobi.

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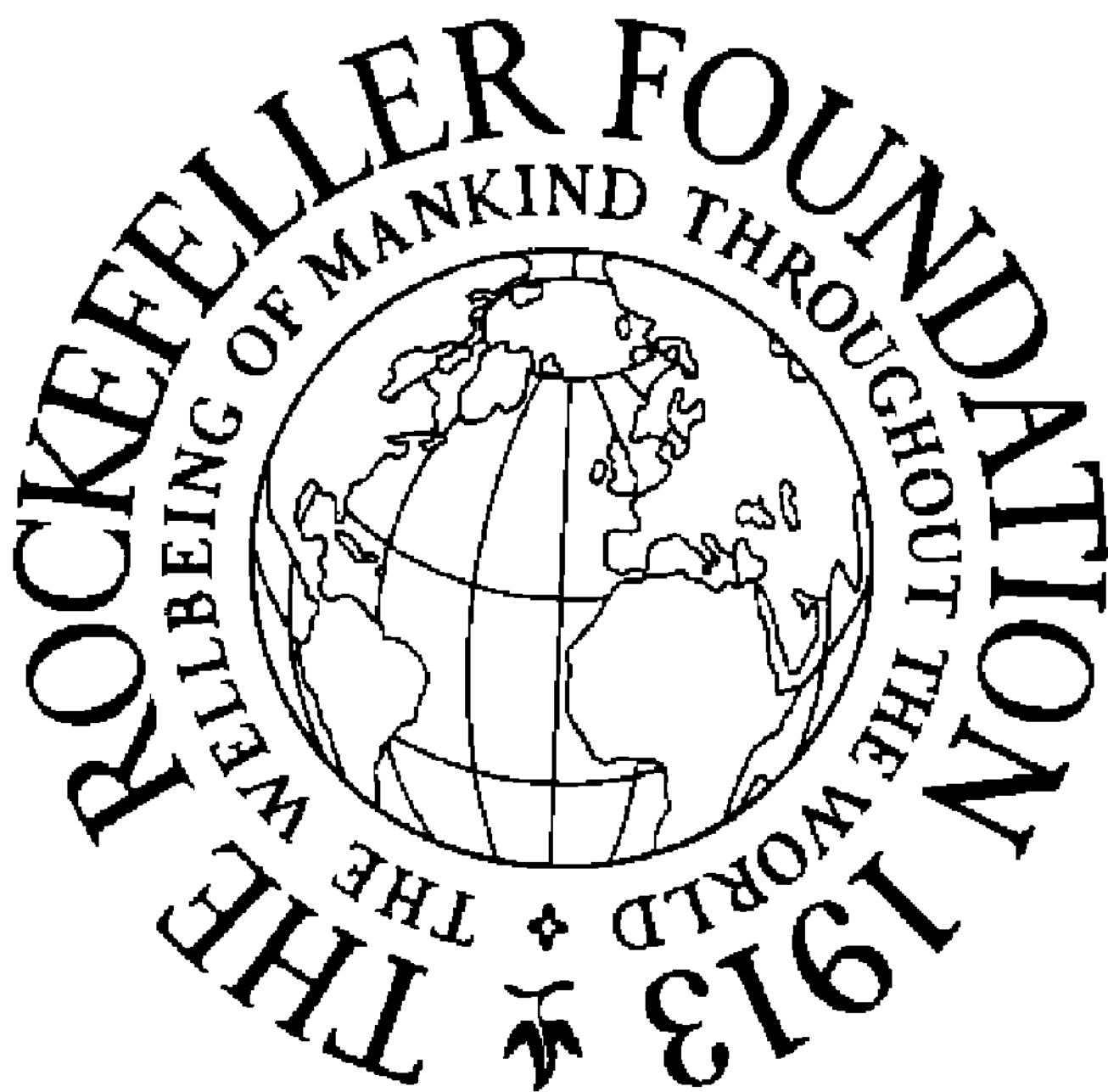
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forts with Foundation and other international programs concerned with the conquest of world hunger, population stabilization, delivery of health care, preservation of the environment, and allied fields. Support for this pattern of extended outreach takes different forms in the several universities, as a brief review of present and projected assistance will show.

PROJECTIONS

At the University of Valle in Colombia, disciplines such as sociology and the humanities are being strengthened to match the high level of attainment in the natural and medical sciences, agricultural economics, and engineering. Overall support will gradually be phased out as the ten-year development plan comes to a close and other sources of funding have been consolidated, but selected projects, especially postgraduate teaching and research in areas relevant to Latin American problems, will be assisted.

Cooperation between the University of Valle and the Foundation-supported International Center of Tropical Agriculture, whose permanent headquarters is located in Palmira, a short distance from Cali, will strengthen University programs in the agricultural sciences and offer superior facilities for graduate research. A cooperative arrangement between the University of Valle and the National University's Faculty of Agronomy, also in Palmira, is designed to strengthen teaching and research programs in agricultural engineering and agricultural economics at both institutions. A Foundation grant this year supported installation of an irrigation and drainage field laboratory at the Palmira Faculty.

The University of Valle was recently selected by the World Health Organization to participate in a comprehensive research program into means of utilizing health resources to meet the needs of developing countries, a project that has broad implications for all of the Latin American countries. A Foundation grant to the University this year contributed to the planning phase of this project.

The University of the Philippines has developed a number of outstanding units, including the College of Agriculture and the School of Economics. The latter has launched a Ph.D. program

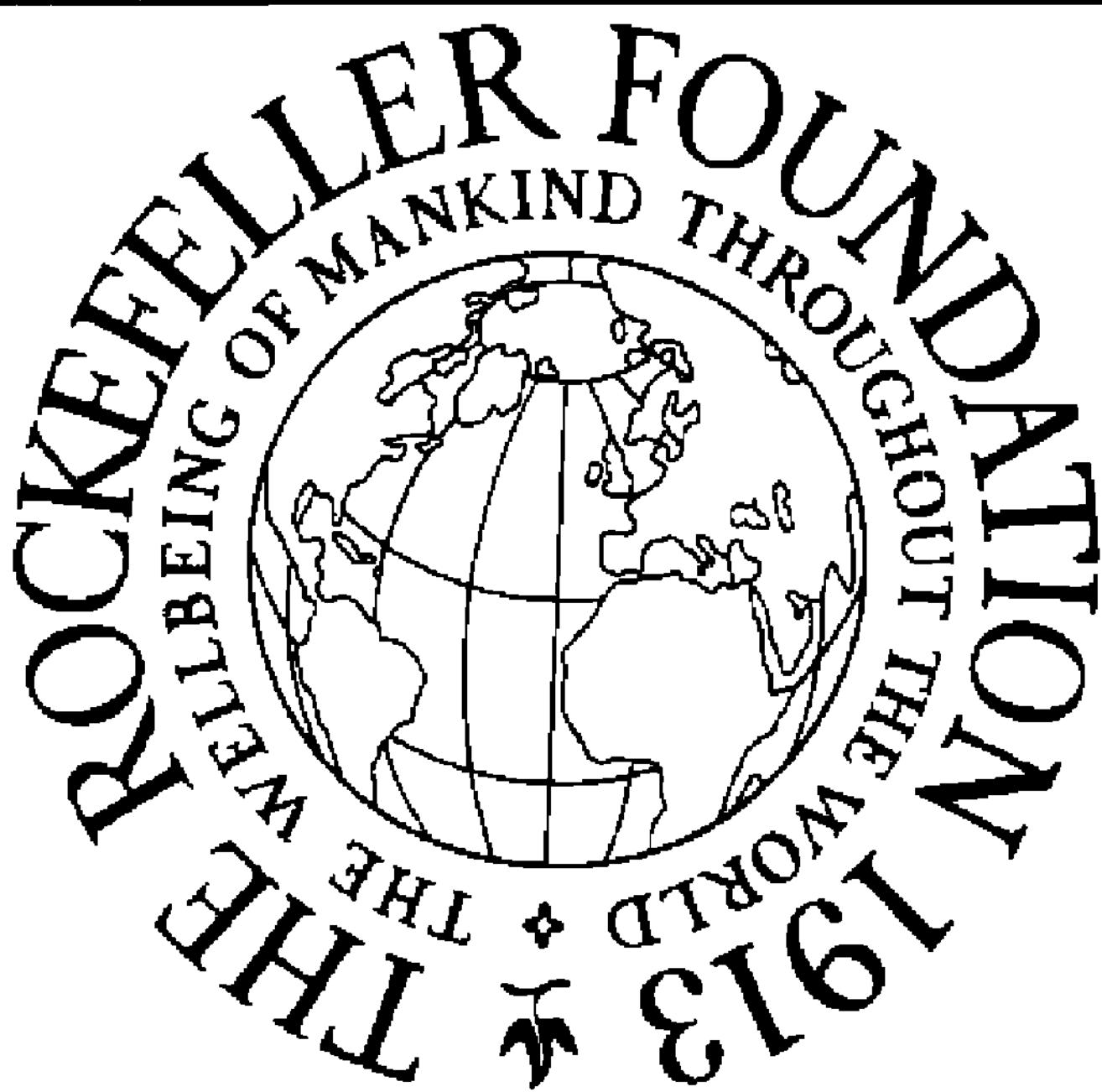
that is attracting students from other Southeast Asian countries as well as the Philippines; the Foundation is continuing to support the development of strength in all core areas of the School's curriculum.

The College of Agriculture, located in Los Baños near the International Rice Research Institute, plays a key role in regional education; cooperation between the two is well established. Graduate students at the College take part in research at IRRI to fulfill thesis requirements, and numerous College training programs at all levels have the cooperation of IRRI's international specialists.

Also growing in importance are the University-wide programs in community medicine and the experiments in delivery of health care to rural areas, in which the Foundation is assisting. A grant made at the end of last year supported a major expansion of the program, which now serves four *barrios* in Laguna Province with a total population of close to 75,000.

This year saw the three constituent colleges of the University of East Africa assume the status of independent universities in Kenya, Tanzania, and Uganda. In 1961 the idea of a federal university was in the planning stage; therefore the Foundation's original assistance was given to the individual colleges. The University of East Africa, which was created in 1963, was a notable success during a second stage of evolution of higher education in the three countries. In 1963 observers believed that the federal system of the University would meet the needs of higher education in East Africa for at least a decade. National development in each country has, however, been more rapid than anyone anticipated, and a new stage has been reached.

Professional faculties shared by the three countries were developed as a means of economizing academic manpower and expensive facilities when the University was established; these will now serve a broad area while comparable resources are built up in each separate nation. Outstanding among these are the Faculty of Veterinary Science at Nairobi and the Faculty of Agriculture at Kampala, in both of which the Foundation has concentrated developmental aid. An Inter-Uni-



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William Lee Baldwin, professor of economics at Dartmouth College, helped develop a postgraduate economics program as a visiting professor at Thammasat University in Bangkok.

versity Committee will coordinate research and educational programs in the three nations while the independent Universities consolidate their assets and map their future courses. The Foundation hopes to assist programs in each institution in fields closely related to national developmental needs—research in animal disease, for example—and to encourage professional ties with institutions in West Africa through faculty and student exchanges.

Foundation funds continued this year to support the Staff Development Program throughout the three institutions. This systematic effort to increase the number of Africans holding University posts has succeeded in bringing the total number of tenured African faculty to 278 in 1970; taking into account an overall growth in faculty numbers from 264 to 817, the climb from 17 to 34 percent of Africans in seven years is an impressive achievement. East Africans appointed under the Staff Development Program constitute 75.6 percent of African staff members.

In West Africa, Foundation aid has been concentrated at the University of Ibadan, which is now in a strong position to play a leading role in the Nigerian Government's program to coordinate educational facilities and resources in the various states. The University of Ibadan will undoubtedly be a major center for postgraduate studies in the nationwide educational system.

The establishment of the International Institute of Tropical Agriculture on the outskirts of Ibadan opens possibilities of cooperation with the University in disciplines such as agronomy, animal sciences, agricultural economics, and allied fields; the central position of the University in Nigeria's educational network will provide IITA with a valuable link to provincial centers for cooperative extension and research work.

In Bangkok, the University Development Program for almost a decade has worked with several institutions, the most important of which are Kasetsart University, Thammasat University, and

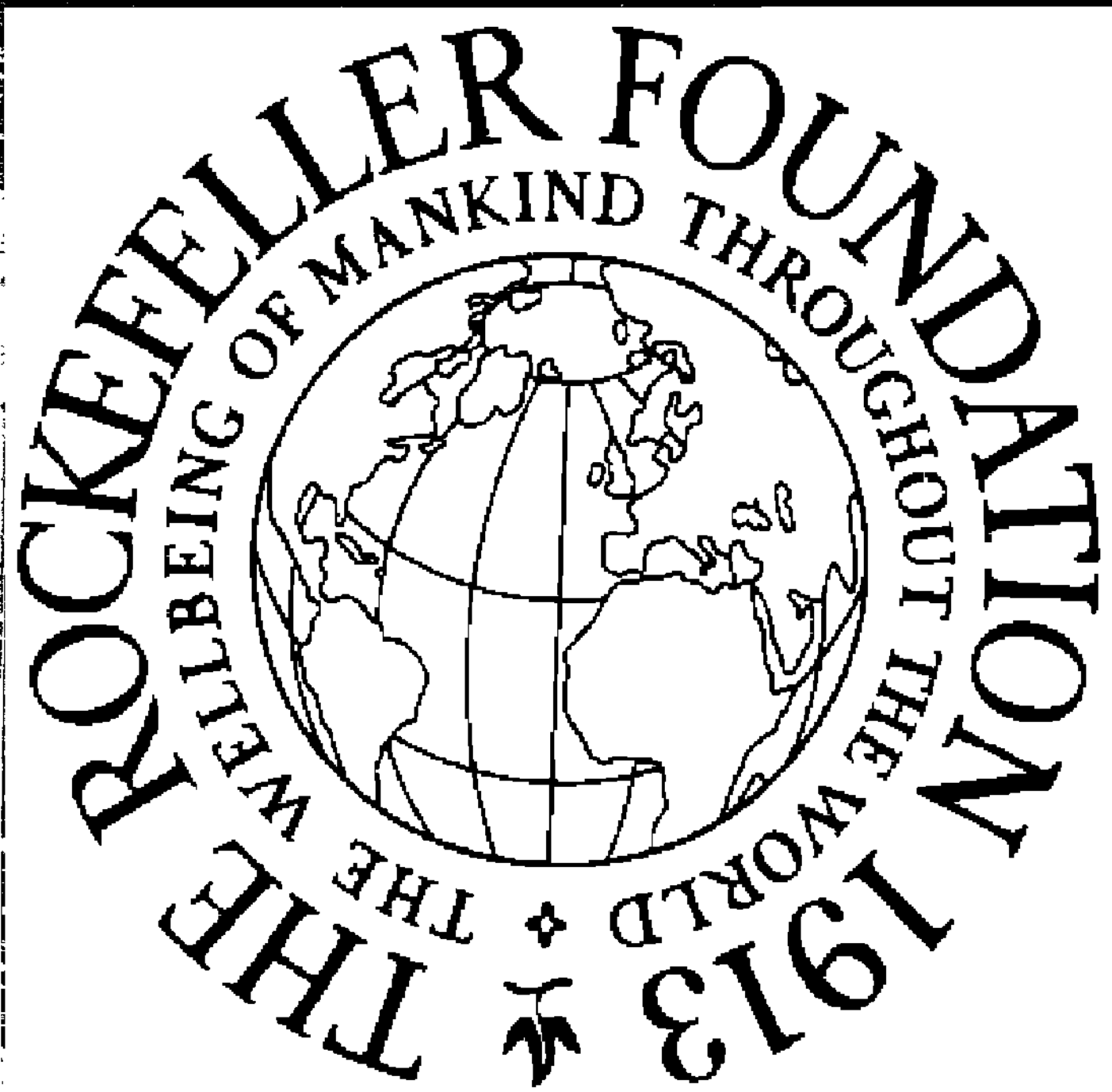
Mahidol University (formerly the University of Medical Sciences). Assistance with agricultural education at Kasetsart has been coordinated with Foundation projects in crop improvement and experimental farm development carried out in collaboration with the Thai Ministry of Agriculture. Economics has been the chief area of interest at Thammasat, and graduate studies have been built up to the M.A. level.

At Mahidol University, the Foundation is helping with development of strength in the clinical and basic sciences. In 1970 twenty field staff members in the biomedical sciences and four visiting faculty members were assigned at the request of the University to teach and conduct research, and 15 Thai fellows and scholars received awards for study abroad. In addition to building up basic academic departments at the University, the Foundation is assisting with a project in medical education and delivery of comprehensive health care, based at Ramathibodi Hospital, an affiliate of Mahidol.

Population studies have been developed at Mahidol's Center for Population and Social Research, and two family planning demonstration clinics are being operated by the Faculty of Public Health. The University of North Carolina has assisted with this effort under past Foundation grants, and the prospects are good for creation of a University-wide population program combining basic and clinical research, family planning, and social science research.

In the further development of the various institutions in Bangkok, the Foundation is working with the University Development Commission in the Prime Minister's office, which is charged with expansion and strengthening of Thai education at the graduate level.

In the future the Foundation may consider comprehensive assistance to one or two additional universities, especially as staff and resources are freed by developments at the institutions now being aided.



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Dean Wilson, a professor of engineering, took a leave of absence from the University of Michigan to help set up operations-research and systems-analysis procedures at the University of Valle.

GRANTS AND PROGRAMS APPROVED IN 1970

INTERNATIONAL

ROCKEFELLER FOUNDATION University Development Program Centers:

University of Valle, Colombia		\$ 411,700
Staff on assignment and visiting faculty	\$ 278,900	
Project support	132,800	
University of Ibadan, Nigeria		220,200
Staff on assignment and visiting faculty	179,200	
Project support	41,000	
Universities in East Africa		622,400
Staff on assignment and visiting faculty	542,400	
Project support	80,000	
Universities in Bangkok, Thailand		1,543,900
Staff on assignment and visiting faculty	1,326,400	
Project support	217,500	
University of the Philippines		4,140
Project support	4,140	
Total		<u>\$2,802,340</u>

COLOMBIA

ROCKEFELLER FOUNDATION International Program in University Development: Colombian program; see *International, above*;

UNIVERSITY OF VALLE:

Rockefeller Foundation International Program in University Development; visiting faculty requested by the University of Valle; see *International, above*;

Rolando Castañeda; to continue as visiting professor, Department of Economics;

Dr. James C. Dixon, University of Florida, Gainesville; visiting professor of psychology;

Salaries of teaching personnel in the sciences, humanities, economics and social sciences, health, and engineering; research projects in the sciences, humanities, health, and engineering; special projects of Central Administration; and scholarships for graduate training; \$513,660;

For salaries of teaching personnel in the Division of Health Sciences; \$180,974;

For the purchase of equipment and supplies for the Division of Engineering; \$130,000;

Equipment and supplies for the Division of Health Sciences; \$81,625;

For the purchase of equipment and supplies for the Division of Sciences; \$66,000;

Purchase of equipment for Central Administration; \$32,600;

Equipment and supplies for the Division of Economics and Social Sciences; \$15,000;

Equipment and supplies for a research project on the fundamental chemistry of glutathione reagents, under the direction of Dr. Walter Correa; \$15,000;

To enable the Division of Humanities to purchase equipment and supplies for its language laboratory; \$12,000;

Cornell University, Ithaca, New York; to enable two graduate students from the Department of Entomology to assist in research and teaching in the Department of Biology, University of Valle; \$11,000;

Toward the appointment of Peter J. Murphy as visiting professor in the Division of Engineering; \$9,000;
For use by the Division of Humanities toward the costs of microfilming regional archives for historical research; \$4,000;
Toward the further development of its Intensive English Program; \$2,100;
Purchase of equipment for the Division of Humanities; \$1,100;

KENYA

ROCKEFELLER FOUNDATION International Program in University Development: East African program; *see International, above*;

UNIVERSITY OF NAIROBI (formerly University College, Nairobi, University of East Africa—*see also Tanzania and Uganda*):

Rockefeller Foundation International Program in University Development; visiting faculty requested by the University of Nairobi; *see International, above*;

Dr. Claude Ake, Carleton University, Ottawa, Canada; visiting senior lecturer, Department of Government;

Dr. David W. Brokensha, University of California, Santa Barbara; visiting research professor, Institute for Development Studies;

Peter R. Moock, Columbia University, New York; visiting research fellow, Social Science Division, Institute for Development Studies;

Dr. William B. Neaves, Harvard Medical School; visiting lecturer, Faculty of Veterinary Science;

Dr. Harland I. Padfield, University of Arizona, Tucson; visiting senior research fellow, Social Science Division, Institute for Development Studies;

Dr. Kenneth C. Prewitt, University of Chicago; visiting senior research fellow, Social Science Division, Institute for Development Studies;

Nathan H. Shapira; to continue as head, Department of Design;

Dr. William Edward Whitelaw, University of Oregon; visiting research fellow, Social Science Division, Institute for Development Studies;

Support of the activities of the Social Science Division, Institute for Development Studies; \$98,000;

University of Iowa; to enable Dr. Joseph R. Ascroft, School of Journalism, to serve as visiting research fellow in the Social Science Division, Institute for Development Studies; \$26,672;

Support of East African graduate scholars in the Department of Economics; \$15,000;

To enable Goran Hyden to continue as visiting senior lecturer in its Department of Government; \$10,700;

Toward the costs of the research programs of the Cultural Division, Institute for Development Studies; \$10,000;

Toward support of a study in the Faculty of Veterinary Science on the inherited blood characteristics of local breeds of cattle in Africa; \$9,300;

Toward support of a study in the Faculty of Veterinary Science on the pathogenesis of East Coast fever; \$9,000;

Appointment of a junior research fellow in the Department of Geography; \$4,522;

Toward the expenses of research on East Coast fever and trypanosomiasis; \$3,500;

Toward the acquisition of a core collection of books, periodicals, and other publications to constitute the basic research collection of the Social Science Division, Institute for Development Studies; \$2,500;

Toward the appointment of J. Mugo Gachuhi, doctoral student at the State University of New York at Buffalo, as a research fellow in the Social Science Division, Institute for Development Studies; \$2,036;

Toward support of its Staff Development Plan; \$2,000;

Toward the costs of a research and teaching assistantship in its Department of Government; \$1,915;

To enable Dr. John J. Okumu, Department of Government, to complete his research on political development; \$1,885;

Toward the appointment of Dr. Victor P. Diejomaoh, Department of Economics, University of Lagos, Nigeria, as a visiting research fellow in the Social Science Division, Institute for Development Studies; \$1,212;

Stanford University, California; for use by its Food Research Institute for a two-year research fellowship in the Social Science Division, Institute for Development Studies, for Peter N. Hopcraft, a Kenyan doctoral candidate in agricultural economics; \$798;

NIGERIA

ROCKEFELLER FOUNDATION International Program in University Development: Nigerian program; *see International, above*;

UNIVERSITY OF IBADAN:

Rockefeller Foundation International Program in University Development; visiting faculty requested by the University of Ibadan; *see International, above*;

Dr. William J. Chambliss; to continue as visiting professor of sociology;

John D. Hargreaves, University of Aberdeen, Scotland; visiting professor, Department of History;

Toward costs of the arbovirus research program in the Faculty of Medicine; \$102,000;

For use by the Faculty of Social Sciences toward the costs of selected research projects of the Departments of Geography, Economics, and Sociology; \$68,414;

Support of three medical training posts in the Department of Pathology; \$42,200;

For the community mental health project in the Department of Psychiatry and Neurology; \$28,350;

Toward the costs of establishing a language laboratory in the Faculty of Arts; \$15,000;

For the salary of a biostatistician in the Department of Preventive and Social Medicine; \$14,000;

For support of two medical training posts in the Department of Preventive and Social Medicine; £ 4,700 (about \$13,250);

University of Iowa; for use by its Institute of Urban and Regional Research toward the costs of research on "Traditional Markets and Modern Urban Centers: The Markets of Metropolitan Lagos," to be conducted by Professor Michael L. McNulty, visiting professor at the University of Ibadan; \$13,000;

Toward the costs of acquisition of a stop-flow spectrophotometer for its Department of Chemistry; \$12,500;

For use by its Department of Agricultural Economics and Extension toward the costs of four selected research projects; £ 3,700 (about \$10,360);

To provide graduate study in research methodology in endocrinology for Dr. Percy P. S. Nylander, senior lecturer in the Department of Obstetrics, Faculty of Medicine; \$3,450;

Toward costs of special field operations of the virus unit under the direction of a Foundation staff member; \$3,000;

In support of the Reading Centre in the Faculty of Arts; \$2,200;

PHILIPPINES

ROCKEFELLER FOUNDATION International Program in University Development: Philippine program; *see International, above*;

UNIVERSITY OF THE PHILIPPINES:

For scholarship, research, and library support; \$40,100;

For use by the College of Agriculture for its program of advanced training and research for production of corn, sorghum, soybeans, and other upland crops; \$25,000;

TANZANIA

ROCKEFELLER FOUNDATION International Program in University Development: East African program; *see International, above*;

UNIVERSITY OF DAR ES SALAAM (formerly University College, Dar es Salaam, University of East Africa—*see also Kenya and Uganda*):

Rockefeller Foundation International Program in University Development; visiting faculty requested by the University of Dar es Salaam; *see International, above*;

Leonard Berry; to continue as director, Bureau of Resource Assessment and Land Use Planning;

Nelson M. Kasfir, Makerere University, Kampala, Uganda; visiting lecturer in political science;

Ian Livingstone; to continue as research professor, Economic Research Bureau;

Dr. R. Gerald Saylor; to continue for three months as research fellow and then for one year as director, Economic Research Bureau;

Dr. Gerhard Tschannerl, Clark University, Worcester, Massachusetts; research fellow, Bureau of Resource Assessment and Land Use Planning;

Research and teaching in geography undertaken by its Bureau of Resource Assessment and Land Use Planning; \$38,948;

In support of the research program of its Economic Research Bureau; \$30,310;

Clark University, Massachusetts; to enable Dr. Robert W. Kates, Graduate School of Geography, to complete his research on agricultural drought begun while serving as director of the Bureau of Resource Assessment and Land Use Planning; \$14,884;

Developmental programs in the Department of Political Science; \$12,120;

Toward costs of the continuing and expanding regional activities of the Social Science Council established by the former University of East Africa; \$11,480;

Toward the appointment of Geoffrey Ferster as a research fellow in the Bureau of Resource Assessment and Land Use Planning; \$1,500;

THAILAND

ROCKEFELLER FOUNDATION International Program in University Development: Thai program; *see International, above*;

UNIVERSITIES IN BANGKOK:

Toward equipment and supplies and other expenses associated with experiment station development in Thailand; \$100,000;

Toward operating expenses of the rice and corn-sorghum programs in Thailand; \$53,000;

Kasetsart University

Support for graduate assistantships; \$6,750;

Toward the costs of advisory services by visiting agricultural specialists and study and observation visits by University staff members to international institutes or other specialized agricultural centers; \$5,000;

Mahidol University

Rockefeller Foundation International Program in University Development; visiting faculty requested by Mahidol University; *see International, above*;

Mohammad Saeed Dar, Virginia Commonwealth University; research associate, Department of Pharmacology, Faculty of Science;

Dr. M. R. Lakshmanan; to continue as research associate, Department of Biochemistry, Faculty of Science;

Dr. Hideo Negoro; to continue as research associate, Department of Anatomy, Faculty of Science;

Dr. Meng Kwoon Sim, University of Sydney, Australia; research associate, Department of Pharmacology, Faculty of Science;

For the purchase of teaching and research equipment and supplies for the Faculty of Science; \$222,000;
Toward the costs of the Community Health Program of the Ramathibodi Faculty of Medicine; \$171,000;
Teaching equipment and materials for the Ramathibodi Faculty of Medicine; \$11,400;

Thammasat University

Rockefeller Foundation International Program in University Development; visiting faculty requested by Thammasat University; *see International, above*;

Dr. James C. Ingram; to continue as visiting professor, Faculty of Economics;

For use by its Faculty of Economics for study grants to qualified candidates for M.A. study in the School of Economics of the University of the Philippines; \$6,000;

Toward the costs of research in the Faculty of Economics on the differential in regional growth rates and income in Thailand; \$3,400;

To enable Professor William L. Baldwin and Acharn Sukanya Nitungkorn, Faculty of Economics, to conduct research on some aspects of the promotion of tourism in Thailand; \$1,200;

To enable Professor James C. Ingram to describe and analyze the principal economic changes in Thailand from 1950 to 1970; \$950;

UGANDA

ROCKEFELLER FOUNDATION International Program in University Development: East African program; *see International, above*;

MAKERERE UNIVERSITY (formerly Makerere University College, University of East Africa—*see also Kenya and Tanzania*):

Rockefeller Foundation International Program in University Development; visiting faculty requested by Makerere University; *see International, above*;

Dr. Jay W. Artis, Michigan State University; visiting professor, Department of Sociology;

Dr. Marshall Hall, Washington University; visiting senior lecturer, Department of Economics;

Dr. Selwyn Douglas Ryan, York University, Toronto, Canada; visiting senior lecturer, Department of Political Science and Public Administration;

Gerald E. Thierstein, McGill University, Montreal, Canada; senior lecturer, Department of Agricultural Engineering and Land Planning;

Toward the support of faculty development and research in the Faculty of Agriculture; \$122,000;

Research and teaching in the Department of Economics; \$36,400;

Toward the purchase of equipment and supplies for the Faculty of Agriculture; \$28,000;

Toward the appointment of Professor Muddathir Abdel-Rahim, formerly of the University of Khartoum, as visiting professor of political science; \$15,735;

Program of teaching through research in the Department of History; \$14,560;

Equipment and supplies for the Faculty of Agriculture; \$14,000;

Toward costs of a readership in comparative economic systems; \$11,700;

Toward support of graduate teaching assistants in the Faculty of Social Sciences; \$4,200;

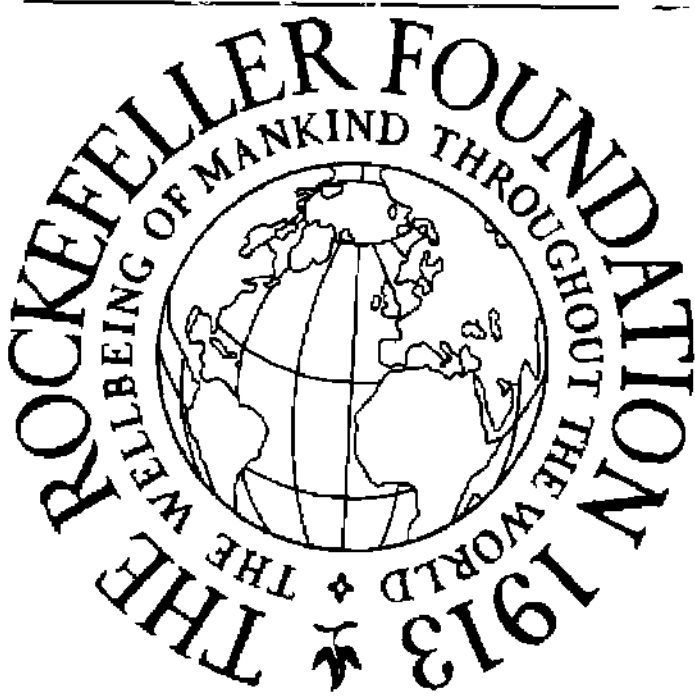
To continue its course for the Diploma in Drama; \$2,300;

Toward costs of a one-year exchange of staff between the Departments of History of Makerere University and the University of Ibadan, Nigeria; \$2,100;

RELATED GRANTS

CENTER FOR ADVANCED STUDY IN THE BEHAVIORAL SCIENCES, California: toward the costs of a one-year fellowship for a distinguished African scholar; \$15,000;

- CHRISTIAN MICHELSEN INSTITUTE, Norway:** toward research on the East African economy to be undertaken by H. E. Dahl, research associate; \$11,300;
- EAST AFRICAN COMMUNITY, Tanzania:** for use by the East African Veterinary Research Organization in support of an integrated teaching and research program with the Faculty of Veterinary Science at the University of Nairobi, Kenya; \$32,000;
- NORTHWESTERN UNIVERSITY, Illinois:** to support and develop the relationships between its Department of Geography and those of African institutions; \$12,200;
- PRINCETON UNIVERSITY, New Jersey:** toward support of a program to enable scholars to accept assignments for teaching and research related to university development in selected institutions in Africa, Asia, and Latin America; \$200,000 through June, 1974;
- ROCKEFELLER FOUNDATION International Program in University Development:** to enable Dr. John H. Power, Department of Economics, University of Wisconsin, to continue research begun while a visiting professor, School of Economics, University of the Philippines;
- STANFORD UNIVERSITY, California:** toward support of a program to enable scholars to accept assignments for teaching and research related to university development in selected institutions in Africa, Asia, and Latin America; \$200,000 through June, 1974;
- SUPPORT of a conference on economic aspects of modernization, organized by The Rockefeller Foundation and held at the Villa Serbelloni Conference and Study Center;** \$11,000;
- UNIVERSITY OF HAWAII:** toward support of a program to enable scholars to accept assignments for teaching and research related to university development in selected institutions in Africa, Asia, and Latin America; \$200,000 through June, 1974;
- UNIVERSITY OF LONDON:** for use by the Institute of Commonwealth Studies to enable Dr. John A. Ballard, visiting fellow, to prepare for use in Nigerian universities teaching materials on the impact of administration on politics in West Africa; \$10,200;
- UNIVERSITY OF SUSSEX, England:** to enable scholars in the humanities and social sciences to accept assignments for teaching and research related to university development in Africa, Asia, and Latin America; \$175,000 through June, 1975;
- UNIVERSITY OF WISCONSIN:** to enable scholars in the humanities and social sciences to accept assignments for teaching and research related to university development in Africa, Asia, and Latin America; \$300,000 through June, 1975.



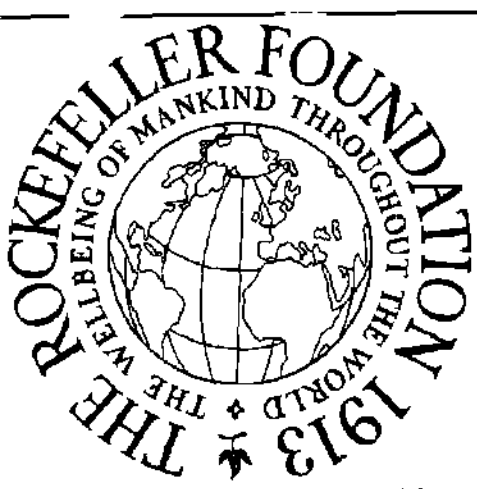
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Under University auspices, a comprehensive community-health program is being carried out in the Philippines' Bay region for the inhabitants of isolated villages.

Work-in-Progress

THE UNIVERSITY OF THE PHILIPPINES' COMMUNITY HEALTH PROGRAM

Rural people in developing countries generally are the last to be reached by modern medical care. Trained personnel and available funds are almost non-existent, and thus attempts to introduce comprehensive care to rural communities have been few. One of the pace-setting programs in this field is the Comprehensive Community-Health Program sponsored by the University of the Philippines and The Rockefeller Foundation with the cooperation of the Philippine Department of Health and other government agencies. The Program, now in its fourth year, provides training in rural health care for University students in several disciplines and at the same time serves a population of about 60,000 in four barrios in Laguna Province. Far from following a traditional internship pattern, however, the CCHP is attempting to create a new formula for delivery of health care, and to train professionals and paraprofessionals in a comprehensive approach to medical practice and public health. Several University units are participating, including the Colleges of Medicine, Nursing, Pharmacy, and the Arts and Sciences; the Institute of Hygiene;



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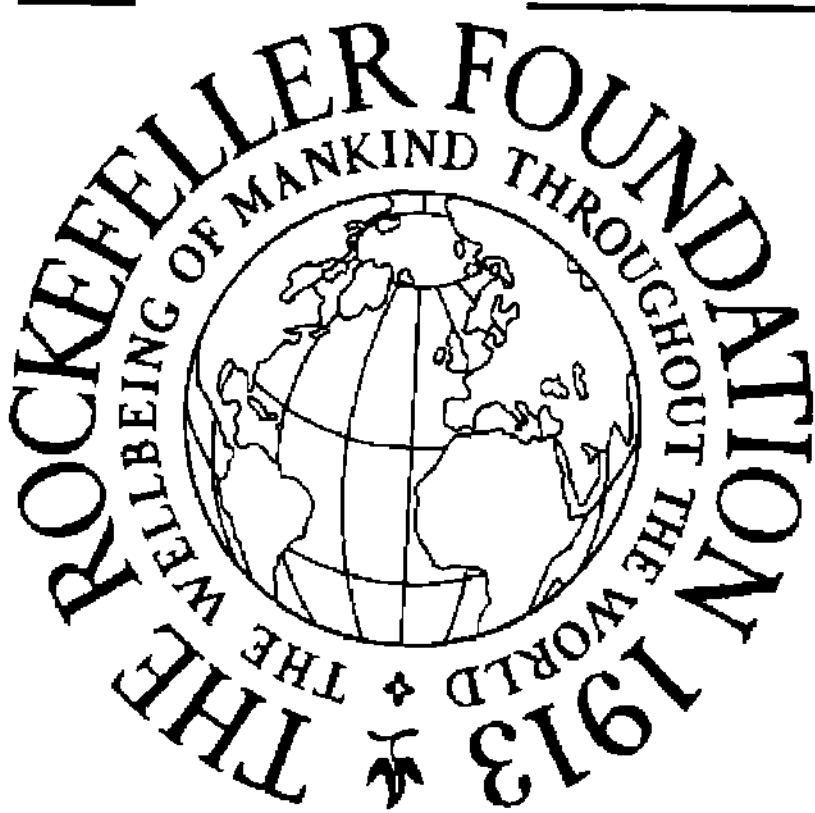


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and the Population Institute. Medical students are required to spend a month at the Program center in Bay, and students in nursing, dentistry, sanitation, and other related fields are also given rural experience. A central clinic provides outpatient care; a 25-bed hospital is planned. Medical teams based at the center fan out into small villages and farm areas to visit families where there is illness, to follow up on patients under treatment, or to bring obstetrical and pediatric services, including immunizations and well-baby check-ups, to remote areas. Major diseases of the region are tuberculosis, upper respiratory tract infections, parasitism, and gastro-enteritis. Poor sanitation and malnutrition are often contributing causes, and attempts are being made, through mothers' classes, radio and extension programs in cooperation with the College of Agriculture in nearby Los Baños, and other measures, to teach the basics of nutrition and sanitation to the population. A family-planning program, funded by U. S. AID, works in coordination with the health program, training medical students and offering contraceptive services.



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Students at this private institution in Colombia are enrolled in a strong general studies program that prepares them to enter the University's excellent professional faculties.

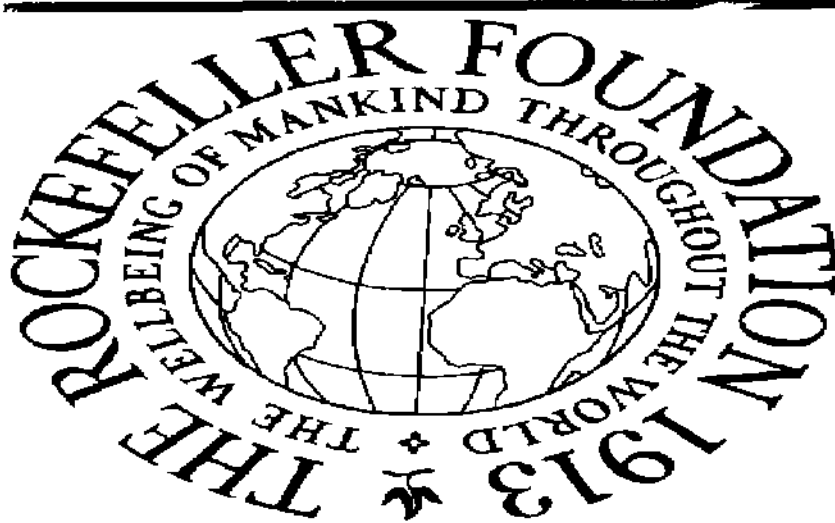
Work-in-Progress

THE UNIVERSITY OF VALLE

The University of Valle, a modern center of learning alive to local and regional needs, has grown in prestige and stature over the past decade to become a pace-setter in Latin American higher education. In 1961 it became the first university with which The Rockefeller Foundation undertook a long-term cooperative development program. At that time, the total enrollment was less than 1,500; by the 1969-70 academic year it had topped 3,700. During the same period, the full-time teaching staff rose from 249 to 438. Research, teaching, and administration have been strengthened through systematic programs of advanced training for staff members, support for visiting professorships in key disciplines, and a complete overhaul of University organization that has simplified internal operation and given new impetus to academic programs. An early achievement was the design of a standardized course of general studies required of all entering students to prepare them for university-level work. Other Latin American countries, which, like Colombia, draw from a wide variety of independent secondary schools, subsequently introduced similar courses. Valle has also pioneered in university administrative and fiscal reform.



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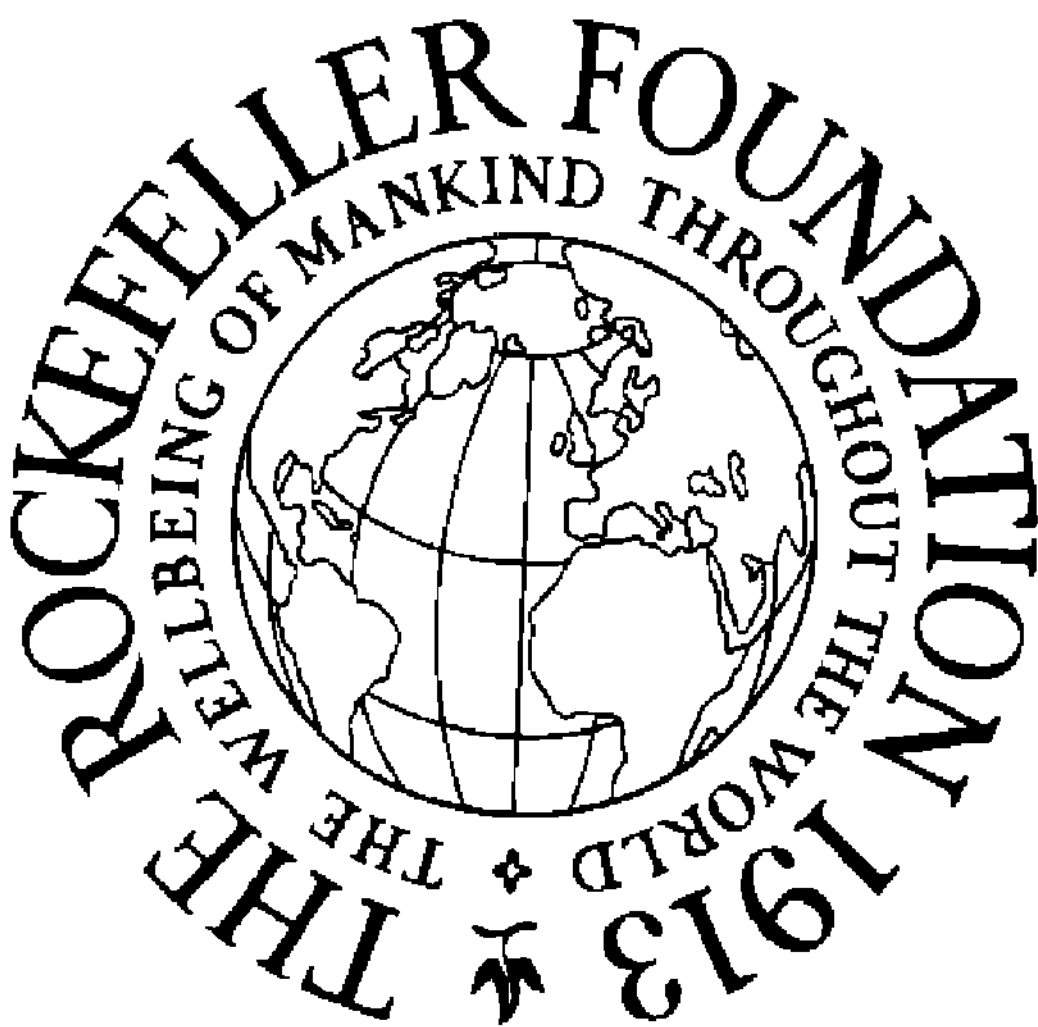


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In 1966 the loosely federated professional schools and faculties were regrouped into more cohesive units, and such services as accounting, planning, fund-raising, and student counseling were centralized. Because of the success of these measures, the Organization of American States sponsored a six-week summer course in Cali in 1969, which was attended by administrators from 14 Colombian and 16 other Latin American institutions. The University is playing an increasingly significant role in the social and economic development of the Cauca Valley and the city of Cali, one of the fastest-growing metropolitan centers in Colombia and one that has a good sampling of the typical problems besetting Latin American cities today. In addition to training the professionals needed in many fields, the University offers consulting services to government, business, and industry, and is involved in a number of research programs geared to local needs. Of fundamental significance are a study of health manpower needs being carried out by the Division of Health Sciences, studies of population trends by the University Committee for Population Studies, and several projects in the Division of Social Sciences and Economics.



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Work-in-Progress

THE FACULTY OF VETERINARY SCIENCE IN NAIROBI

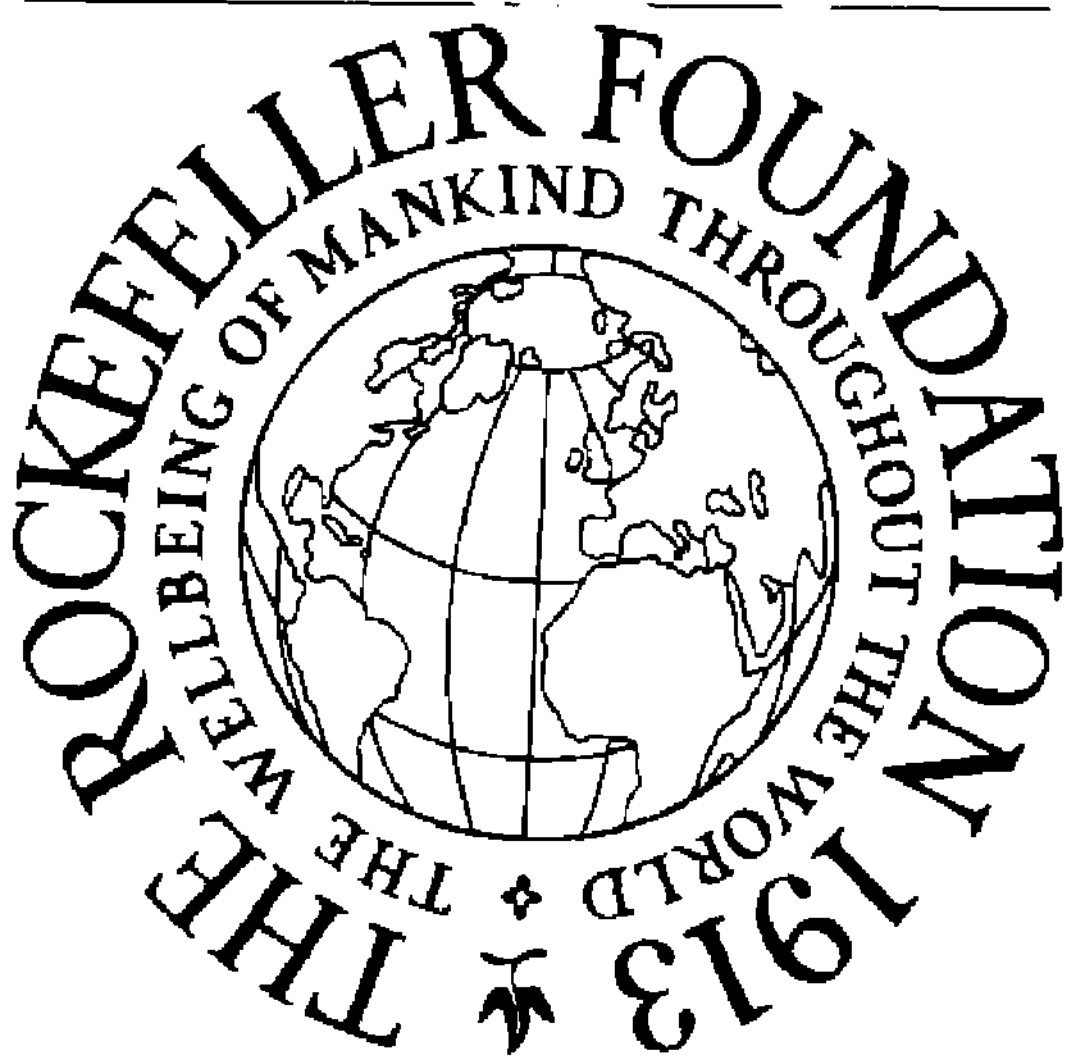
Livestocking is a traditional source of wealth in East Africa, supporting, wholly or in part, about 30 percent of the people. The leaders of Kenya, Tanzania, and Uganda are making efforts to develop the ancient practice of herding into a viable animal industry, and some progress has already been made in this direction. Massive programs to control animal disease and spread knowledge of good husbandry are urgently needed, but all three countries are short of trained manpower in veterinary science and animal production. When the three nations gained their independence in the early 1960's, a high-priority goal was to build up the veterinary profession. At that time, virtually all graduate veterinarians were expatriates with degrees from foreign schools; professional training at the university level was not available anywhere in East Africa. In less than a decade, one of the finest veterinary schools on the African continent has been developed: the Faculty of Veterinary Science in Kenya. Since 1962 The Rockefeller Foundation has cooperated closely in the development of the Faculty, which now trains between 50 and 60 veterinarians from the three East African nations each year. (The first class numbered four.) Candidates are mainly government scholarship holders, and most will go into government service after graduation. Some few with a bent for research and teaching go on to do graduate work



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Animal scientists, badly needed in a region heavily dependent on cattle and other livestock, receive first-rate training at East Africa's only university-level veterinary school.

and join the staff of the Faculty. For example Peter K. Bitakaramire (center), after a year of graduate work at the University of Glasgow, has been working on a Ph.D. project on liver fluke of cattle and lecturing on parasitology to second- and third-year students. Like other educational institutions in East Africa, the Faculty is anxious to have more Africans on its roster. About 33 percent of tenured posts are now held by Africans with advanced degrees from abroad. Dr. G. M. Mugeru (left), a Ph.D. from Michigan State University, is a lecturer in the Department of Veterinary Pathology and Microbiology. Several teams of scientists supported by foreign assistance organizations and governments make up the rest of the staff. From the outset, The Rockefeller Foundation provided funds to support both African and expatriate staff. The University of Glasgow sponsored one of the first teams of faculty members; the Federal Republic of Germany provided a group from Justus Liebig University in Giessen; and U. S. AID sponsored a team from Colorado State University. More recently, a Norwegian development organization brought in a group of animal production specialists. In 1966 Dr. Peter Nderito (right), a Kenyan, became the Faculty's first African dean. Research is focused on disease and production problems of the region, especially East Coast fever and trypanosomiasis.

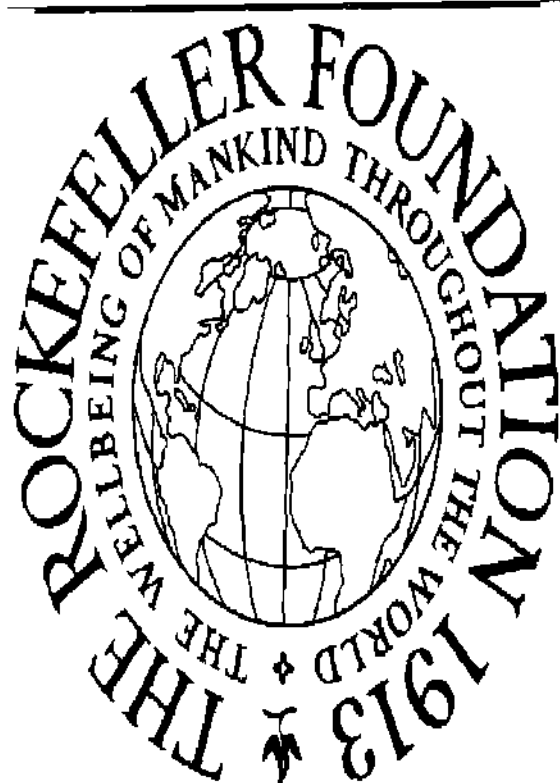
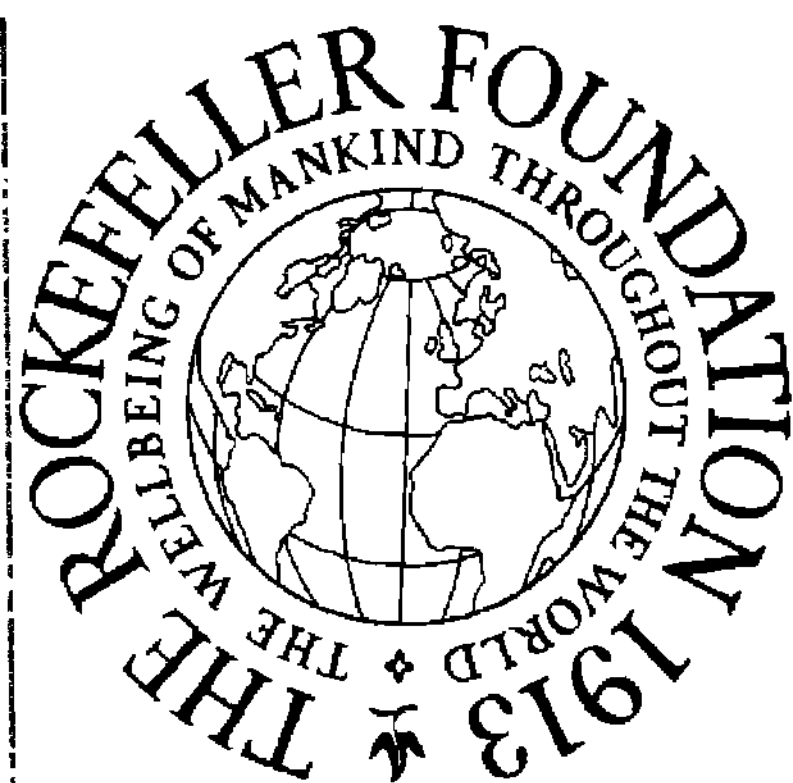


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Work-in-Progress

RURAL-HEALTH TRAINING IN BANGKOK

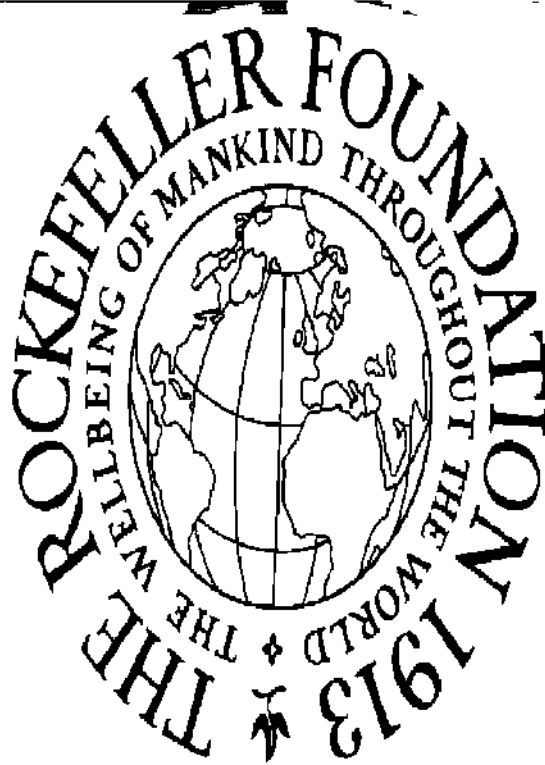
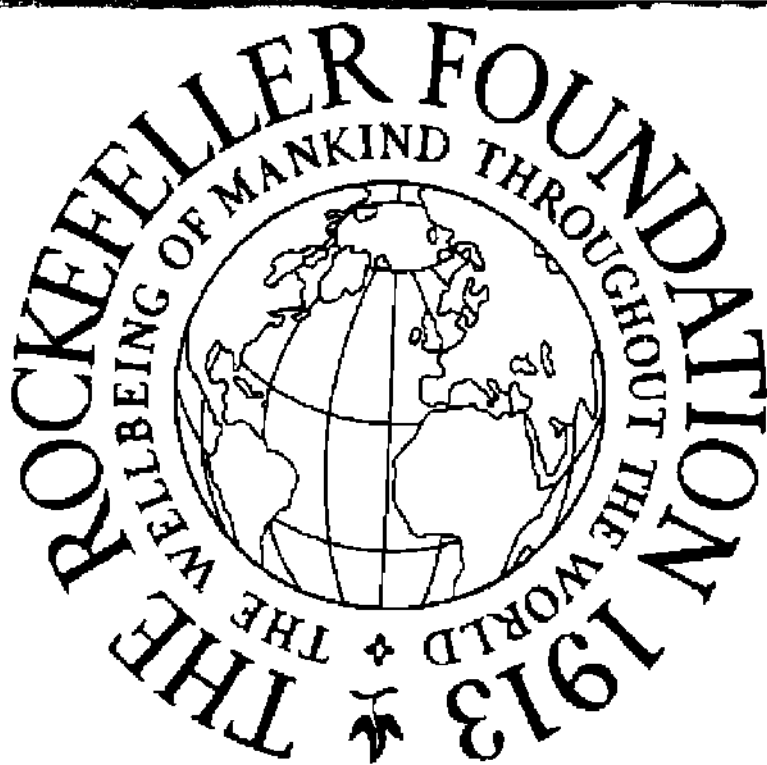
Community medical care delivered by a team of health workers is a fairly new concept in both the developed and developing countries of the world. The Community Health Program now being set up at the Ramathibodi Faculty of Medicine in Thailand heralds a new era in a university's concept of its role and function. A rural teaching facility is being built about 37 miles out of Bangkok, under the joint auspices of the Faculty and the Thai Ministry of Health, with assistance from The Rockefeller Foundation. It will train physicians, nurses, and other health personnel, and develop improved systems of delivering health care to the community. A first experiment in bringing medical students into direct contact with the problems of rural communities was made in 1968, with the cooperation of Foundation field-staff members stationed in Bangkok. A summer program, offered to medical-student volunteers, generated considerable enthusiasm and, more important, demonstrated that the idea would work. Students participated in every step of the planning: under faculty supervision, they designed and carried out a survey of the Bangchan district, a community of rice farmers near Bangkok, to determine the health status and



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Thai medical students, who traditionally seldom left their classroom, now travel into the villages to investigate health problems of rural people.

needs of the people. Teams of students traveled in launches along the klongs (canals) between rice fields, taking a door-to-door poll of health and sanitary conditions, collecting data on nutrition, population, and child development, and inquiring into local economic conditions, attitudes, and customs. Mothers were generally helpful and friendly but, reported the students, in the Thai tradition of child-rearing they would not force reluctant toddlers to get up on the scale or submit to being measured. A tally of preschool children's weights and heights showed over 50 percent suffering from malnutrition; head circumference measurements of malnourished children supported findings from other parts of the world that suggest a link between malnutrition and impaired intellectual development. The students tabulated their own data and drew up reports for classroom discussion as part of a course on community medicine introduced the following semester. Firsthand experience with rural living conditions and health problems was an eye-opener for many of the students. Faculty and government officials involved were more than ever convinced that rural clerkships should be a part of every medical student's training.

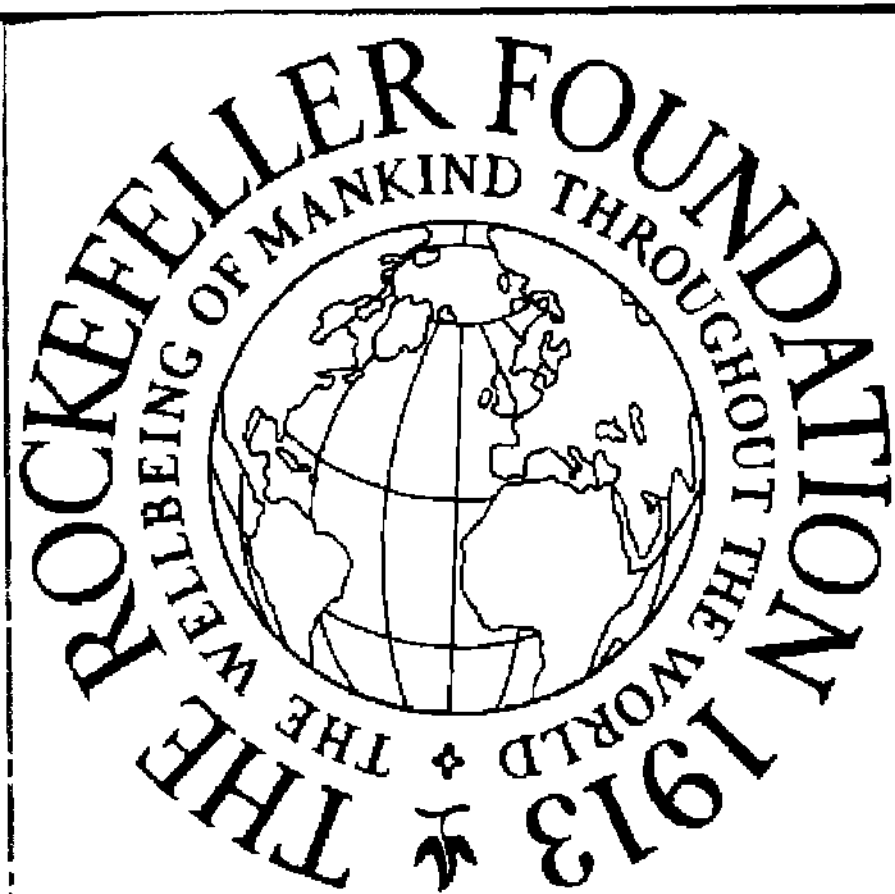


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Work-in-Progress

IBADAN'S READING CENTRE AND LANGUAGE LABORATORY

Freshmen entering the University of Ibadan often find their adjustment to college work complicated by the difficulty of having to study in English, which for many is a second language. For students who need help in improving their English reading and writing skills, the University created the Reading Centre, in operation since 1967; in addition, for help with spoken English, a language laboratory was established. The Rockefeller Foundation provided funds toward equipping and staffing these two facilities, which serve all the faculties of the University. The Reading Centre, in the Faculty of Arts, enrolls about 300 first-year students annually, most of them referred by their departments. The candidates are tested for reading efficiency and given background questionnaires designed to analyze individual reading and study habits. They are then enrolled in a course consisting of a weekly lecture and two laboratory sessions, with additional seminars and tutorials dealing with special problems. Concentrated work on pronunciation and grammar is provided for English majors to improve their fluency in class discussion and debate. The lectures are designed to give a general understanding of the psychological and linguistic factors behind reading difficulties and to explain overall remedial strategy; in the laboratory sessions students are taught to come to grips with their individual problems and to master



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African college students are developing reading and speaking skills in English and other modern languages through skilled instruction and the use of immediate play-back equipment.

corrective techniques. Practice with the aid of machines includes use of the eye-spanner trainer, reading accelerators, and reading films. Book-centered practice focuses on comprehension: students are helped to deal with difficult technical material, to grasp nuances of style in literary texts, to read between the lines. The classes and labs are scheduled for late afternoon and evening so as not to overlap with the regular curriculum, and students may sign up for individual practice, using the laboratory equipment in their free periods. Upperclassmen, too, who wish to improve their reading speed and language skills are encouraged to consult with the Centre's staff and to make use of the library and laboratory facilities. Although the Reading Centre and language laboratory are intended primarily for the study of English, they are used also by students of linguistics, Arabic, and any of the Nigerian languages; and students of European languages may have access to the equipment when the smaller laboratory in the Department of Modern Languages becomes too crowded. The Reading Centre has been invaluable in improving the academic performance of students working under a language handicap as well as in developing better methods of teaching reading and in training Nigerian reading specialists. It has attracted a great many visitors with a professional interest in teaching reading or remedial reading.

QUALITY OF THE ENVIRONMENT

During 1970 concern about the quality of the environment reached major proportions. The President brought the question before Congress and established the Council on Environmental Quality; the mass media responded to and further stimulated widespread public awareness of the dangers of pollution and deterioration. A national determination to come to grips with the problem began to take shape: the struggle to carry out this resolve, however, has only begun.

The issues involved are complex. Man has been changing his environment for centuries, but today the increasing speed and variety of change, generated by rapid population growth, advances in technology, and increasing urbanization, have brought us to the brink of an ecological crisis. Scientists now believe that man may have the potential to destroy the earth's biosphere. Evidence of deterioration includes air, water, and soil pollution, the accumulation of solid wastes, contamination of foods, radiation hazards, noise, increasing ugliness, and the complex of undesirable effects that results from decay of the inner city along with unplanned urbanization.

Pollution of air, water, and soil means essentially that the load of wastes discharged into them exceeds the capacity of the natural systems for regeneration. Prevention or reduction of pollution requires management and disposal of these wastes, which are the residuals from extraction, production, and consumption processes. Because matter cannot be destroyed, it is possible only to alter the form of residuals, not to eliminate them; this means that attempts to diminish one kind of pollution often increase another. The total amount of wastes produced can be lessened by increasing the efficiency of production and consumption processes and by recycling to reduce introduction of new materials into the system. Residuals that cannot be reused must be changed to forms that can be discharged into the environment with tolerable adverse effects.

Pollution is not the only problem. As urban centers have become increasingly unsatisfactory to live in, people have moved to the cities' outskirts where they have created sprawling and unplanned suburbs. Decay in the inner city and uncontrolled urbanization around it have resulted

in overcrowding, confusion, stress, noise, and ugliness as well as in the overtaking of educational resources, transportation networks, health care services, and other essential facilities and services.

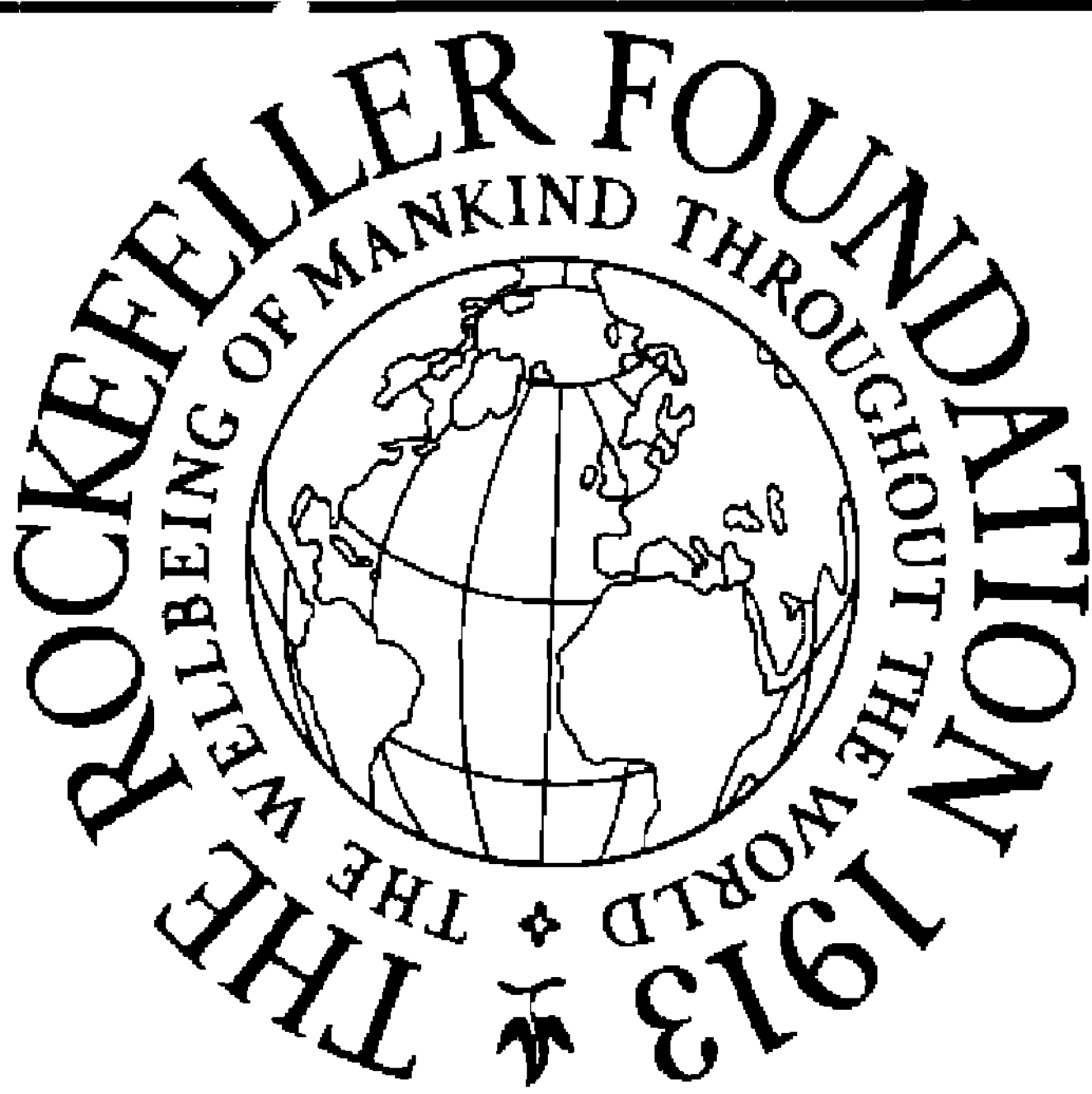
The individual family or factory has little control over the total residuals problem or the erosion of the quality of life. In fact, economic considerations commonly encourage actions that further damage the environment. Community, regional, state, and federal action is usually necessary for environmental preservation or improvement. Such action requires and will increasingly require an aware citizenry and substantially more information than is now available on the costs and benefits of alternative programs.

There are critical shortages of scientists, managers, technicians, and other trained personnel to staff existing public and private institutions and agencies. As efforts to cope with environmental problems are accelerated, the manpower shortage will worsen. Particularly needed at the managerial and scientific level are men with broad, multidisciplinary competence and understanding.

At the end of 1969 The Rockefeller Foundation established a program in Quality of the Environment to concentrate resources on a few selected aspects of the many needs in this field. Analysis of the causes of progressive environmental blight and of prospects for halting and reversing it, along with a review of existing public and private programs addressed to the problem, led to the selection of several general areas in which Foundation support might make a significant difference. A total of \$5.3 million has been allocated for projects within these areas since the program was inaugurated.

UNIVERSITY CENTERS

Universities generally are not structured to deal with new fields of study that cross disciplinary boundaries and demand the focusing of research and teaching from several different departments on a central problem. Development of knowledge about the components of the ecosystem and their interactions, required for management of various aspects of environmental degradation, demands a kind of teamwork that most academic institutions are not set up to provide.



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Luther Gerlach, an anthropologist at the University of Minnesota, is studying citizens' groups working for the improvement of the environment.

To mount research and training in environmental sciences, universities must develop new structures and mechanisms that permit them to make the best use of their disciplinary capabilities.

Foundation support has been given to a number of institutions to help them build up and coordinate studies focused on environmental problems, from which other institutions can benefit in setting up similar programs. The University of Michigan, the University of California at Davis, the University of Illinois, Pennsylvania State University, and Utah State University have received grants to establish centers of environmental studies that can involve the relevant disciplines in campus-wide interdisciplinary research, graduate training, and action programs on environmental quality. These institutions have excellent resources in various departments, schools, and institutes as well as ongoing programs dealing with conservation, regional planning, pollution control, and related efforts. The Foundation grants will enable them to coordinate and intensify these efforts and to expand their consultative services to state and local agencies seeking expert advice.

MANAGEMENT OF RESIDUALS

There is a critical need for comprehensive theoretical and empirical studies of the total problem of managing the wastes that cause environmental pollution. A conceptual framework is needed, embracing the extraction, production, and consumption activities in a given area, the inputs of materials in each process, the points at which residuals are generated, and the kinds and amounts generated at each point. With this framework and with data collected from the region, a total balance sheet can be developed. With models adapted for computerized analysis, the results of changes in each of the processes—including reduction of inputs, increased efficiencies, recycling, and treatment of residuals—can be tested with respect to their various interactions with economic and social factors, provision of goods and services for the community, environmental pollution of various kinds, and costs and means of disposal of the residuals.

Resources for the Future, an independent re-

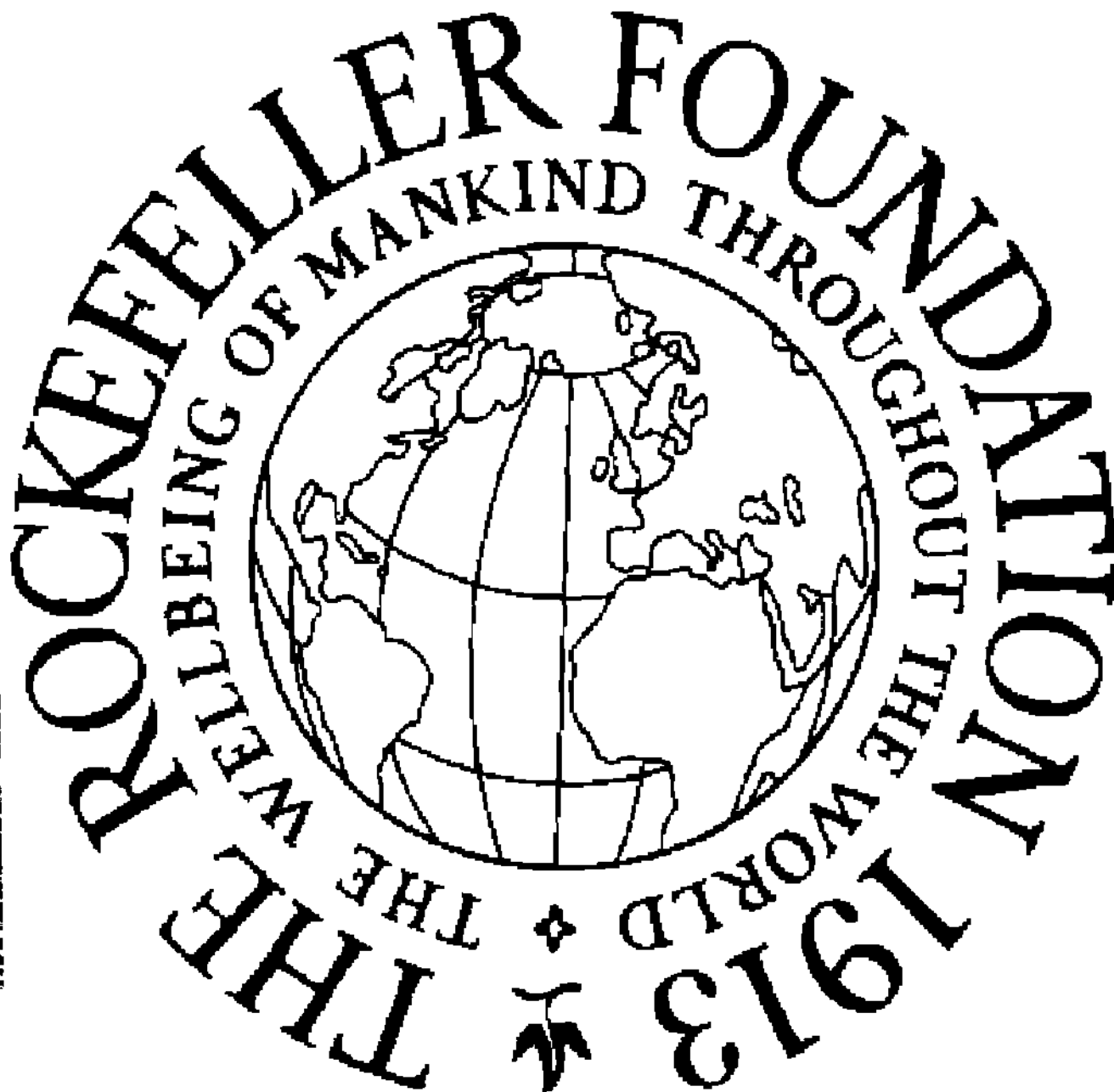
search concern in Washington, D. C., received a Foundation grant in 1969 to undertake studies in this field; some of the university programs being assisted are also working on related projects.

RESEARCH ON COMPONENTS OF THE ECOSYSTEM

The total ecosystem, of which man is a part, is composed of a large number of component ecosystems and of an extremely complex set of interactions among them. One such component is the freshwater ecosystem. In it is a diverse, closely integrated biological community within which energy and materials are accumulated and transferred through a food chain. This community is affected by a host of factors, including various pollutants. Under some conditions the end point in the chain is food and sport fish; under others, it is undesirable plant life or inedible scrap fish. More complete knowledge of the components of this ecosystem and their interactions should lead to management practices that would assure beneficial rather than undesirable products and might have implications for the understanding and manipulation of similar entities. In this area, a grant to the Academy of Natural Sciences of Philadelphia is supporting a study of the responses of freshwater plant and animal life to changes in water quality. A grant to the Boyce Thompson Institute for Plant Research, in Yonkers, New York, will support expansion of research on the Hudson River estuary, which is heavily polluted. The study will aim at defining ways of maintaining a functional ecosystem that will utilize urban and industrial wastes by converting them into marine food.

MONITORING POLLUTANT LEVELS

Acceptable limits for pollution or other forms of environmental damage are determined by a number of factors, including use and cost-benefit relationships. In fresh water, for example, the level of purity required will depend on whether the water is to be used for drinking, swimming, fishing, or boating, or as a medium for discharge of wastes and for commercial transport. Critical questions for which experimental evidence is required are the level of tolerance per-



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John Casida, an entomologist at the University of California, is cooperating with scientists from several universities on new and highly selective bio-degradable chemical pesticides.

missible for each use and the cost and benefits of attaining given levels. In addition, existing equipment and techniques for measuring levels of many pollutants must be refined for use in modern monitoring and control programs. These questions are being studied as part of Foundation-supported projects at Michigan State University and the University of Michigan.

REDUCTION OF POLLUTION

Problems of pollution of air, water, and soil are reaching emergency proportions. Major Foundation support for programs in this area has taken four directions: finding alternatives to chemical pesticides, designing a workable system of sewage disposal and community water management, developing an innovative approach to reduction of air contaminants from industrial plants, and investigating the problems of soil and water pollution from the raising of livestock.

At present there is no efficient alternative to the chemical insecticides that cause serious damage to agricultural soils, seep into watercourses, and ultimately contaminate food. The development of new pesticides with greater specificity of action and with controllable degradability is an urgent need. Research in this area is being supported by the Foundation at the University of Illinois, Cornell University, and the University of California at Riverside and at Berkeley. These four leading laboratory teams are conducting complementary research toward development of chemicals that will attack vital enzyme systems of certain insects without harming other species or the environment.

In addition, at three of these Universities, studies are in progress on insect sex attractants, or pheromones. Cornell and the University of California at Berkeley and at Riverside received additional support this year for research aimed at understanding the action of pheromones and devising ways to use them to interfere with insect mating.

Another promising approach to pest control, under study at Harvard, is the use of juvenile hormones. A grant made this year is supporting the work of the Laboratory of Insect Physiology, where Dr. Carroll M. Williams and his colleagues

are working on ways of preventing insects from reaching the reproductive stage in their development. Like the sex attractants, the juvenile hormones are highly selective and have little effect on man or animals or even on insects of other species.

The need for chemical pesticides can also be greatly reduced by altering certain characteristics of the plants they attack. Innate resistance to insect pests has been successfully bred into superior varieties of a number of crops through genetic manipulation. Now research will be focused on cotton, one of the major crops for which chemical protection is necessary. The cotton bollworm or corn earworm (*Heliothis zea*) and the related *Heliothis virescens* are the target pests of the heaviest load of chemical pesticides used in agriculture in the United States. In an effort to breed plants resistant to these insects, a cooperative program, involving teams of entomologists, plant breeders, and plant biochemists, was initiated this year with Foundation support at Texas A & M University, Mississippi State University, and the University of California at Davis. The research on cotton is expected to suggest approaches to breeding resistance to these same insects into other crops that they attack.

Studies of water management and sewage disposal are under way at Michigan State University with the aid of a 1970 grant from the Foundation. In a 300-acre area, a system of lakes and ponds stocked with aquatic plants and fish is being developed to provide "living filters" for gradual breakdown of sewage effluent. The water, in various stages of purification, will be used on planted areas, and parts of the project will serve as public parks. The complex will offer possibilities for research and training in hydrology, biology, agronomy, fish culture, and other sciences; and social and economic studies will be made to evaluate the usefulness of the system for the management of the quality of community water supplies.

Soil filtration of smoke from industrial plants, under investigation at the University of Arizona, is a new and promising approach to reducing air pollutants. With Foundation support, a team of scientists is at work on a project in which exhaust



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Blair Bower and Allen Kneese of Resources for the Future are studying man's extraction, production, and consumption activities in various geographical areas in order to develop an environmental overview.

gases would be channeled through a network of tunnels near the soil surface, so that chemical pollutants, heat, and particles would be absorbed or filtered, and the harmless components released into the air. The scientists believe that the soil could renew its absorptive capacity if allowed to rest between periods of use as a gas filter. Tests are being made to determine what soils would be best adapted for this purpose.

The New York State College of Agriculture at Cornell is undertaking a program of research and graduate education dealing with the management, utilization, and disposal of animal wastes, including study of nutrient accumulation in waters from agricultural lands and the factors affecting the eutrophication process. The program will attempt to develop techniques for reducing contamination of land and to discover means of predicting the sensitivity of lakes and rivers to the addition of nutrients from soils used in livestock raising. Social and economic factors will be studied to help guide policy concerned with food production and environmental quality.

TRAINING FOR TECHNICIANS

In addition to graduate training for environmental specialists at university centers, the Foundation is supporting training for technicians to staff public and private agencies engaged in pollution monitoring and control. Personnel skilled in these fields are in short supply. A grant was made this year to Monroe County Community College in Michigan to develop a training pro-

gram for environmental technicians. In cooperation with local industries, municipal officials, and specialists from Wayne State University, the Community College has designed a curriculum for training personnel to support engineering staffs and to operate quality control and monitoring equipment.

STUDIES OF SOCIETAL ACTION

Much of the effort to combat environmental deterioration will have to be made by community and governmental agencies, since the individual has little control over the total problem and in fact is more often faced with economic disincentives. In order to develop effective public programs for environmental protection and improvement, better understanding is needed of the mechanisms and institutions involved in community, state, regional, and federal action. On another level, it is important to know how ecological values become societal issues, what factors are involved in individual participation in groups concerned with environmental quality, and what strategies are most likely to be effective in securing compliance with proposed control measures. A group of researchers at Princeton University's Woodrow Wilson School of Public and International Affairs is seeking answers to these questions in a long-range study of the role of public authorities in different societies and at different levels of government in dealing with environmental problems. A Foundation grant was made last year in support of this work.



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John Bardach, professor of fisheries, is a member of the University of Michigan's new interdisciplinary center for environmental studies.

GRANTS APPROVED IN 1970

UNITED STATES

COLUMBIA UNIVERSITY, New York: for use by its School of Engineering and Applied Science toward studies for a survey of environmental pollution, conducted by the New York City Science and Technology Advisory Council; \$25,000;

CORNELL UNIVERSITY, New York:

Toward the cost of developing a research and graduate education program on management of agricultural wastes and nutrients for minimum environmental damage; \$600,000 for a four-year period;

Toward support of collaborative research and graduate training on the development of selective, non-persistent pesticide chemicals; \$50,000;

Toward support of collaborative studies on the role of insect pheromones in the biology and control of insect pests; \$25,000;

HARVARD UNIVERSITY, Massachusetts: toward the costs of a program dealing with new approaches to the selective control of insects, under the direction of Dr. Carroll M. Williams of the Biological Laboratories; \$250,000 for a three-year period;

MASSACHUSETTS INSTITUTE OF TECHNOLOGY:

In partial support of the 1970 Summer Study on global climatic and ecological effects of pollution of the atmosphere-ocean system; \$25,000;

Toward the costs of its participation in the MIT/Cal Tech Clean Air Car Race; \$25,000;

MICHIGAN STATE UNIVERSITY: toward the initiation of an experimental program on water quality management; \$250,000;

MISSISSIPPI STATE UNIVERSITY: toward support of cooperative research and graduate training on plant resistance to insects, primarily to species of *Heliothis* and *Lygus*; \$42,060;

MONROE COUNTY COMMUNITY COLLEGE, Michigan: toward the costs of developing a pilot program to train environmental control technicians; \$45,000 for a two-year period;

PENNSYLVANIA STATE UNIVERSITY: toward the costs of developing an interdisciplinary program for research and training in environmental studies; \$750,000 for a four-year period;

TEXAS A & M UNIVERSITY: toward support of cooperative research and graduate training on plant resistance to insects, primarily to species of *Heliothis* and *Lygus*; \$116,300;

UNIVERSITY OF ARIZONA: toward the costs of research on soil absorption and filtration of air pollutants; \$95,000 for a three-year period;

UNIVERSITY OF CALIFORNIA:

Berkeley

Toward support of collaborative research and graduate training on the development of selective, non-persistent pesticide chemicals; \$100,000;

Toward support of collaborative studies on the role of insect pheromones in the biology and control of insect pests; \$25,000;

Davis

Toward the costs of developing its research and training programs in environmental studies; \$284,000 for a two-year period;

Riverside

Toward support of collaborative research and graduate training on the development of selective, non-persistent pesticide chemicals; \$49,730;

Toward support of collaborative studies on the role of insect pheromones in the biology and control of insect pests; \$25,000;

UNIVERSITY OF COLORADO: support of a joint working meeting of the Science and Society Committee of the Biological Sciences Curriculum Study with representatives of the Consortium of Professional Associations in Social Science, for the development of classroom materials at the secondary level concerned with environmental quality and population control; \$4,500;

UNIVERSITY OF ILLINOIS: toward support of collaborative research and graduate training on the development of selective, non-persistent pesticide chemicals; \$49,800;

UTAH STATE UNIVERSITY: toward the costs of developing an interdisciplinary program of research and training in environmental studies; \$600,000 for a four-year period.



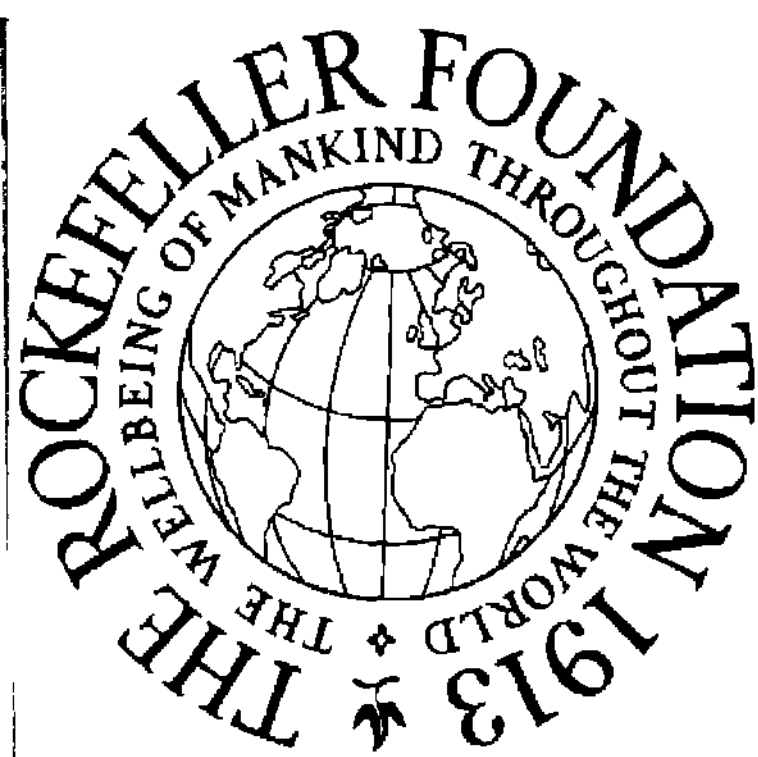
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Professor Hinrich Bohn (far right, bottom) leads a team at the University of Arizona that seeks to purify noxious gases by using soil as a living, self-renewing filter.

Work-in-Progress

DE-TOXIFYING INDUSTRIAL GASES IN ARIZONA

Industrial plants are important sources of pollution of the air by noxious gases, including sulfur dioxide, oxides of nitrogen, and hydrocarbons; by heat or water vapor; and by small particles of matter. The adverse effects of these emissions are commonly controlled in the immediate area of the plant by very high stacks, which cause the pollutants to be dissipated over a large area downwind from the plant. Pollutants can now be controlled to some degree by various kinds of chemical and physical equipment, but this equipment, while elaborate and costly, is only moderately effective. Consequently, for economy's sake, it is usually operated at the upper limit of allowable environmental pollution. Professor Hinrich Bohn and his associates at the University of Arizona believe that the soil might be used effectively as a living filter for such industrial emissions. Soil has many advantages as a filter—high absorptive capacity, porosity, rapid and continual regeneration, and reaction with many chemical pollutants. It is known to absorb and filter, effectively and inexpensively, chemical and particle pollutants from water; theoretically, it should be able to remove pollutants from the air. Dr. Bohn theorizes that the gases could pass through the soil from a network of closed or open-ended horizontal tunnels near the soil surface. Reactive sub-



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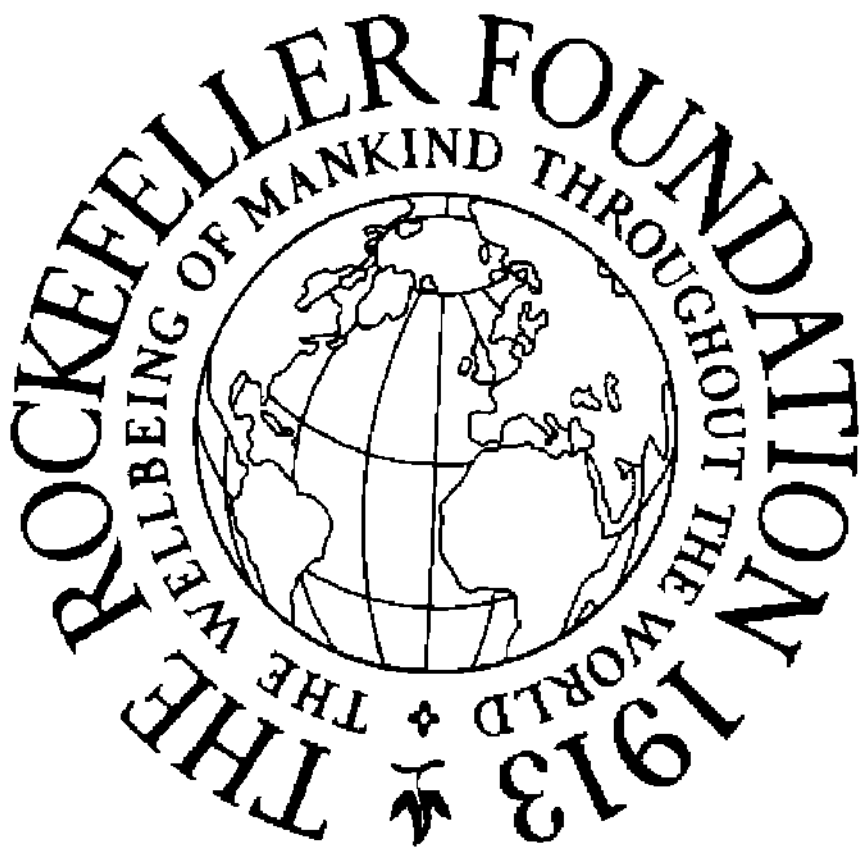


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fur, nitrogen and carbon compounds, and heat would be absorbed and the particles filtered. The harmless components—nitrogen, oxygen, and carbon dioxide—would be released into the atmosphere. The soil's microorganisms, utilizing the air pollutants as an energy source, would then convert them into innocuous and potentially useful substances. Because the gases would be converted to other substances and because they would stimulate microbial growth, the soil could, it is hoped, continually regenerate its absorptive quality. A two-phase program is now under way. In Phase I, which will take place over a period of three years, research is being conducted in University laboratories under controlled conditions to check the theoretical calculations on the absorptive capacities of various types of soil and to determine the chemical, physical, and biological effects of use of soil as a living filter. These experiments are being carried out by a team of four University of Arizona faculty members: Professor Bohn, who is a soil chemist; two soil physicists; and a microbiologist. If the theoretical conclusions regarding soils as a filter are substantiated by this research, Phase II, consisting of economic and engineering studies under practical conditions, will then begin.



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At Harvard University, Professor Carroll Williams and his associates seek to control insect populations by biological means that Dr. Williams calls third-generation pesticides.

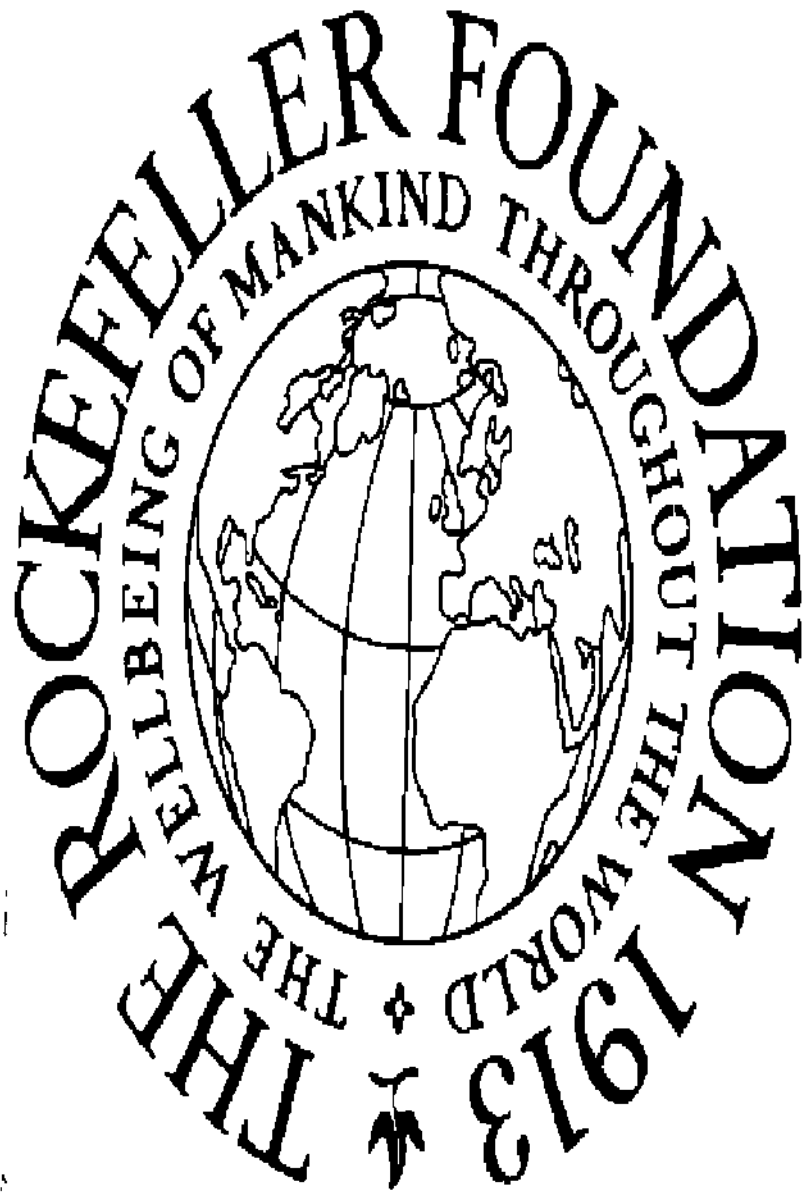
Work-in-Progress

THIRD-GENERATION PESTICIDES

Modern agriculture and public health owe a huge debt to the use of pesticides, which protect against the insect plagues that once ruined crops or decimated populations. But present "broad spectrum" and persistent pesticides such as DDT have been increasingly implicated as major pollutants of the environment, with harmful effects on man and other organisms. The work of Dr. Carroll M. Williams and his staff at Harvard's Laboratory of Insect Physiology promises to lead to some important new alternatives. The Laboratory, which is guided by Dr. Williams and two of his associates, Drs. Fotis C. Kafatos and Lynn M. Riddiford, is an important center of insect-control research. One significant area of investigation has been the discovery and testing of the juvenile hormone and its synthetic equivalents — a chemical compound that keeps insects from passing from the larval to the adult stage in their life cycles — thus making them unable to reproduce. Field tests of these hormones are now being conducted in Europe and the United States. Dr. Williams calls the juvenile hormones a probable "third-generation" pesticide

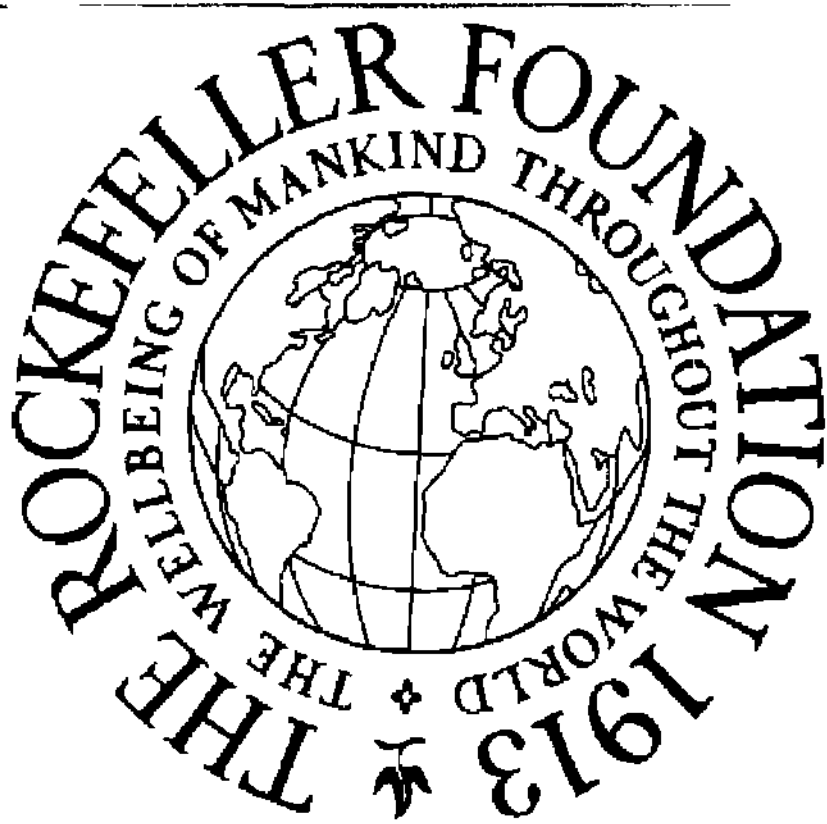


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— the latest in a series of discoveries that began about 50 years ago. Lead arsenate was a “first-generation” pesticide, used extensively in the 1920’s and ’30’s in increasingly heavy dosages. The pests developed an unbelievable resistance to it; also it was found to be too highly poisonous to man to be of continued practical use. The chlorinated hydrocarbons such as DDT, “second-generation” pesticides used in the ’40’s and ’50’s and up to the present, were hailed as a breakthrough — until their long-term effects became known. The DDT-type pesticides are generally nonselective — they destroy beneficial insects as well as pests. Also, they are “persistent”; they will not break down, in months or even in years, into harmless chemical components. In contrast, Dr. Williams’s “third-generation” pesticides will affect only target insect species — by using their own hormones against them. In addition to research on the replacement of conventional insecticides, the Laboratory is studying several other potential insect-control measures, including the time-keeping mechanism of the insect brain.



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Students sponsored a race from Cambridge to Pasadena to dramatize especially adapted low-pollution cars, which aroused great interest during stopovers along the route.

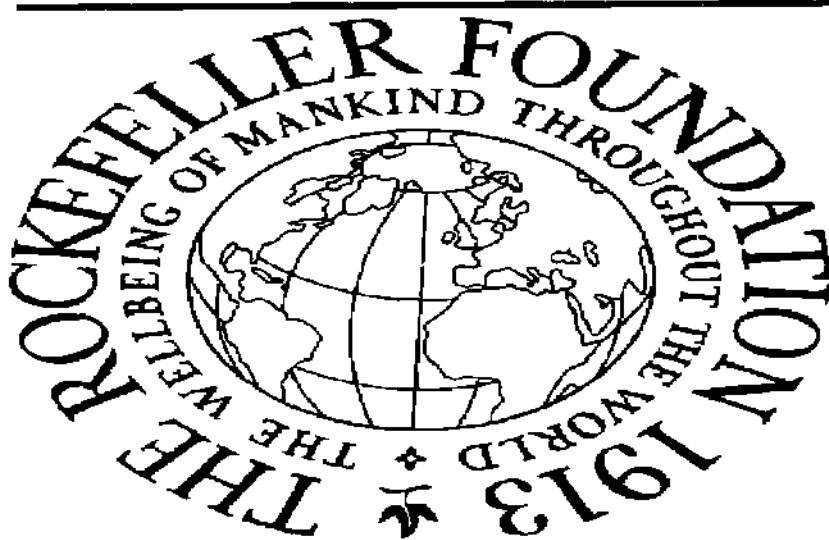
Work-in-Progress

CLEAN AIR CAR RACE

Last August, 45 student teams from 30 colleges and universities and three high schools lined up in Cambridge, Massachusetts, for the 3,600-mile, cross-country Clean Air Car Race, in cars especially built or rebuilt to meet low-pollution standards. The starting point was the campus of the Massachusetts Institute of Technology and the finish line the California Institute of Technology in Pasadena, the universities to which the race's young sponsors belonged. The event was designed to demonstrate how automotive technology can be enlisted in the fight against the air pollution problems it has helped to create. Said one young participant: "If we wait for nature to remove all the pollutants we put into the air, we will be dead." At halts in Toronto, Detroit, Ann Arbor, Urbana, Oklahoma City, Odessa (Texas), and Tucson, the cars were put on public display, and the student drivers rested, answered questions, and enjoyed a brief celebrity. Pollution emissions of the cars were tested at the start and finish, and midway, in Detroit, and the results fed into a computer along with speed and performance data. Highest points went to lowest polluters. The entrants fell into six categories: cars with internal combustion engines that used liquid fuels; those with internal combustion engines using other types of fuel such as propane or natural gas; electric cars whose batteries were recharged at stations along the way or by generators carried in accompanying trucks; hybrid electric models with their own gasoline-powered rechargers; steam-powered cars; and cars run by turbine engine.



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All met the standards for emissions of carbon monoxide, hydrocarbons, and nitrogen oxides proposed by the Federal Government for new cars in 1975; some did even better. A winner was announced in each category, with the overall prize going to the Wayne State University team, which drove a Detroit production model running on unleaded gasoline and fitted with several antipollution devices. The race aroused curiosity and interest all along its route, and a central information center in Chicago monitored daily progress by telephone. In addition to dramatizing the problem and stimulating some inventive thinking about solutions, the event is expected to create an upsurge of interest in automotive engineering in schools of technology, where it has traditionally been considered a subject of minor importance. Student participants as well as spectators gained an appreciation of the complexity of the questions involved. The Rockefeller Foundation made a grant to M.I.T. toward costs of the race, and a number of companies provided financial and technical support. Prizes of up to \$5,000 in each category were given by the National Air Pollution Control Administration, in return for a two-month lease of the winning vehicles. The best performing entries will be copied for further testing as part of the Government's program to promote development of clean car engines. Significantly, the race brought together representatives of government, industry, technology, education, and the motoring public, providing a good sample of the kind of cooperation it will take to tackle the problem on a national scale.

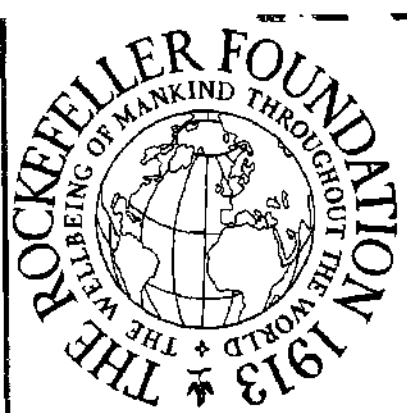


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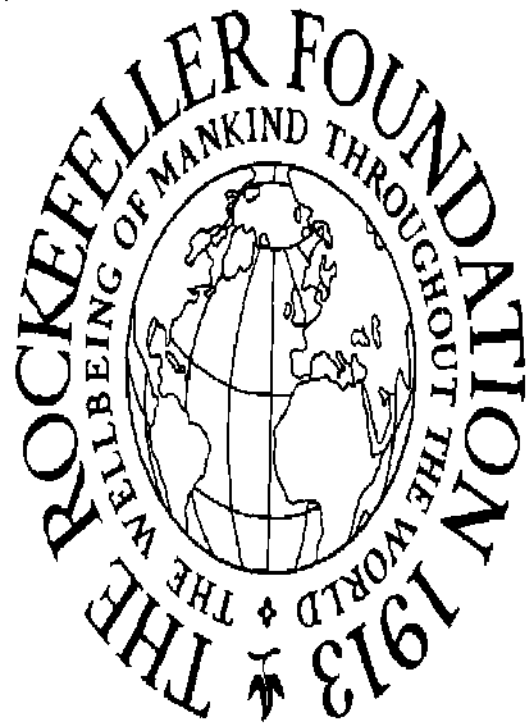
Work-in-Progress

TRAINED MANPOWER FOR A BETTER ENVIRONMENT

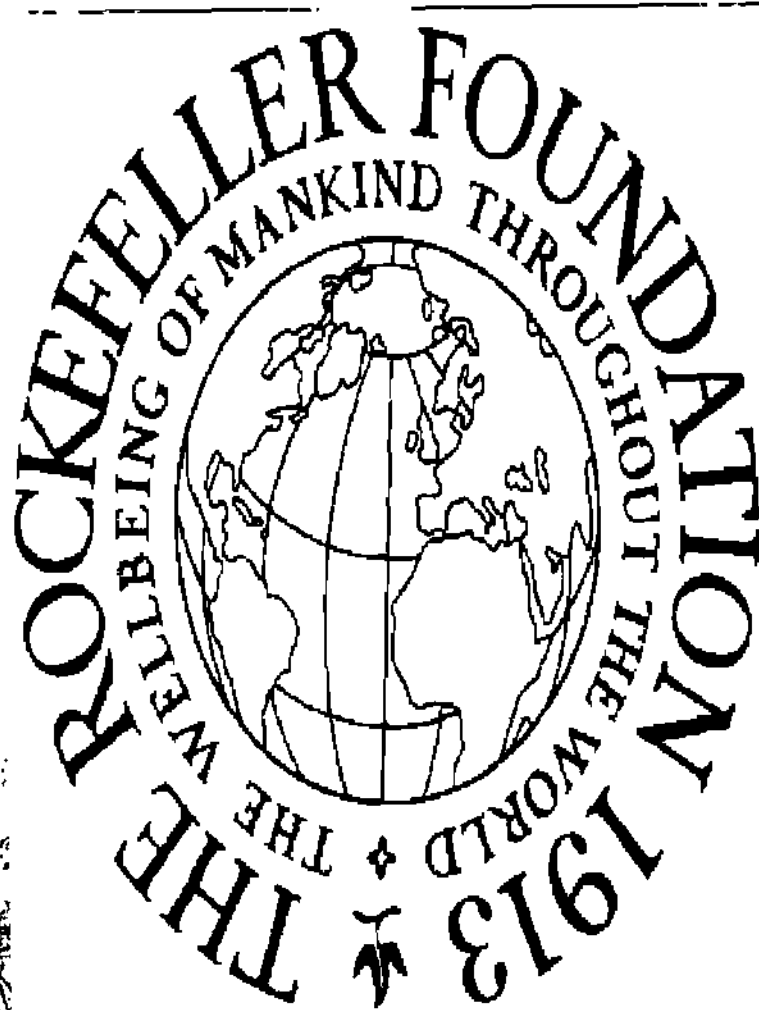
Concern over environmental deterioration has led a great many private industries and public agencies to step up their pollution control efforts, with the result that the demand for trained people is running far ahead of the supply. A number of universities have introduced graduate and undergraduate programs for environmentalists, but little attention has gone to forming a supporting cadre of technicians. Needed now is a sound pattern for training the engineer's right-hand man, the skilled technician who can operate and service air and water quality monitoring equipment and other pollution control facilities. Among the first to recognize this training gap, and to take action, was a group of educators, engineers, manufacturers, and municipal officials in Monroe County in southeastern Michigan, among them faculty members of Monroe County Community College. With the help of a committee of specialists, and with financial support from The Rockefeller Foundation, Monroe has designed a pioneer educational program in environmental control technology, to focus initially on water quality. In a two-year curriculum, which includes a summer of field work, candidates will receive practical training in waste-water manage-



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Photograph Excised Here Training environmental technicians has become an important part of the curriculum at Monroe County Community College.

ment, balanced by general education, specialized courses, and supporting theory in science and mathematics. Cooperating industrial concerns in the area have agreed to offer job experience during the summer months as well as self-help opportunities for needy students. Laboratory space and facilities are being provided by Environmental Research Associates, a local nonprofit corporation, which has a research center near the campus. Located between Toledo and Detroit, and just ten miles from Lake Erie, the College is in an area surrounded by heavy industry and increasingly subject to the pressures of commercial and residential expansion. Waters of Plum Creek, which crosses the campus, and the nearby Raisin River, like Lake Erie, are heavily polluted, and there are a number of industrial and municipal water treatment plants in the vicinity. A 60-acre nature laboratory containing two artificial ponds for experimental purposes is under construction on the campus. Monroe Community College is a fast-growing, service-minded institution, whose enrollment is expected to climb to 3,500 in the near future. Several other colleges have been in touch with Monroe and are following developments in the environmental technology program.



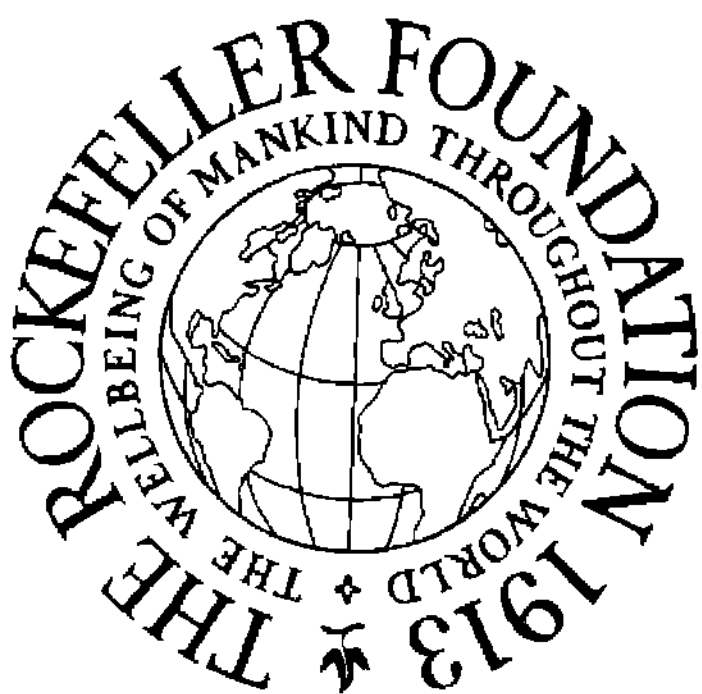
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Work-in-Progress

A UNIVERSITY ENVIRONMENTAL CENTER

Many environmental problems are unique to specific resource-and-climate combinations, or to local patterns of industrial activity. In Utah, for example, the effects of years of mining, recent rapid industrial growth, and the fact that effects of environmental disturbances persist much longer in arid lands than in humid regions, present problems which demand specialists well acquainted with the region and trained to understand the many factors contributing to environmental deterioration. Utah State University, chartered in 1888, has had a long and notable record of concern with environmental quality in the Mountain States region. Under the leadership of President Glen Taggart, who is committed to making environmental concern a major thrust of the University, a novel and experimental three-year multidisciplinary program is now being created on the theme of "Environment and Man." The program emphasizes the relationship of man to the physical and biological attributes of the environment, particularly as they relate to his socio-economic circumstances. Students, social scientists, home economists, specialists in education, and faculty in the humanities are being encouraged to cooperate with their counterparts in the natural sciences in seeking solutions to compassable environmental problems. Procedures for the program are being developed initially by the University Environmental



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At Utah State University, investigators in several disciplines are making a unified approach to the environmental problems created by both industry and massive consumer demands.

Council, a panel of nine members drawn from a cross section of departments and research institutions. Colloquia will be called by the Council periodically to consider selected topics of major concern to the area, such as the appropriate distribution of the costs of environmental improvement among the interest groups involved or the development of guidelines for land use planning in sections of the state being rapidly urbanized. Task forces made up of faculty and graduate students, and initiated at the recommendation of a colloquium, will be responsible for undertaking applied research, educating the public, and developing alternatives for legislative or public consideration. As research needs are identified and evaluated, the University will attempt to secure preliminary two-year funding from regular institutional funds such as those allocated through the University's own Agricultural Experiment Station, the Ecology Center, or the Water Research Laboratory. As a counterpart to the University Environmental Council, a State Council on Environmental Quality is also being organized. Representing the public, industry, and state and local government, the State Council will consider state needs, advise the University Council, and operate as an independent group to promote community and state action. Utah State hopes to assume a regional role for stimulating interest in similar research and service programs.

EQUAL OPPORTUNITY FOR ALL

The Rockefeller Foundation believes that it can make its most important and lasting contributions in the areas of race relations and equal opportunity by steadfastly seeking ways to advance the full and successful participation of all groups in the mainstream of American life.

The Foundation began this program in 1963 by helping to improve opportunities in higher education for minority-group students, in the belief that individual achievement would benefit the whole country. Since then Foundation-supported programs in universities and colleges have been instrumental in bringing about changes in attitudes and in procedures that formerly barred gifted minority-group students from a good education and hence from positions of leadership and influence in community and national life. At the high school level, programs of student guidance and educational reinforcement led the way in preparing disadvantaged young people for careers and professions from which they were traditionally excluded. Such programs were often the prototypes for subsequent publicly funded efforts to bring about equality of educational opportunity.

In 1968, as governmental support became increasingly available in this area, the Foundation made the decision to turn its attention to the growing crisis of the inner cities. Among the many possibilities, the Foundation selected three strategic areas in which a concentration of effort might be expected to provide the greatest leverage: the improvement of inner-city schools; development of leadership within minority and poverty groups; and research on the causes and possible cures of ghetto problems.

IMPROVING INNER-CITY SCHOOLS

The American ideal of equality of opportunity is, in theory, implemented by universal free education. This has not worked out in practice. The great urban centers in this country, in particular, have failed to achieve adequate schooling for the poor and the minority groups crowded into their slums. The educational experiences of inner-city youth have provoked frustration, confusion, and anger — or worse, apathy — rather than the desire to learn or the will to master an academic dis-

cipline or a professional skill. This is also true in rural areas, but in large cities the problems are massive and concentrated. The nation must now find the ways and pay the costs of adapting existing institutional structures to the task of making education meaningful and productive.

In major cities where public school leaders have committed themselves to innovation and improvement in the inner-city schools, the Foundation has assisted with key projects aimed at specific goals: increasing the school's participation in neighborhood and community affairs; involving parents and other neighborhood people in the school's activities; improving teachers' relationships with the pupils and their parents; improving the character and effectiveness of the school's curriculum, teaching materials, programs, and methods; developing more realistic and workable programs and counseling to guide and assist graduates into more advanced study or promising jobs; and improving the interest, aspirations, and effective learning of the pupils.

Several pioneering programs have been initiated with Foundation support. For example, in Philadelphia an innovative demonstration mini-school has served as a model in the planning of a new school in the Mantua district; Alain Leroy Locke High School in Los Angeles has experimented with a variety of activities directly related to changing the image of the school, making its educational program more effective, and finding new ways of building bridges to the community; in St. Louis three community school programs have been initiated with Foundation aid and have proven so successful that the school system has launched three additional programs; in Minneapolis a North Side community has been drawn directly into the planning of a new educational complex; community counseling and innovation centers have been created in the Chicago-East Chicago-Gary area as a result of the Foundation's effort to help schools find new ways of developing meaningful community relationships.

Critically important for effective public school performance in the inner cities is administrative leadership at all levels from superintendent to assistant principal. Highly trained, experienced people are needed to deal with the complex and



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Philip del Campo was trained in the superintendent's office of the Rochester, New York, school system for superintendent-level responsibilities.

difficult problems of the school system in our large cities with their heterogeneous populations. The Foundation is helping to pioneer a very promising method of providing the type of in-service training necessary to enable qualified minority-group administrators to advance to top-echelon positions. A program of internships has been designed to familiarize the candidates with the problems of inner-city schools and to provide them with experiences that would normally take many years to acquire on the job. Many of the country's ablest big-city school superintendents are cooperating in this program.

Last year, with Foundation aid, Baltimore and Detroit launched internship programs for school principals, and Philadelphia initiated a similar program for educational planners. In 1970 the Baltimore School District received a second grant to appoint an additional ten trainees, the first group of five having been promoted to administrative posts following their year of internship.

The internship program at the level of superintendent and assistant superintendent was launched this year with the appointment of seven candidates of the highest caliber recommended by their school systems; each is serving in the school superintendent's office in two cities, one semester in each. Participating in the program are the superintendents of schools in Cleveland, Minneapolis, Detroit, Rochester, San Diego, Gary, Philadelphia, and Baltimore.

One of the first Foundation-supported programs aimed at improving ghetto schools was started in 1967 by the Bank Street College of Education in New York. The College established a Division of Field Services in Harlem, where it has been operating a demonstration project in three public school districts with the cooperation of the Board of Education. Division staff members have worked with teachers, supervisors, and principals in the area and have also assisted parent and community groups in developing constructive activities for the improvement of neighborhood schools. A second grant was made this year for expansion of this program.

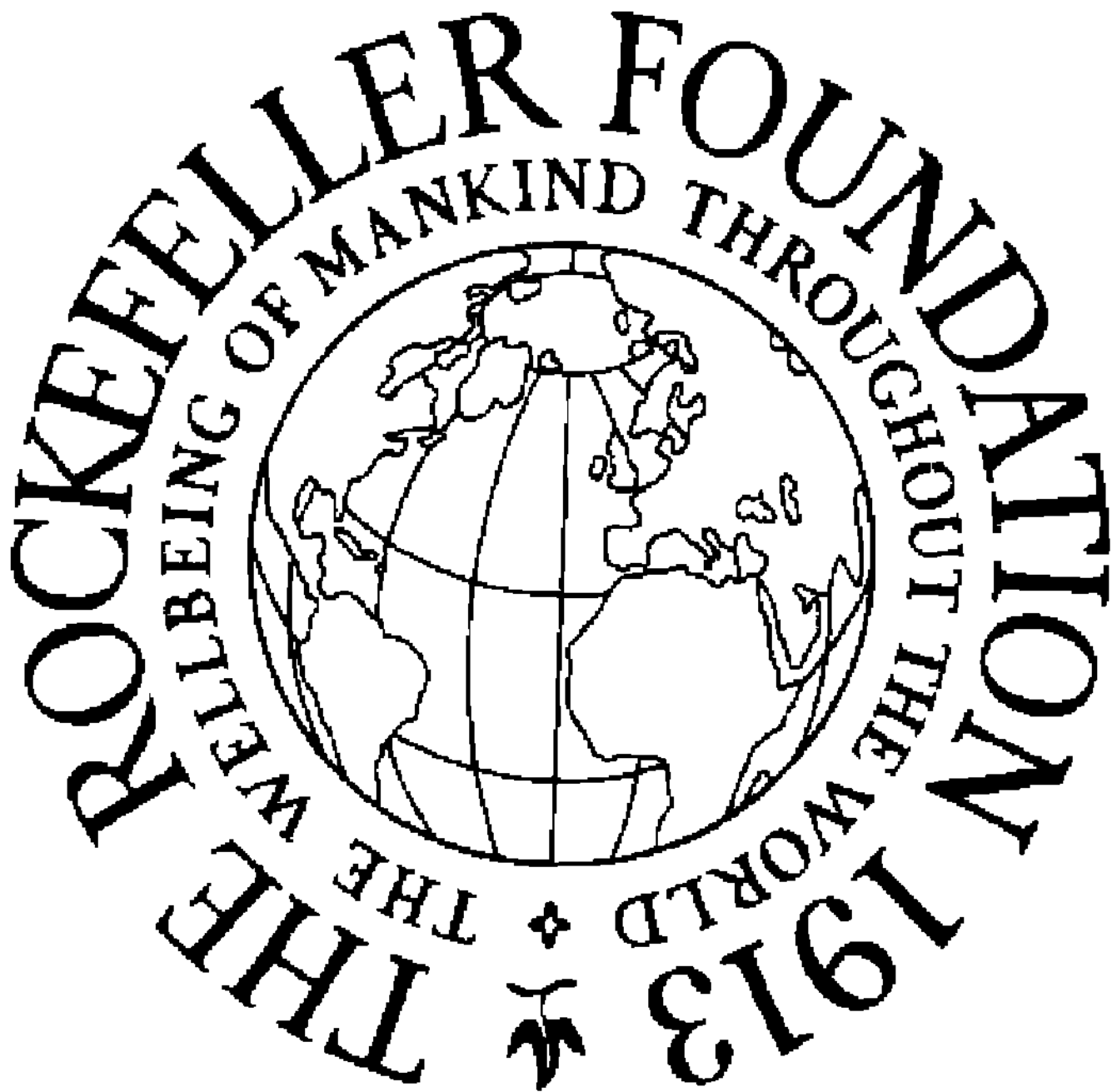
Temple University in Philadelphia received support this year for an innovative project in public education and teacher training called the

Portal School Program. Temple's College of Education has created a Department of Urban Education to focus on the special needs of inner-city children and to provide teachers with first-hand experience in ghetto schools. Working with selected neighborhood schools, the Portal School Program seeks to involve community residents and parents in the schools' activities and to work out better ways of using paraprofessional and student aides.

Another experimental approach to improving the learning experience of children and to furthering equality of educational opportunity is being successfully developed by the Rochester City School District in its World of Inquiry School, a component of Project UNIQUE. Good scholastic results and successful racial integration have both been achieved, and some of the teaching methods developed have already been adopted in other Rochester schools. A Foundation grant was made this year to help support the School for a two-year period while local sources of funding are being consolidated.

An experiment in preparing children at an early age to live successfully in a culturally and racially diversified society is being carried out at the Multi-Culture Institute in San Francisco. The emphasis in this innovative educational program is on teaching minority-group children about their own cultural heritage and on developing interest in and respect for other ethnic groups. A grant was made by the Foundation this year to help support the Institute and to enable it to train teachers and administrators from other schools in the curriculum and methods used in this program.

Two grants made in 1970 were focused on the problems of inner-city high school seniors and recent graduates. In Detroit the Volunteer Placement Corps received support for its program to place the graduates of six inner-city high schools in suitable jobs, job-training programs, or colleges. Four hundred and fifty volunteers have been recruited and trained since this effort was started in 1967; the program now functions within the framework of the Board of Education. Its record of successful placements is over 95 percent; before the VPC began work, the average of graduates successfully placed was 10 percent.



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Carole Williams is the director of a Detroit school-system program that tries to place every graduating senior from six inner-city high schools in either a job, job-training program, or college.

In Baltimore a work-study program called *School Without a Building* is offering on-the-job training in business and industry for 12th graders as part of their studies for a general diploma. Both the Detroit and Baltimore programs stress the importance of making graduation from high school a meaningful goal for inner-city youth by demonstrating that it can lead to better opportunities.

LEADERS FOR THE INNER CITY

If inner-city dwellers are to have an authentic voice in decisions affecting their own affairs, leadership must be developed from within disadvantaged and minority groups. As yet, however, no tried and true methods have been formulated for discovering and training effective leaders for the inner city. The most successful programs have taken an empirical approach—shrewd selection of trainees, courses of study that provide them with the information and practical skills they need for specific areas of leadership, and supervised experience in actual leadership roles. Undoubtedly, different methods and content are needed for different situations and types of leadership. The Foundation is supporting a number of promising programs, each one of distinct merit in its own field.

One important line of attack lies in helping the National Association for the Advancement of Colored People and the National Urban League to enlarge and intensify their leadership development programs, especially in inner-city areas and among the poor. Both these organizations have large constituencies and are actively engaged in systematic leadership training programs that are closely related to specific action projects in local communities and neighborhoods in all parts of the country.

At the same time the Foundation is supporting a number of unusual and exceptionally promising projects for demonstrating successful ways to discover, train, and develop leadership in minority groups and indigenous neighborhoods. These projects represent a variety of approaches: formal training institutes for community leaders under the guidance of successful veterans in community leadership (Saul Alinsky's Training Institute in

Chicago); programs of sensitivity training for staff members of agencies that work in inner cities and expect to provide similar training for leaders in these neighborhoods (the YMCA project in Chicago); student internship programs in government offices and under minority-group officials (the Urban Affairs Foundation program in Los Angeles); and classroom training plus supervised participation in neighborhood development programs (the projects of the Ecumenical Institute and the Community Renewal Society in Chicago).

The Urban Academy operated by the Ecumenical Institute received a second grant in 1970 to support its intensive training course for community workers. Trainees at the Academy have come from over 30 cities, and over 70 percent of the graduates have assumed active roles in urban leadership.

CHANGING THE GHETTO

Before much of the needed constructive change can come about in the central cities, a great deal more must be learned about the tangled and persistent causes, and the effective remedies, of poverty, ignorance, racial discrimination, and their short- and long-range consequences. Two important research programs have been launched with Foundation support to gather the basic information needed to guide policy and action in attacking ghetto problems. A group of social scientists, scholars, and experienced practitioners, assembled by the Metropolitan Applied Research Center in New York, is engaged in a comprehensive study of two selected metropolitan ghettos, one urban and one suburban, in an attempt to develop and document recommendations for feasible programs.

At the University of Chicago, in cooperation with city governmental and private agencies, a broad research program on poverty has been initiated with Foundation support. Teams of researchers and graduate students are studying in detail the characteristics and problems of Chicago's poor and the operation and results of the many programs that are seeking remedies to the problems of poverty in that city. One important aim of the program is to provide data and guid-



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Philip Townley is associated with the Ecumenical Institute in Chicago, which operates a training program in community and leadership development for young inner-city residents.

ance to help the responsible agencies achieve greater effectiveness.

RELATED PROGRAMS

In addition to its three major thrusts, the Foundation assists exceptionally effective organizations in carrying out special programs. Among these are the National Urban Coalition's efforts to mobilize and concert governmental and private efforts in a comprehensive attack on the problems of cities. Another is the Southern Regional Council's programs aimed at reducing racial conflict and discrimination in the South. The NAACP Legal Defense and Educational Fund received a second grant this year in support of its work in assisting minority and poverty groups and communities in the South to secure even-handed administration of governmental programs. The NAACP Special Contribution Fund also received a grant to enable it to contribute to the nationwide programs of the NAACP aimed at bettering social and economic opportunities for minorities and promoting racial equality, as well as developing and consolidating basic sources of support for the future. A grant to the National Urban League is supporting its Veterans Affairs Program, which offers counseling and help in such areas as employment, housing, education, and welfare benefits to men returning to civilian life from the Armed Forces.

Foundation grants in such fields as delivery of health care, economic development of depressed rural areas, and the performing arts often have implications for equality of opportunity for minority groups. Experimental projects aimed at developing efficient ways of providing comprehensive health care in low-income areas frequently include training for minority-group members to prepare them for semi-skilled or skilled jobs in the health professions. Some family planning projects in areas with large minority-group populations, supported under the Foundation's program in Problems of Population, also include training for auxiliary personnel.

This year a grant was made to the People-to-People Health Foundation to enable Project HOPE to continue its work in Laredo, Texas, which has a large low-income Mexican-American population. In addition to seeking means for providing health care to the community, Project HOPE workers have assisted with training programs for nursing assistants and other health personnel at local institutions.

With the aid of a 1970 grant, a training program for paramedical personnel is being established by the Watts Labor Community Action Committee at its residential training center in Saugus, California. Programs in several other fields are already under way at the center, which was developed by the Committee with cooperation from Los Angeles authorities to provide specialized vocational training for unemployed adults and high school dropouts from the Watts area. Last year a grant was made to the Watts Committee to support the horticultural and agricultural training program at the Saugus center.

During 1969 a special Foundation task force on rural poverty, composed of leading authorities in this field, made a study of the possibilities for Foundation participation in development programs in depressed rural areas. Following their recommendations, a grant was made this year to West Virginia University for an educational program aimed at revitalizing the local agricultural economy and stemming the tide of emigration from farm areas.

Some support is also extended to selected Negro and other minority-group arts organizations that engender creative work in the arts through training programs, workshops, and performances, and expand minority-group audiences for theatre, music, and dance. Distinguished groups like the Free Southern Theater in New Orleans and the New Lafayette Theatre and Workshop in New York have received assistance under the Foundation's program in Cultural Development (see page 127), as have training centers like the Elma Lewis School in Boston.



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Clark Jones, once a member of the Young Life program, now runs Young Life on the Lower East Side, a project of a national organization which trains young people in community service.

GRANTS APPROVED IN 1970

UNITED STATES

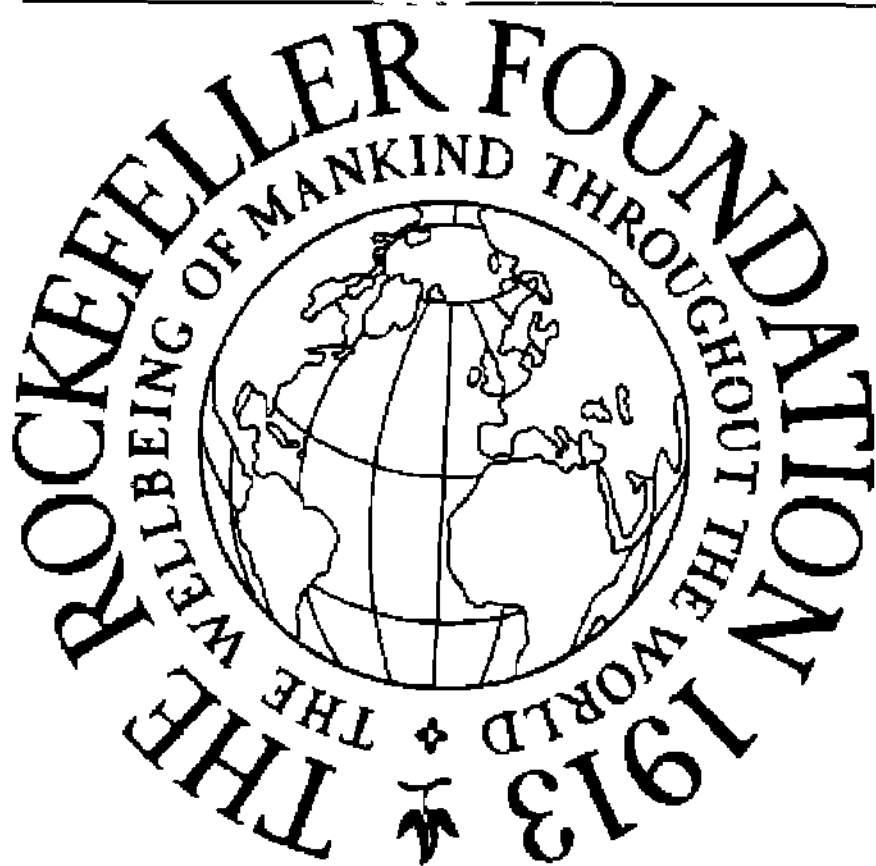
- AMERICANS FOR INDIAN OPPORTUNITY, Washington, D.C.:** to enable an Indian educator to work with selected American universities in developing Indian programs and student placement; \$15,000;
- ATLANTA UNIVERSITY CENTER CORPORATION, Georgia:** University of Toronto, Canada; additional support for Professor Romney Robinson while serving as visiting professor of economics at the Center; \$592;
- BALL STATE UNIVERSITY, Indiana:** for use by its Center for Community Education Development toward the costs of community school programs in Indianapolis; \$200,000 for a three-year period;
- BALTIMORE CITY PUBLIC SCHOOLS, Maryland:**
Toward the costs of initiating the vocational component of its "School Without a Building" program; \$169,000;
Toward the costs of expanding the Central City Administrative Internship Program; \$130,000;
- BANK STREET COLLEGE OF EDUCATION, New York:** toward the costs of the program of its Division of Field Services and Leadership Development to improve the effectiveness of the New York City school system in deteriorating areas; \$300,000 through June, 1974;
- BOARD OF EDUCATION OF THE SCHOOL DISTRICT OF THE CITY OF DETROIT, Michigan:**
Toward the costs of a program conducted by the Volunteer Placement Corps to provide guidance, counseling, and placement for high school students; \$300,000 through June, 1972;
Toward the costs of educational research; \$150,000 through June, 1972;
- BOARD OF EDUCATION OF THE SCHOOL CITY OF EAST CHICAGO, Indiana:** toward the costs of program evaluation, field visits, and program planning to be conducted by the Superintendent's Task Force; \$25,000;
- COLUMBIA UNIVERSITY, New York:** toward a summer program in the physical and life sciences for disadvantaged students; \$15,000;
- COMMISSION ON RELIGION IN APPALACHIA, Tennessee:** toward support of its efforts to alleviate poverty through assistance to community-development and local self-help organizations; \$15,000;
- COMMUNITY CONSOLIDATED SCHOOL DISTRICT No. 65, Cook County, Illinois:** toward the costs of an evaluative study of its school integration program; \$15,000;
- DARTMOUTH COLLEGE, New Hampshire:** toward the costs of developing ABC (A Better Chance) programs in selected public high schools; \$75,000 through June, 1973;
- ECUMENICAL INSTITUTE, Illinois:** for the leadership training program of the Urban Academy; \$130,000;
- FISK UNIVERSITY, Tennessee:**
Faculty appointments; \$82,700;
Revision and completion of its master plan for campus and buildings and landscape design; \$14,500;
- GARY COMMUNITY SCHOOL CORPORATION, Indiana:**
Toward the costs of a community-based reciprocal education program; \$50,000;
For use by the Reciprocal Education Council for its Leadership Training Development Program; \$25,000;
- HOUSTON BAPTIST COLLEGE, Texas:** for scholarship assistance for 11 nursing candidates in the School of Nursing; \$11,000;
- MICHIGAN STATE UNIVERSITY:** toward the costs of its Presidential Commission on Admissions; \$15,000;
- MINNEAPOLIS PUBLIC SCHOOLS SPECIAL SCHOOL DISTRICT No. 1, Minnesota:** toward the costs of expanding its community-school centers program; \$53,800;
- MULTI-CULTURE INSTITUTE, California:**
Toward general support and the development of a training program for teachers and administrators; \$300,000 for a two-year period;
Toward operating costs of the Institute; \$15,000;
- NAACP LEGAL DEFENSE AND EDUCATIONAL FUND, New York:** for use toward support of the program of its Division of Legal Information and Community Service; \$250,000 through December, 1973;

- NAACP SPECIAL CONTRIBUTION FUND, New York: toward the costs of its basic programs and the strengthening of its support capabilities; \$500,000;
- NATIONAL FOUNDATION FOR THE IMPROVEMENT OF EDUCATION, Washington, D. C.: toward the cost of a Four-State Institute on Changing Urban Education conducted by Project URBAN of the National Education Association; \$15,000;
- NATIONAL URBAN COALITION, Washington, D. C.: toward support of its national and local programs; \$200,000;
- NATIONAL URBAN LEAGUE, New York: toward the costs of its Veterans Affairs Program; \$500,000;
- NAVAJO COMMUNITY COLLEGE, Arizona: toward the salary and travel costs of the head of its Development Office; \$15,000;
- NEW YORK URBAN LEAGUE: for use toward the costs of a street workers program in New York City problem-area high schools; \$65,000;
- PEOPLE-TO-PEOPLE HEALTH FOUNDATION, Washington, D. C.: for use by its Project HOPE toward support of its health program in Laredo, Texas; \$150,000 for a three-year period;
- PROJECT NECESSITIES, Utah: toward the organizational and transitional-year expenses of its project to strengthen elementary and secondary school education for American Indian children; \$12,950;
- ROCHESTER CITY SCHOOL DISTRICT, New York: toward support of the Inquiry School sponsored by Project UNIQUE (United Now for Integrated Quality Urban-Suburban Education); \$200,000 for a two-year period on a matching fund basis;
- SAN DIEGO CITY SCHOOLS, California: toward the costs of a one-year counseling and guidance program to be conducted in cooperation with the Department of Counselor Education of San Diego State College; \$200,000;
- STANFORD UNIVERSITY, California: toward the costs of its graduate program in Afro-American studies; \$200,000 through June, 1975;
- STORE-FRONT LEARNING CENTER, Massachusetts: toward its general operating costs; \$15,000;
- TEMPLE UNIVERSITY, Pennsylvania: for use by its Department of Urban Education toward support of a Portal School Program in the Philadelphia school system; \$150,000 for a three-year period;
- THOMAS MORE COLLEGE, Kentucky: toward scholarship support for students displaced from Lincoln School, Simpsonville, Kentucky; \$15,000;
- UNIVERSITY OF CALIFORNIA, Irvine: educational reinforcement programs for Mexican-American and Negro junior and senior high school students in the Santa Ana schools; \$5,000;
- WASHINGTON UNIVERSITY, Missouri: for use by its University College toward the costs of a work-study career development program for financially handicapped high school graduates; \$150,000 for a four-year period;
- WATTS LABOR COMMUNITY ACTION COMMITTEE, California: toward the expenses of a paramedical training program at Saugus; \$169,931;
- WEST VIRGINIA UNIVERSITY: toward the initiation of an experimental program to alleviate poverty in Appalachia; \$498,000 for a four-year period;
- YOUNG LIFE CAMPAIGN, Colorado: toward the costs of an urban leadership training program to be conducted on the Lower East Side of New York City; \$125,000 for a two-year period.

Administrative Training Internship Program

In support of an internship program for minority-group school administrators at the superintendent level, a total of \$211,047 was appropriated. Funds were made available to school systems to enable the following individuals to serve as interns:

- PHILIP DEL CAMPO (San Diego City Schools, California);
- JOHN H. GRIFFITH (Rochester City School District, New York);
- DR. ERNEST E. HARTZOG (San Diego City Schools, California);
- DR. LEONARD F. SAIN (Board of Education of the School District of the City of Detroit, Michigan);
- WAYMAN W. SMITH (Cleveland Public Schools, Ohio);
- BRUCE E. WILLIAMS (Minneapolis Public Schools Special School District No. 1, Minnesota);
- DR. LAVAL S. WILSON (Community Consolidated School District No. 65, Cook County, Evanston, Illinois).



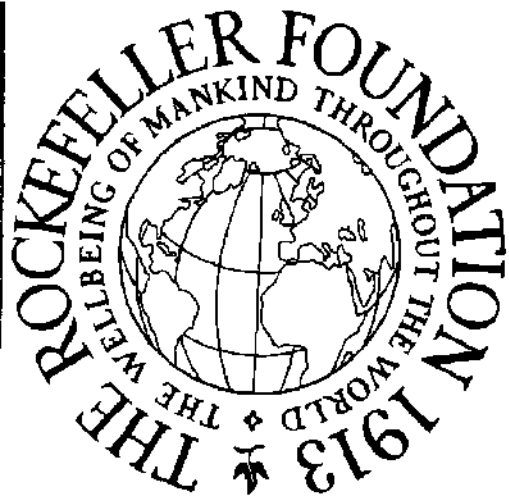
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In college communities such as Hanover, New Hampshire, residents and local high schools are helping disadvantaged students to improve their education.

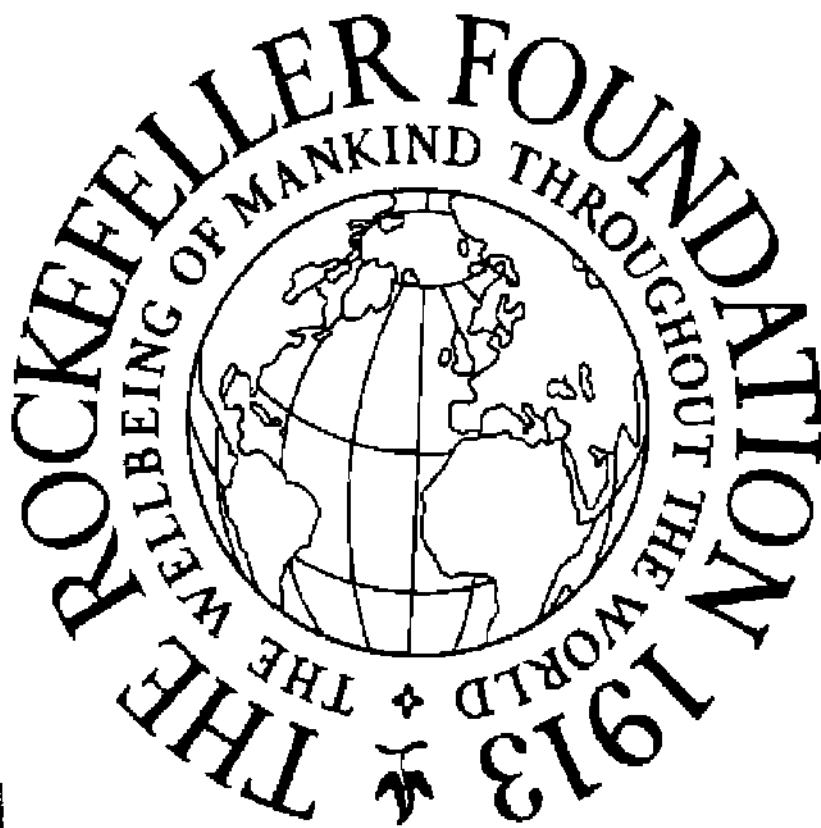
Work-in-Progress

A BETTER CHANCE

In 1964 a program called ABC—A Better Chance—was launched at Dartmouth College, with support from The Rockefeller Foundation, to help recruit and prepare talented boys from minority groups for entrance into independent secondary schools. A number of preparatory schools were cooperating in the Independent Schools Talent Search Program, which later merged with ABC, to give promising boys, primarily from poor black families, a first-rate education. A program for girls was added at Mount Holyoke College in 1965, and subsequently other institutions, including Carleton, Williams, and Amherst Colleges and Duke University, joined the effort, with funds from the Office of Economic Opportunity. ABC scholars spent a summer on campus, where they received instruction and tutoring in academic subjects as well as guidance and counseling, and, in the fall term, were placed in independent high schools on scholarships. By 1969 over 1,400 boys and girls had entered the program, and there was still a long waiting list of talented youngsters. ABC leaders at Dartmouth next turned their attention to the public schools. They created the first public school ABC program in Hanover, New Hampshire, and as soon as it began to gain acceptance, they approached other communities that had strong public high schools and good public spirit. The communities provided housing—a former faculty residence, nursery school,



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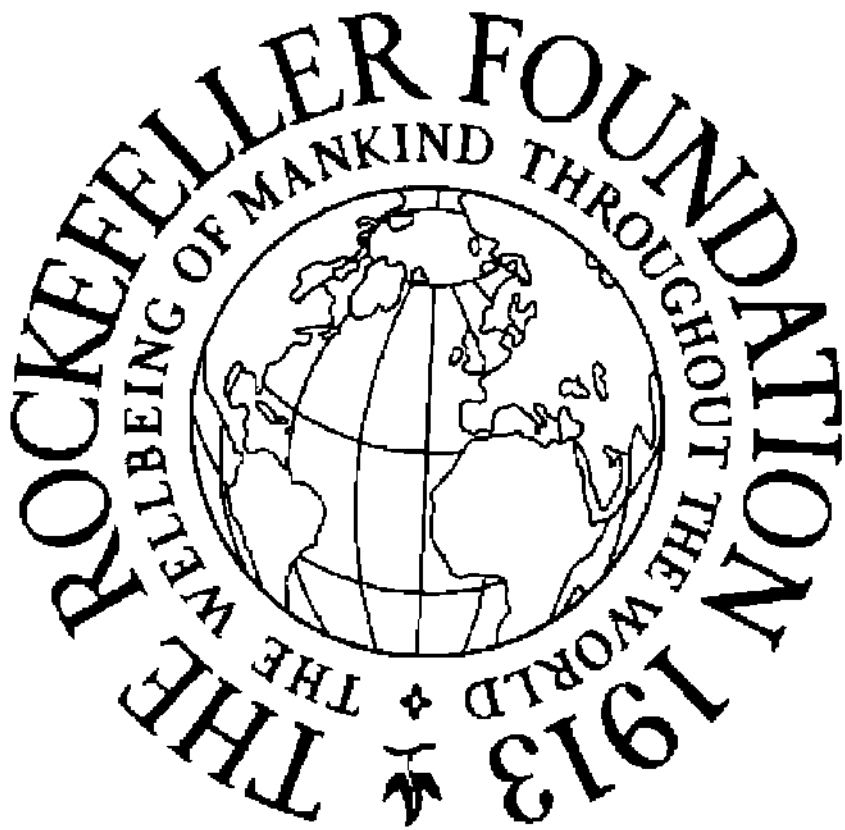


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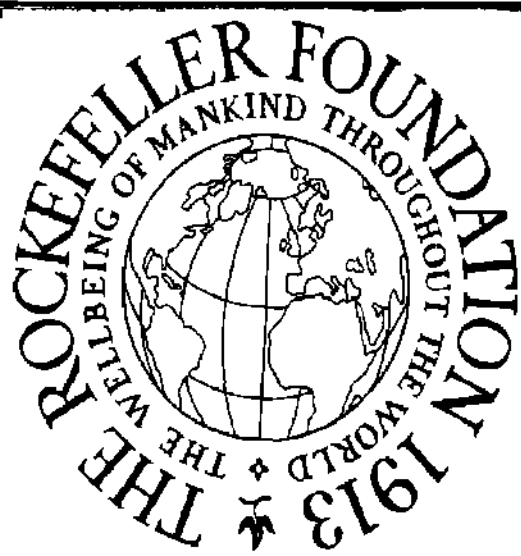


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rooming house, general store—for about ten ABC students under the tutelage of two resident undergraduates (who served as teacher-interns at the high school) and a high school faculty member and his family. Some communities added a local ABC component—ten bright but under-achieving local youngsters, who took part in the summer courses and joined the resident ABC family for their evening study hours, tutorial sessions, and social activities. The program has grown rapidly. Following the original public school ABC program in Hanover, came similar efforts in Lebanon, New Hampshire, and Hartford, Vermont. Woodstock, Vermont, and Claremont, New Hampshire soon followed suit. These community ABC projects are all linked with the prototype center at Dartmouth. Programs centering around other colleges and universities are now operating in Amherst, Massachusetts (Amherst College and the University of Massachusetts); Appleton and Shorewood, Wisconsin (Lawrence University); Northfield, Minnesota (Carleton College); Andover and North Andover, Massachusetts (Merrimack College); and Williamstown, Massachusetts (Williams College). Additional programs are in the planning stages, and local ABC corporations have been formed in Philadelphia and Milwaukee. ABC's directors have hopes of seeing the public school programs involve communities all over the country.



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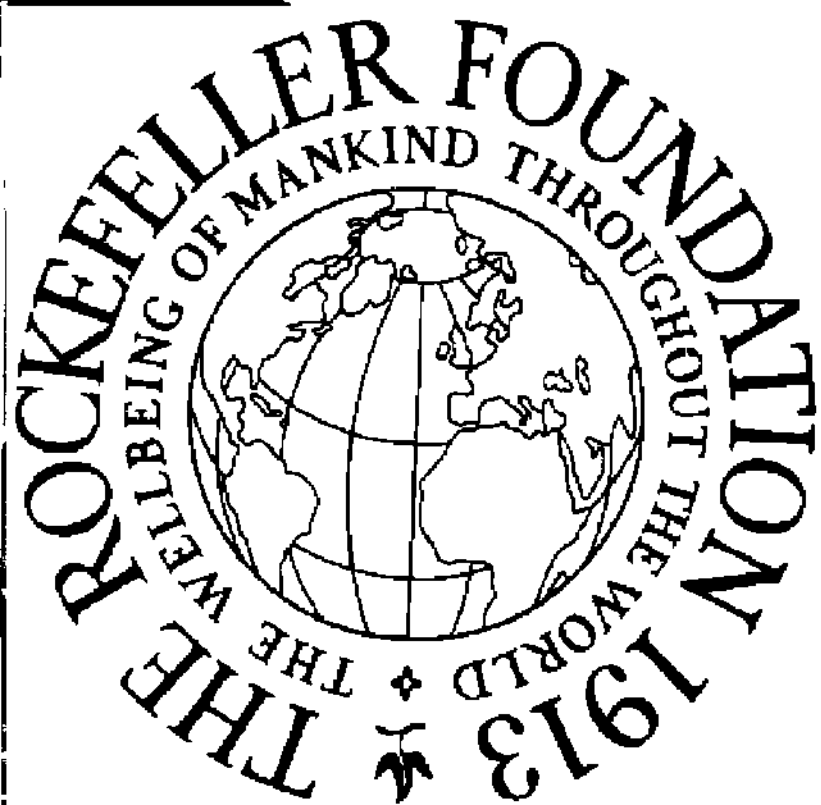


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Work-in-Progress

THE WORLD OF INQUIRY SCHOOL

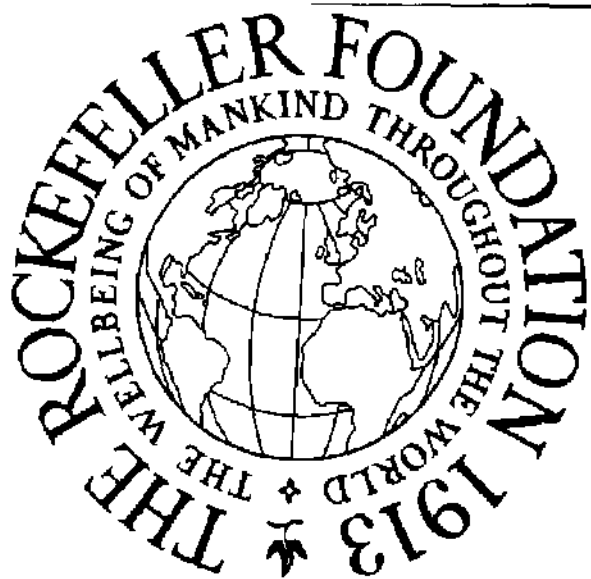
The plight of the city of Rochester is familiar: in the past fifteen years its black and Puerto Rican population has doubled and redoubled—an increase of over 1,000 percent. White families have moved out—a mass migration to the suburbs that has struck hard at the city's tax base. Racial tension has been high, changes and adjustments painful. One alarming development has been the de facto segregation in Rochester's city schools, where 30 percent of the children are black. In 1967, in response to these problems, a group of Rochester residents and educators began a program called Project Unique—an enterprise that has developed into one of the most successful Title III programs in the country. Project Unique has attacked the problems of inner-city education, and urban-suburban segregation, across the board. It includes a program for increasing the communication between parents and teachers, a teacher internship plan that trains teachers specifically for work in inner-city schools, and a program of academic improvement for para-professional teacher aides. One of its most successful components has been an experimental elementary school called the World of Inquiry School, in which the racial structure of the city and its suburbs has been reproduced in miniature. The school has 200 students from 8 to 11 years old. It is totally integrated—boys and girls, black children and white children, well-to-do youngsters and those from lower economic backgrounds. Even age differences are mini-



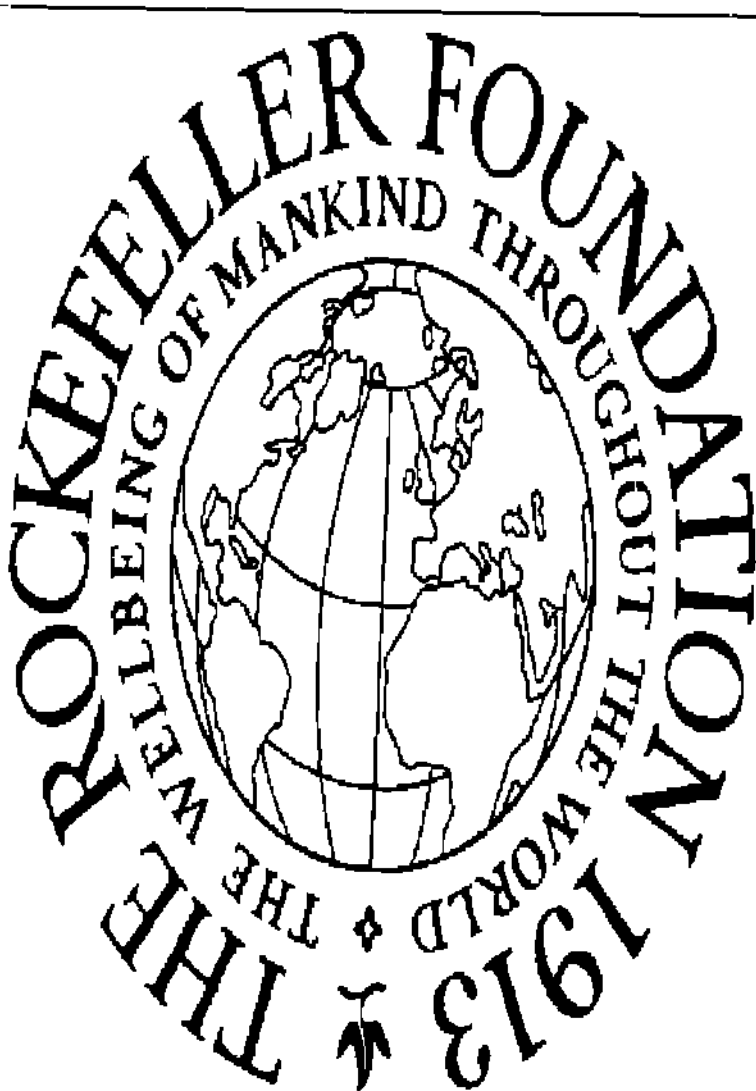
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Children from varied backgrounds enjoy learning from each other, and from adults with special skills, in Rochester's successful experimental elementary school.

mized: children work in "family groups" instead of graded classrooms, older children often taking on the instruction of a younger child. (One visitor watched, fascinated, while a 5-year-old girl used a saw under the supervision of a 12-year-old boy.) Children choose their own schedules. Once they have demonstrated a certain proficiency in reading and math they are free to choose among special-interest subjects—industrial arts, music and art, science, current events, and so on. Observers are often struck by the fact that the youngsters are curious about the whole range of subjects open to them. None of the children spent all their time on one or two subjects, as had been expected: physical education and arts and crafts were no more heavily attended than science and reading. In faculty and administration, too, the World of Inquiry School is a mix. One of its most imaginative aspects is the use of specialists from the community—people who are experienced and talented craftsmen or technicians but not necessarily certified teachers—to teach some of the special-interest courses. Thus, a 70-year-old retired welder teaches welding (to 7- and 8-year-olds), a college student teaches engineering, and a retired teacher teaches weaving. Parents often serve as teacher aides. Project Unique administrators hope that soon their methods can be extended into all the city schools. The World of Inquiry School's waiting list—of over 1,000 pupils—is strong proof that parents and children would welcome the new plan.



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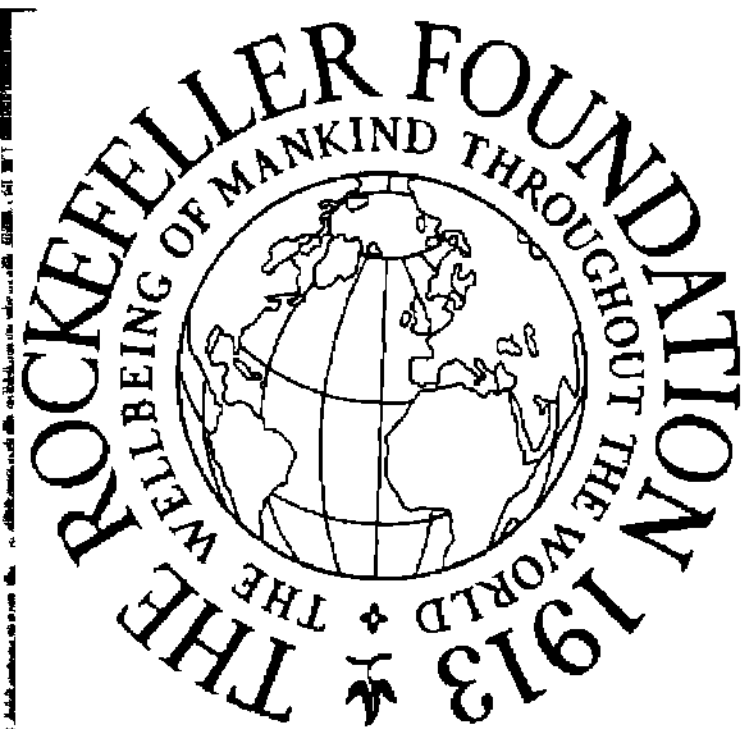


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Work-in-Progress

THE ALLEGHENY-HIGHLANDS PROJECT

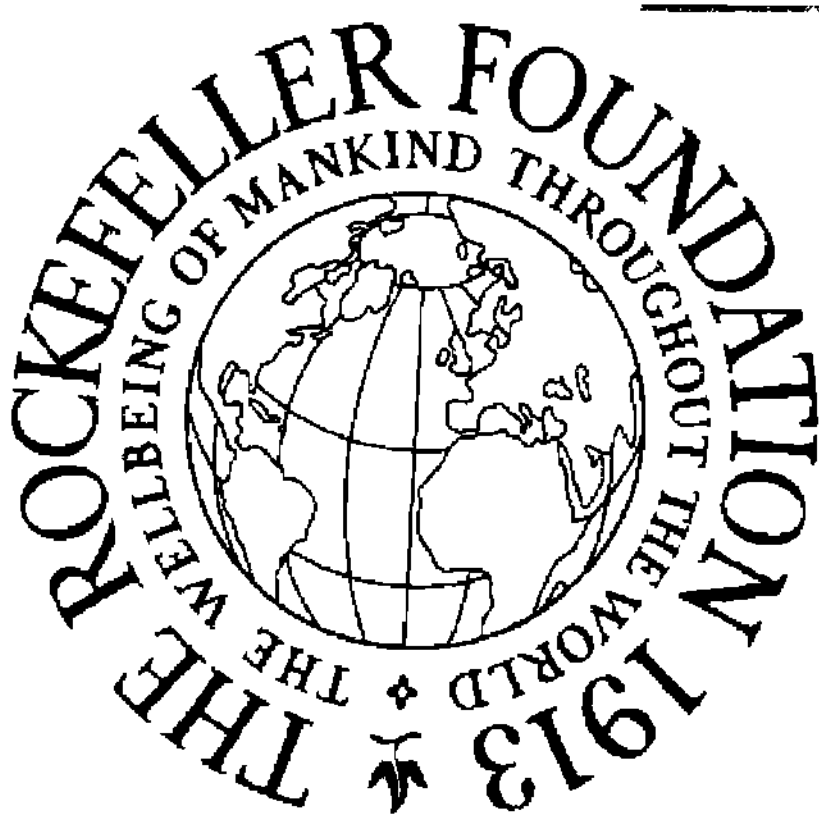
A century ago, when land was worked with horse-drawn ploughs, the hill country of West Virginia was profitable farmland. Modern farm machinery, which is appreciably faster, cheaper, and more efficient than the horse, is, however, less maneuverable: it operates most successfully on level land. As farming has become more and more unprofitable for them, millions of West Virginia farmers have migrated to the cities. Most often they are the people that rural communities can least afford to lose: the young, the educated, and the able-bodied. Most often the decline in population helps to feed a decline in income; there is a subsequent drop in the quality of education, housing, and medical care, and even less incentive to remain. For some time West Virginia University has recognized its responsibility to the people of the state. In 1963 it took the formal step of establishing a Center for Appalachian Studies and Development, concerned with problems of health care, population control, education, cultural activities—and the overriding problem of poverty. More recently, in 1968, the University intensified its studies of rural regions to search for ways in which it could help substantial numbers of the rural poor. Early in 1970, with Rocke-



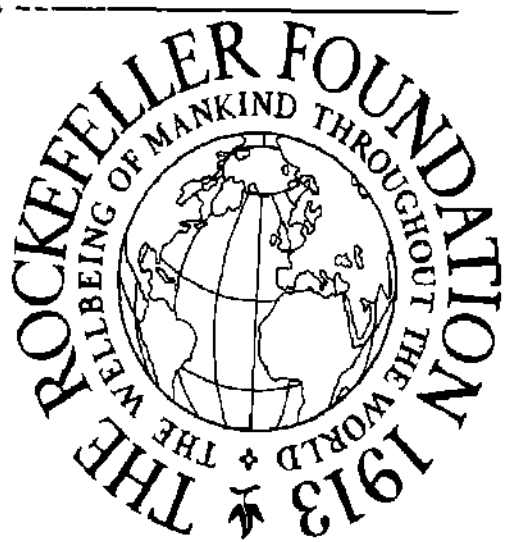
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Robert Maxwell (near left) is participating in West Virginia University's new effort to bring economic vitality to Appalachia's farmers through livestock production.

feller Foundation support, West Virginia University began a pilot project in two rural counties, Randolph and Upshur, where population has dwindled and the number of farms has dropped. In both counties, farmers are being taught how to increase their income by substituting livestock and forage crops for the traditional field crops. The rolling land and small farms are well suited to this kind of agriculture, and the possibilities are good that the operation will be highly profitable. If the forage-livestock technology takes hold, it is estimated that close to \$2 million annually may be added to the agricultural income of these two counties alone. Directed by Dr. Robert Maxwell, specialists and students from West Virginia University are training farmers in a combination of new agricultural skills. In addition, the University is increasing its health, community development, and small-business services in the two-county area. If rural poverty and migration to cities can be halted in these two counties, the same methods may be used in other rural communities. Equally important, the project may set a precedent for other American universities to increase their community involvement.



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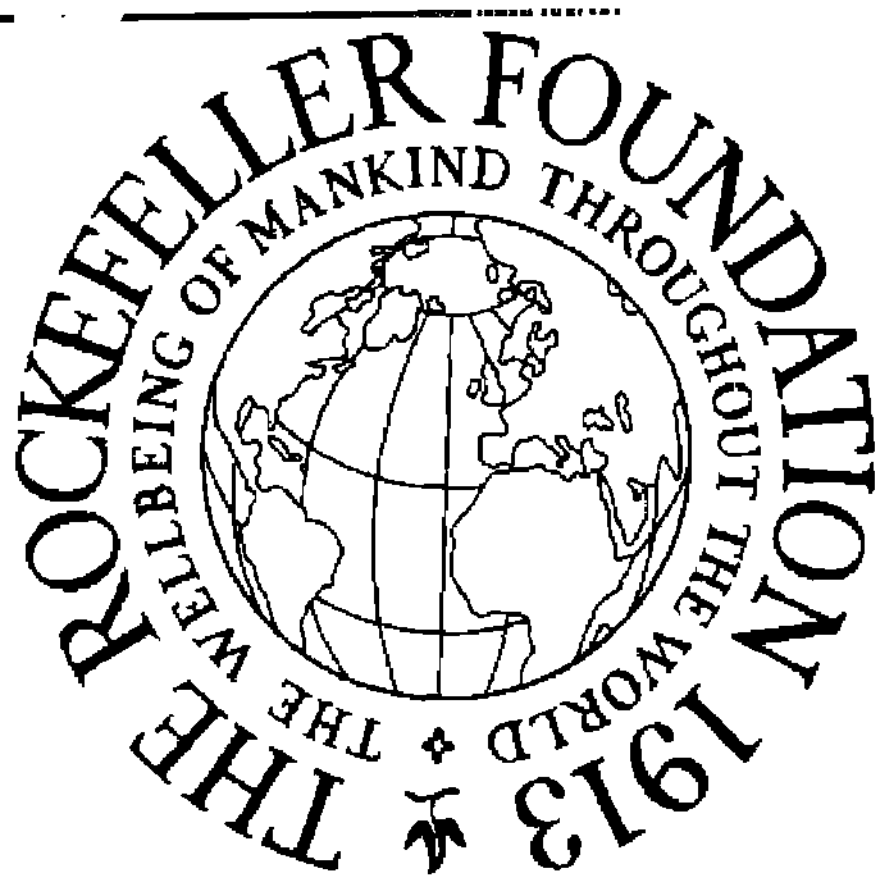


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Work-in-Progress

THE WATTS LABOR COMMUNITY ACTION COMMITTEE

Since 1965 Watts has been a synonym for ghetto to most Americans. That summer the Watts riots were headline news—and national attention was suddenly focused on an exploding neighborhood that had festered for years. Very little attention was given to the formation of the Watts Labor Community Action Committee—a joint enterprise of ten labor unions begun in that same year. The unions had decided that their organizational skills might be as effective in mobilizing the ghetto as they had been in bargaining with industry: they joined together to help create an economic base on which the neighborhood could build. In the five years since it was formed, the Committee has taken its personality and dynamism largely from its chairman, Ted Watkins, who came to Watts from Mississippi 12 years ago. In 1968 Watkins arranged with the city of Los Angeles for the lease of a 580-acre campsite at Saugus, California, about 30 miles north of the city proper. A year later, with the help of a grant from The Rockefeller Foundation, Saugus became a working farm. About 150 young high-school dropouts work the land, producing fruit and vegetables for sale in the greater Watts area. (Part of their produce is sold through four Shop-Rite supermarkets which the Committee bought out of its profits in 1970. The supermarkets, too, are training centers—for young people interested in grocery-store management.) Horticultural trainees—about 100 a year—grow trees and plants at Saugus for com-



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High-school dropouts from the Watts section of Los Angeles are trained for jobs in agriculture, horticulture, and paramedical technology at a 580-acre center in Saugus, California.

mercial use: part of their on-the-job training is the maintenance of some 22 vest-pocket parks which the Committee has provided in Watts — some as small as 40 by 100 feet — one with a barbecue pit and shuffleboard court, another with an outdoor stage for neighborhood plays. Trainees must be at least 16 years old—high-school dropouts or unemployed persons who have been out of school for at least three months and do not plan to return. The Saugus program is basically residential: students live on the farm for an entire year. They receive not only job training, but basic and remedial education as well. In mid-1969 the Community Action Committee received a second Foundation grant to begin a new paramedical training program at Saugus for about 150 students. Like all the other Committee enterprises, this one serves two purposes: young high-school dropouts receive technical training in several categories — from dental assistant to electrocardiograph technician. And these technicians are helping to fill the heavy demand for paramedical personnel which has reached crisis proportions in the Los Angeles area. Ted Watkins is particularly happy about the new Martin Luther King Jr. Hospital in Watts, now under construction. His horticultural trainees are doing part of the landscaping, and his paramedical workers are available for a wide range of technical positions. "Two thousand new jobs the day it opens," he says happily. "Not even a dream five years ago."



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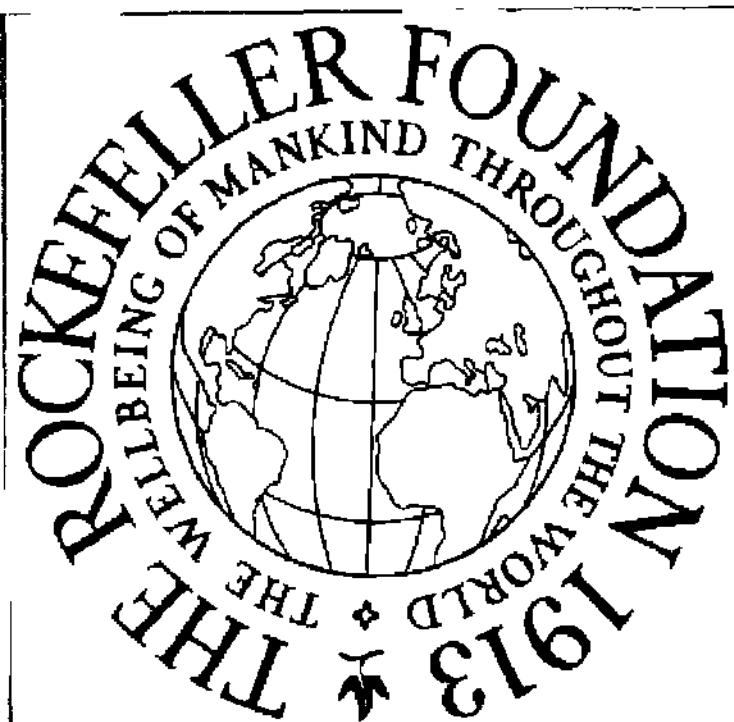


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Work-in-Progress

BALTIMORE'S INTERNSHIP PROGRAM FOR INNER-CITY ADMINISTRATORS

In America's cities, black, Mexican-American, and Puerto-Rican teachers have begun, in strength, to enter the public school systems. Their success, particularly in inner-city schools, only serves to point up the need for far more leaders from among minority groups—who could help beyond all others to bridge the widening gulf between the school and the community. A few far-sighted superintendents are taking steps to make this leadership possible. In Philadelphia, young administrators are working with teachers, architects, and neighborhood people to design new schools, better suited to the community's needs. In Detroit, talented school principals have been assigned to the superintendent's office for the 1970-71 school year—to study such complicated administrative problems as decentralization, racial integration, and deficit financing. And in Baltimore, an on-the-job training program designed by Dr. William Pinderhughes, an associate superintendent in the public school system, has been tailored to provide, for elementary school teachers and beginning administrators, the kind of leadership experience it would normally take years to acquire. Baltimore's "administrative internship" program is among the most successful in the country. Men and women presently employed in the Baltimore school system, who wish to work specifically in inner-city schools, are assigned to work in the same office with elementary-school principals or assistant principals—an assignment in which they are exposed day by day to the process,



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Dr. William Finderhughes (near left) guides outstanding teachers who are interning with elementary-school principals as part of their preparation toward leadership positions in neighborhood schools.

often painful, of running an inner-city school. The internship year, intensive as it is, cuts sharply into the time it normally takes to become a top-level administrator. One young man—a 6th grade teacher who displayed unusual potential during his internship year—was made an assistant principal as soon as the year was up: traditionally he would have served another five to ten years with the school system before being offered a job of this kind. Another intern—a former specialist in elementary education—became the new director of an early-childhood learning program. She attributes her assignment to “the effectiveness of the training I received.” The first internship year began in September, 1969, and ran through to the following June, with five administrative interns. Because the first graduates were so highly successful, the 1970-71 program was doubled to ten interns, with the help of a Rockefeller Foundation grant of \$120,000. Baltimore’s interns do not by any means spend all their time in school, or even in Baltimore. They visit other school systems, take part in cooperative programs with community agencies, spend time studying the relationship between the school board and the teachers union. At the end of the internship year they have had the equivalent, in experience, of five or more years in the school system. Says one graduate, “The depth and variety of the training could not have been duplicated in any other way.” And another: “Last year was the most fruitful year I ever experienced.”

CULTURAL DEVELOPMENT

The Foundation's commitment in 1963 to a program in the arts came at a time when the arts themselves were achieving an altogether new prominence. On campuses and in storefronts, in loft theatres, and in new cultural centers, more people than ever before were drawn to performances and exhibits. Funds from government and from corporations began to find their way to performing groups, universities, museums, arts education programs, individual artists, ghetto and rural projects. If the 1960's was a period of rapid development in the arts, the first year of the new decade has been a time for creators and organizations to consolidate their gains.

The general economic problems which faced the nation in 1970 showed up in reduced contributions to many organizations. If this has tended to reduce the accessibility of the arts to people, it has not had an appreciable effect on the productivity of creative artists themselves, who have continued to develop their expressive skills.

Foundation efforts in the arts continued to underscore the contributions of the creative person: the playwright in theatre, the composer in music, and the choreographer in dance. A grant to the Open Theater in New York helps to continue its experimental theatre in which the playwright works jointly with actors, dancers, and musicians. Additional work was done in 1970 in bringing various artists from traditional disciplines into direct contact with the new technology, including television. The Foundation continues to believe strongly in the importance of educational options to the artist; the campus continued to figure prominently in the Foundation's program.

MUSIC CONSERVATORIES

Musical America covers a wide field which, in classical music, is dominated by several thousand symphony orchestras of which at least a handful are the finest ensembles in the world. The players in these orchestras performing with opera and ballet have received their training, for the most part, in professional schools and conservatories. Conservatories also provide backgrounds for many first-rate soloists, conductors, and composers. They frequently supply free concerts in

their communities and operate valuable preparatory departments for talented children. In recent years these schools have found themselves in danger of losing the best of their faculty because of their inability to offer salaries competitive with colleges and universities. To assist several conservatories, and to call attention to the role and plight of all, the Foundation made an initial series of grants to six major conservatories: the Cleveland Institute of Music, the Juilliard School of Music in New York, the Manhattan School of Music, the New England Conservatory of Music in Boston, the Peabody Institute of the City of Baltimore, and the San Francisco Conservatory of Music. Over the next three years, these funds will provide scholarships and some living expenses to students selected by the schools themselves. The grant to the Juilliard School also assists dance students, and funds for the Manhattan School are going toward a program of preparatory training for children from predominantly low-income homes.

CONTINUED SUPPORT IN MUSIC

Small chamber groups that perform contemporary works, most often at a university or college, have been of considerable interest to the Foundation. One such group, the Contemporary Performance Project at the University of Michigan, received a grant this year to continue its activities at the School of Music and its performances on campuses throughout a wide region of the upper Midwest. The contemporary music component of the Marlboro Festival, which the Foundation has supported since 1965, again received aid through a grant to the Marlboro School of Music.

A 1970 grant enabled the University of Southern California to enroll a final class of candidates in its successful program of training for music critics. Continued support went also to the Congress of Strings for summer training for young instrumentalists at two major centers, one in Los Angeles and one in Cincinnati.

CHILDREN'S THEATRE

Theatre aimed particularly at children has been supported modestly in the past by grants to the



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Sarah Caldwell, the artistic director of the Opera Company of Boston, is making her company's professional resources available to several New England colleges.

Paper Bag Players and the Bil Baird Theater, both in New York. A new and substantial grant to the Children's Theatre Company of the Minneapolis Institute of Arts will enable this active and highly praised company to bring in playwrights who will help create new plays for young audiences. In Atlanta, the Southeastern Academy of Theatre and Music was provided with funds to develop its experimental work in Atlanta high schools. This imaginative theatre group tours schools with plays that involve students and teachers in role-playing techniques whose aim is to bring out improvisatory theatre skills as well as to ventilate problems faced by the students in everyday life.

RENEWED SUPPORT IN THEATRE

Past grantees receiving further support for their work with new playwrights include the LaMama Experimental Theatre Club, and the American Place Theatre, both in New York; the Center Theatre Group of Los Angeles, and the Berkshire Theatre Festival of Stockbridge, Massachusetts. The Goodman Theatre and School of Drama, which is part of the Art Institute of Chicago, was helped to increase its productions and add depth to its training programs.

BLACK THEATRE

The movement toward the establishment of black theatres in the 1960's led to the creation of some important theatre groups. These theatres are, for the most part, still going through the struggles of birth. They are developing repertory, actors, directors, styles, and forms in theatre and, most important, audiences. Examples of new black theatres assisted in 1970 include the Free Southern Theater of New Orleans; the National Black Theatre Workshop and the Afro-American Total Theatre, both of New York; as well as the Performing Arts Society of Los Angeles. These theatres, located in large metropolitan centers, are examples of the vitality and rich variety of the arts today.

DANCE

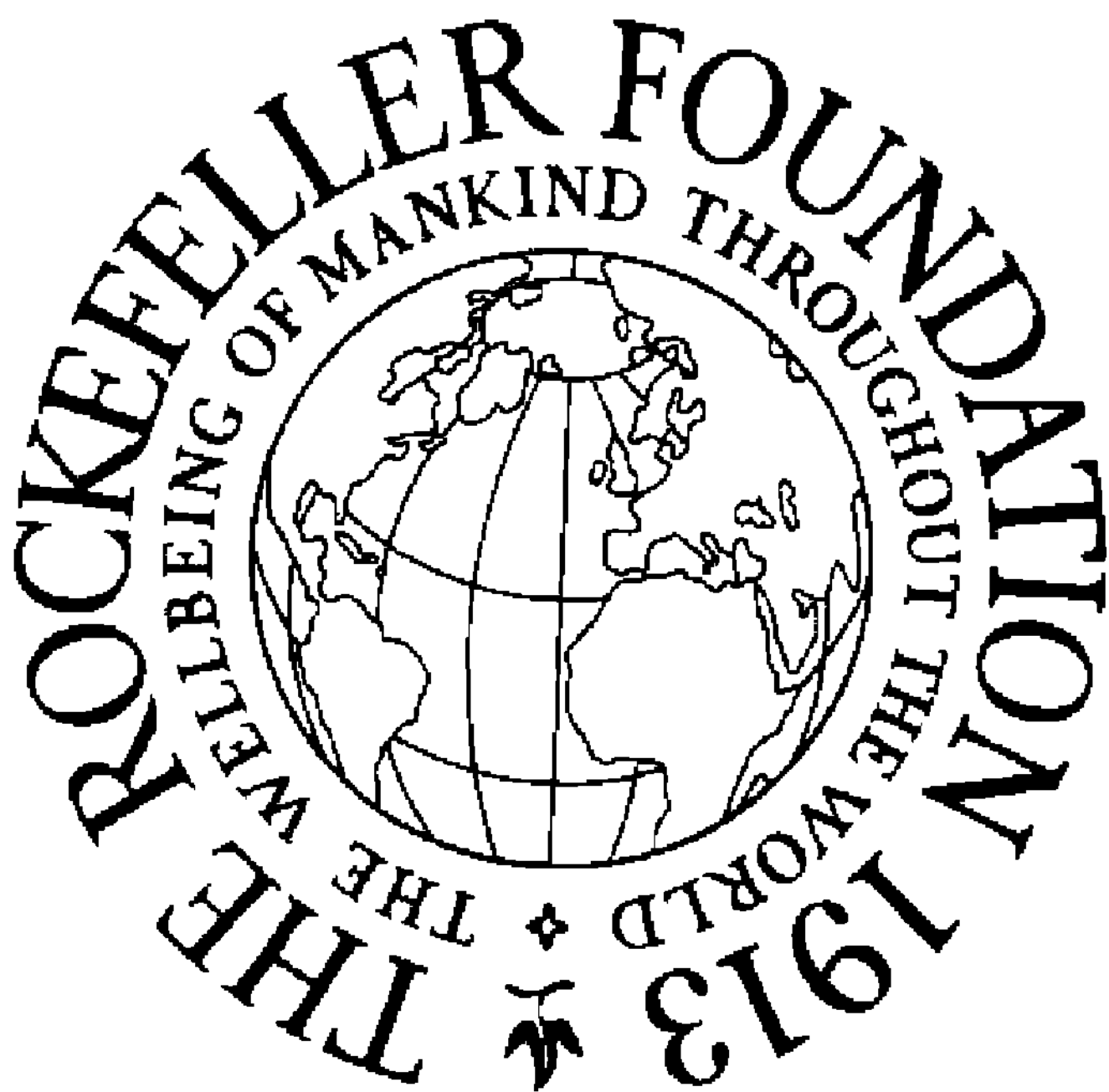
In the field of dance, the Foundation has continued to assist important choreographic work by

supporting choreographer-oriented companies. A grant to the American Ballet Theatre is allowing this company to develop the talents of its own member choreographers, several of whom have already proven themselves to be major creators. A grant to the Martha Graham Center of Contemporary Dance enables this company to tour important works by a unique American artist to colleges and universities. The North Carolina School of the Arts is being helped to form a repertory dance troupe called Dance Theatre South, which will concentrate on contemporary works to be toured in the South and through rural Appalachia.

Other programs in the arts for the Appalachian region included a grant to Berea College in Kentucky, enabling faculty and students to create a Puppetry Caravan which toured a four-state area last summer with programs of indigenous material, utilizing folk tales and music. The Caravan was seen by large numbers of people who had never before had access to live theatre in any form. A grant to the Brevard Music Center in North Carolina helped that educational institution develop a program of selection and training of talented high school musicians who will work as teaching assistants in their home schools, thus providing additional personnel to schools which have low budgets for work in the arts.

THE CAMPUS

The coming together of the professional and the academician is an important phenomenon in the arts. Previous Foundation grants have tried to stimulate this cooperation by supporting residency programs for professionals and encouraging schools to adopt professional standards of performance in the arts. One example of this work has been the University of Iowa, long recognized for its high standards in the arts. In 1969 the University established a new interdisciplinary Center for the New Performing Arts as an outgrowth of a Foundation-supported Center for New Music. A new grant will enable the University to expand its Center, which brings together composers, writers, choreographers, filmmakers, and other artists to work together on productions involving two or more of the arts.



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Raymond Kendall, former dean of the School of Performing Arts at the University of Southern California, founded a training-and-work program that has furnished music critics for a number of newspapers.

TEACHER TRAINING PROGRAMS

Several summer training programs for teachers of the arts, in which great emphasis is placed on revitalizing performance skills, have been aided in the past, among them the highly successful Teachers Performance Institute at Oberlin College. Oberlin received further support this year for the Institute. A training program for high school drama teachers at the Eugene O'Neill Memorial Theater Center, which received a grant last year from the Foundation, enabled the teachers to take part in experimental productions on a professional level.

TELEVISION

Although the Foundation has no major program in television, several key educational stations have been helped to do important experimental work in the past; among these are KQED

in San Francisco, WNDT in New York, and Boston's WGBH. A 1970 grant to WGBH, based on a previous program of artist residencies with the station, will enable the station to bring in artists and scholars who will work with local producers and technicians in developing new ways of utilizing the medium and new themes of exploration.

Grants to further scholarship in the general field of American Cultural Heritage assisted individuals to undertake such projects as research for a biography of the film pioneer, D. W. Griffith; and research and preparation for re-publication of historical American music of the 18th, 19th, and early 20th centuries. In addition, the Trustees approved a new program in this field which will provide modest support for scholars in the humanities, arts, and social sciences working in the area of American Cultural Heritage.



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David Merrick, Broadway producer extraordinary, this year was industry chairman of the New Dramatists Committee, a group which stages workshop productions for new playwrights.

GRANTS APPROVED IN 1970

UNITED STATES

- AFRO-AMERICAN TOTAL THEATRE ARTS FOUNDATION, New York:** toward the creative costs of developing new works; \$10,850;
- AMERICAN HISTORICAL ASSOCIATION, Washington, D. C.:** to promote the proper use of feature films in historical teaching and research; \$9,500;
- AMERICAN PLACE THEATRE, New York:** toward the costs of its Writers Development Program; \$225,000 for a three-year period;
- ANTIOCH COLLEGE, Ohio:** toward the costs of instituting a program of jazz workshops; \$25,000;
- ARIZONA STATE UNIVERSITY:** toward the costs of a program of internships in university administration; \$60,000 for a two-year period;
- ART INSTITUTE OF CHICAGO, Illinois:** to enable its Goodman Theatre and School of Drama to expand its activities and add depth to its training program; \$84,000 for a three-year period;
- ATLANTA SYMPHONY ORCHESTRA, Georgia:** to enable T. J. Anderson to serve as composer-in-residence for an additional year; \$7,500;
- BALLET THEATRE FOUNDATION, New York:** toward the costs of establishing a permanent professional artistic staff for the American Ballet Theatre and for its development program for young choreographers; \$150,000 for a three-year period;
- BEREA COLLEGE, Kentucky:** toward the establishment of a Puppetry Caravan for Appalachia to develop indigenous material suitable for presentation in rural communities and to train students and community residents in the skills of puppetry; \$10,050;
- BERKSHIRE THEATRE FESTIVAL, Massachusetts:** toward the costs of creative and educational theatre programs in the New England area; \$75,000;
- BOSTON COLLEGE, Massachusetts:** toward establishing a consortium of colleges and universities in the New England area to cooperate with and participate in the programs of the Opera Company of Boston; \$24,600;
- BOSTON PHILHARMONIC SOCIETY, Massachusetts:** toward the costs of rehearsing contemporary music for performance in the Boston area; \$15,000;
- BROOKLYN COLLEGE OF THE CITY UNIVERSITY OF NEW YORK:** toward the costs of continuing its program to train professional theatre technicians and artisans; \$25,000;
- CENTER STAGE ASSOCIATES, Maryland:** toward the costs of implementing its creative program, primarily in the area of children's theatre; \$12,500;
- CENTER THEATRE GROUP OF LOS ANGELES, California:** for use by the Mark Taper Forum toward its developmental work in creative aspects of theatre; \$300,000 for a three-year period;
- CLEVELAND INSTITUTE OF MUSIC, Ohio:** to enable it to provide financial assistance to talented students from the United States, in the form of Rockefeller Foundation Awards; \$75,000 for a three-year period;
- COLGATE UNIVERSITY, New York:** toward a program of internship in academic administration; \$15,000;
- CONNECTICUT COLLEGE:** to enable Ward Cannel to continue exploration of the possibility of creating video essays on the nature and image of man; \$15,000;
- CONVERSE COLLEGE, South Carolina:** for use by the Brevard Music Center for a program of musical training in economically and culturally depressed areas of the Southeast; \$20,600;
- DUKE UNIVERSITY, North Carolina:** toward the costs of filming a series "Dance as an Art Form" by the Murray Louis Dance Company; \$25,000;
- EXPERIMENTS IN ART AND TECHNOLOGY, New York:** for the further development of its Technical Services Program; \$25,000;
- FILM SOCIETY OF LINCOLN CENTER, New York:** toward the costs of experimental programs in film education in the schools and for the encouragement of cooperative programs in all aspects of film on the part of the various municipal film programs; \$15,000;

- FREEDOM HOUSE, New York:** toward the costs of international scholarly consultations on university unrest held in England; \$5,000;
- FREE SOUTHERN THEATER, Louisiana:** toward the further development of its Ensemble and Drama Workshop; \$50,000;
- JUILLIARD SCHOOL OF MUSIC, New York:** to enable it to provide financial assistance to exceptionally talented students from the United States in the form of Rockefeller Foundation Awards; \$265,000 for a three-year period;
- KARAMU FOUNDATION, Ohio:** to enable Mr. and Mrs. Russell Jelliffe to serve as consultants for community arts and humanities centers; \$10,000;
- LAMAMA EXPERIMENTAL THEATRE CLUB, New York:**
Toward the costs of developing an experimental workshop on the theatrical uses of music, dance, and cinema; \$100,000;
To provide Ross Alexander, playwright, with an uninterrupted period of writing; \$6,000;
- VERA BRODSKY LAWRENCE, New York:** to research and prepare for re-publication historical American music of the 18th, 19th, and early 20th centuries; \$14,400;
- MAGIC THEATRE FOUNDATION, Nebraska:** toward the costs of development of new theatrical pieces through workshops and productions involving writers, actors, designers, artists, and musicians; \$5,000;
- MANHATTAN SCHOOL OF MUSIC, New York:** to enable it to provide financial assistance to exceptionally talented students from the United States, in the form of Rockefeller Foundation Awards; \$100,000 for a three-year period;
- MARLBORO SCHOOL OF MUSIC, Vermont:** toward the continuation of its contemporary music program; \$50,000;
- MARTHA GRAHAM CENTER OF CONTEMPORARY DANCE, New York:** toward the costs of concerts and residencies of the Martha Graham Dance Company at colleges and universities throughout the United States; \$25,000;
- MASSACHUSETTS INSTITUTE OF TECHNOLOGY:** to enable Professor Irving Singer, Department of Humanities, to complete work on the concepts of certain humanistic problems in Western culture; \$15,000;
- MICHIGAN STATE UNIVERSITY:** toward the costs of a program of internships in university administration; \$60,000 for a two-year period;
- MINNEAPOLIS SOCIETY OF FINE ARTS, Minnesota:** toward the costs of development of original theatre works by the resident Children's Theatre Company of the Minneapolis Institute of Arts; \$250,000 for a three-year period;
- NATIONAL BLACK THEATRE WORKSHOP, New York:** toward the creative costs of developing new works; \$14,700;
- NATIONAL GUILD OF COMMUNITY MUSIC SCHOOLS, Illinois:** toward the costs of operating the executive office of the Guild; \$15,000;
- NEIGHBORHOOD PLAYHOUSE, New York:** toward the costs of extending its training program in theatre and establishing a professional acting ensemble; \$14,500;
- NEW DRAMATISTS COMMITTEE, New York:** support of a program to provide workshop productions of the works of talented new playwrights; \$15,000;
- NEW ENGLAND CONSERVATORY OF MUSIC, Massachusetts:** to enable it to provide financial assistance to exceptionally talented students from the United States, in the form of Rockefeller Foundation Awards; \$200,000 for a three-year period;
- NEW LAFAYETTE THEATRE AND WORKSHOP, New York:** toward its operating expenses; \$100,000;
- NEW ORLEANS PHILHARMONIC SYMPHONY ORCHESTRA, Louisiana:** toward the costs of a two-part program of instrumental and orchestral training for young people; \$18,500;
- NEW YORK PUBLIC LIBRARY:** for use by the Dance Collection for the notation of Doris Humphrey's dance work "Water Study"; \$500;
- NORTH CAROLINA SCHOOL OF THE ARTS:** to assist in the creation of a professional dance company to be known as Dance Theatre South; \$24,300;

- NORTHEASTERN UNIVERSITY, Massachusetts:** toward the second phase of development of a cooperative and participative program involving colleges and universities in the New England area and the Opera Company of Boston; \$24,500;
- OAKLAND SYMPHONY ORCHESTRA ASSOCIATION, California:** additional support for Edward Applebaum as composer-in-residence; \$236;
- OBERLIN COLLEGE, Ohio:** for the continuation of its Teachers Performance Institute for school music teachers; \$170,000 through August, 1971;
- OPEN THEATER, New York:** toward the costs of its developmental work in creative aspects of theatre; \$15,000;
- PEABODY INSTITUTE OF THE CITY OF BALTIMORE, Maryland:** to enable the Peabody Conservatory of Music to provide financial assistance to exceptionally talented students from the United States, in the form of Rockefeller Foundation Awards; \$170,000 for a three-year period;
- PERFORMING ARTS SOCIETY OF LOS ANGELES, California:** toward costs of instructional and administrative staff in its writing and performance workshops; \$13,560;
- REPERTORY THEATRE, Louisiana:** toward the costs of creative experimentation in musical theatre; \$12,000;
- RUTGERS, THE STATE UNIVERSITY, New Jersey:** research project by Dr. Gordon Myers on early American solo songs; \$4,056;
- SAN FRANCISCO CONSERVATORY OF MUSIC, California:** to enable it to provide financial assistance to exceptionally talented students from the United States, in the form of Rockefeller Foundation Awards; \$85,000 for a three-year period;
- RICHARD SCHICKEL, New York:** work on a biography of American film pioneer D. W. Griffith; \$7,215;
- SOUTHEASTERN ACADEMY OF THEATRE AND MUSIC, Georgia:** toward the costs of development and expansion of its programs in theatre; \$175,000 for a three-year period;
- SOUTHERN ILLINOIS UNIVERSITY:** toward the costs of developing a performing company under the direction of Katherine Dunham at the Performing Arts Training Center of the East Saint Louis Campus of the University; \$23,020;
- STATE UNIVERSITY OF NEW YORK, COLLEGE AT BROCKPORT:** to assist in program development of its Center for Philosophic Exchange; \$15,000;
- STATE UNIVERSITY OF NEW YORK AT BUFFALO:** toward the costs of expanding the work of the Center for the Creative and Performing Arts into areas of theatre, dance, and film; \$24,000;
- STATE UNIVERSITY OF NEW YORK, COLLEGE AT NEW PALTZ:** summer residence program of environmental theatre by the Performance Group of New York; \$7,000;
- TEMPLE UNIVERSITY, Pennsylvania:** toward the salary of a full-time administrator for the teaching fellowship program operated by the University in conjunction with the Settlement Music School of Philadelphia; \$8,000;
- THEATRE INCORPORATED, New York:** toward the costs of its New Phoenix program of theatre workshops for the development of new theatrical material and the improvement of the skills of young actors, leading to performances of new productions; \$25,000;
- UNIVERSITY OF CALIFORNIA, Berkeley:** to enable Mrs. Jane Dillenberger to prepare an exhibition on 19th-century American religious art for the University Art Museum; \$14,970;
- UNIVERSITY OF CALIFORNIA AT LOS ANGELES:** toward the costs of establishing a Graduate Dance Center; \$12,000;
- UNIVERSITY OF CINCINNATI, Ohio:** toward the costs of establishing at the University the East Coast branch of the Congress of Strings; \$30,000 through September, 1972;
- UNIVERSITY OF MICHIGAN:** toward the costs of continuing the Contemporary Performance Project of the School of Music; \$36,225 for a two-year period;
- UNIVERSITY OF IOWA:** toward the costs of expanding its Center for the New Performing Arts; \$440,000 for a five-year period;

UNIVERSITY OF NEW MEXICO: to enable John Donald Robb, composer and dean emeritus of the College of Fine Arts, to complete a treatise on Hispanic folk music in New Mexico and the Southwest; \$10,000;

UNIVERSITY OF SOUTHERN CALIFORNIA:

Toward the costs of continuing the West Coast branch of the Congress of Strings; \$45,000 through September, 1972;

For the continuation by its School of Performing Arts of a training program for music critics; \$34,000 through August, 1973;

WGBH EDUCATIONAL FOUNDATION, Massachusetts: toward the costs of bringing artists and scholars into residence at public television station WGBH to participate in its Project for New Television; \$300,000 for a three-year period.



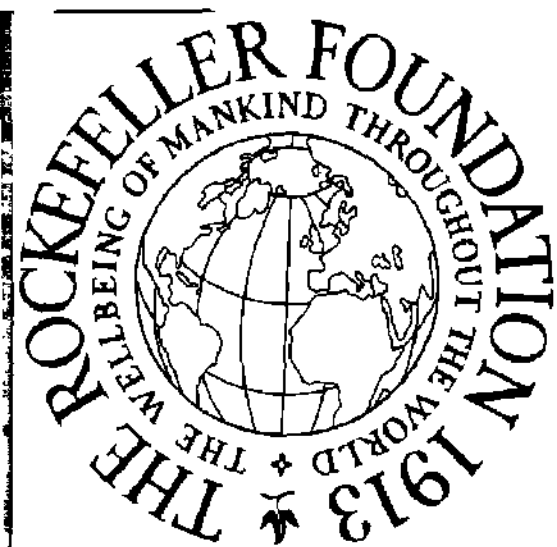
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In professional music schools such as Baltimore's Peabody Conservatory, gifted students pursue their musical training under Rockefeller Foundation scholarships.

Work-in-Progress

THE PLIGHT OF THE CONSERVATORIES

During its hundred-year history, the conservatory of music has been the principal training ground for American musicians. In recent years conservatories have graduated such important concert artists as Van Cliburn, Leontyne Price, André Watts, Itzak Perlman, and John Browning. The Peabody Conservatory of Music, in downtown Baltimore, shares in both the achievements and the problems facing all conservatories today. Its doors were opened to students in 1868, eleven years after George Peabody, a wealthy merchant, endowed it, expressing the hope that it might "become useful toward the improvement of the moral and intellectual culture of the inhabitants of Baltimore." Headed by composer-conductor Richard Franko Goldman, Peabody offers a quality musical education for talented students and confers the Bachelor of Music, Master of Music, and Doctor of Musical Arts degrees. In addition, the Master Teachers Program of the Preparatory Department enrolls a small number of students with truly exceptional gifts for study with master teachers in the Conservatory such as Leon Fleisher and Berl Senofsky. For the enjoyment of the community, concerts by Peabody faculty, students, and ensembles are presented frequently in

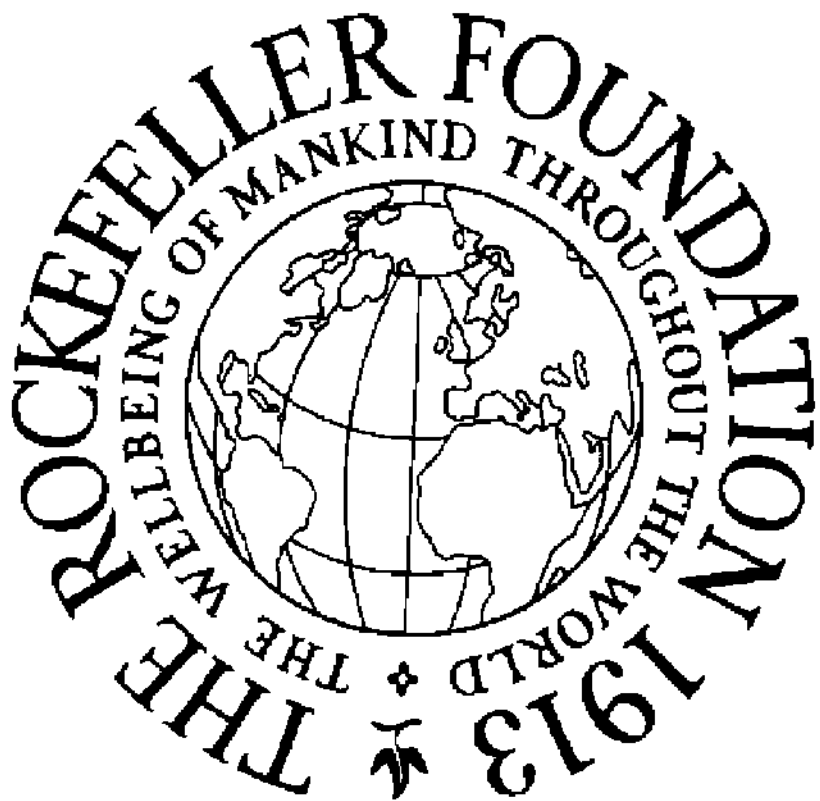


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and around the Baltimore area. In spite of the artistic success of conservatories like Peabody, financial difficulties have mounted. Until very recently, most had made no serious efforts to increase their original capital funds or their investment income. Further, unlike most colleges or universities, conservatories have few wealthy alumni. Therefore, today they are finding themselves unable to give necessary scholarship aid to talented but needy students—precisely the kind of young people who should be able to attend the conservatory. The Rockefeller Foundation, in 1969, awarded \$170,000 to the Peabody Conservatory of Music. This gift will provide student aid and approximately 23 tuition awards for gifted young musicians in the Conservatory or in its Preparatory Department. Similar grants were made this year to the New England Conservatory, the Juilliard School, the Manhattan School of Music, the Cleveland Institute of Music, and the San Francisco Conservatory of Music. This seed money will enable the schools to increase aid to students, while embarking on major endowment fund drives and applying for possible Government support.



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George White (bottom right) has turned an old estate into a theatre center that attracts outstanding troupes like the Theater Workshop of Trinidad (above) and collaborates with college drama departments.

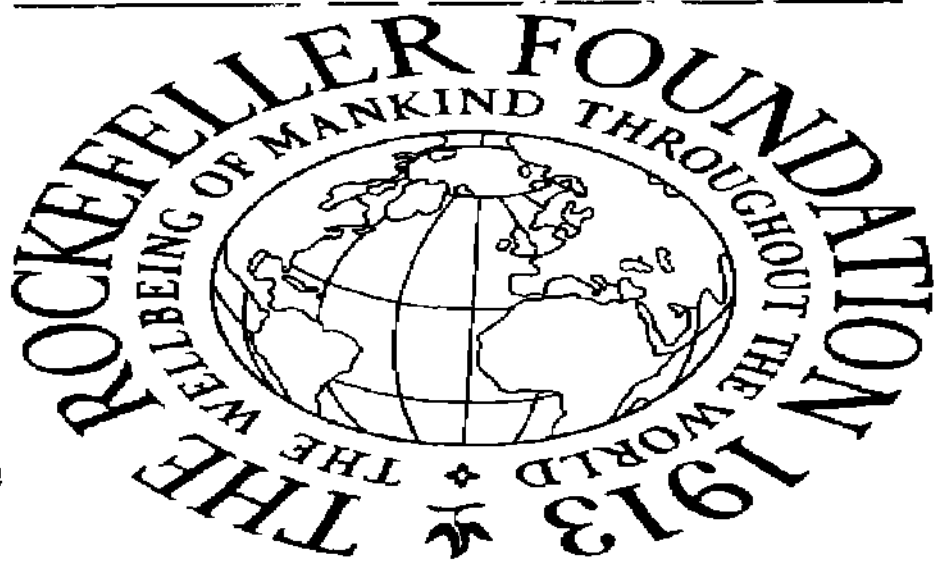
Work-in-Progress

THE EUGENE O'NEILL MEMORIAL THEATER CENTER

One of the most successful attempts to infuse strength and vitality into the American theatre is taking place at the Eugene O'Neill Memorial Theater Center in Waterford, Connecticut, under the leadership of its energetic founder, George White. In White's view, "We need new plays, new playwrights, new dramatic forms. And we need critics who are qualified to discuss a new theatre intelligently. Finally, we need audiences who can appreciate it." Characteristically, White set out to help supply all these needs. At the O'Neill Center, new playwrights are invited each summer to develop their works with the participation of professional directors, actors, and choreographers and the counsel of a "dramaturg"—a theatre expert or kindly disposed critic. Simultaneously, the John Mason Brown Critics Institute trains young reviewers. And audiences composed of drama students, playwrights, regional theatre directors, high school drama teachers, and theatre enthusiasts from many parts of the country flock to the performances with a sense of being part of what is happening at the heart of theatre today. During the winter months, the newly established National Theater Institute is providing a new approach to education in theatre. Summer activities center around the National Playwrights Conference, which has received support from The Rockefeller Foundation since 1967. The Conference is basically a program of plays-in-the-making by resident playwrights. The works are given staged



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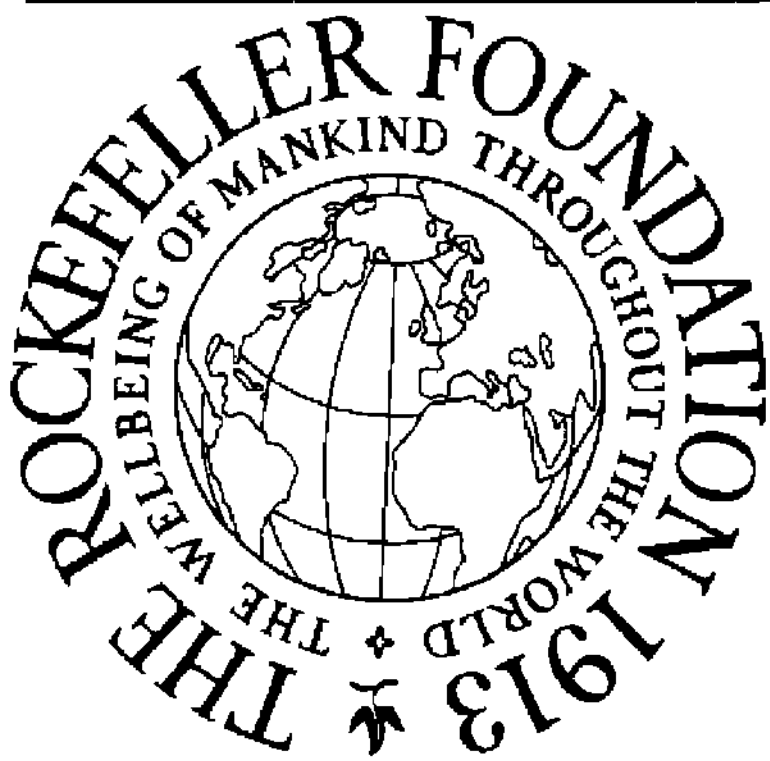


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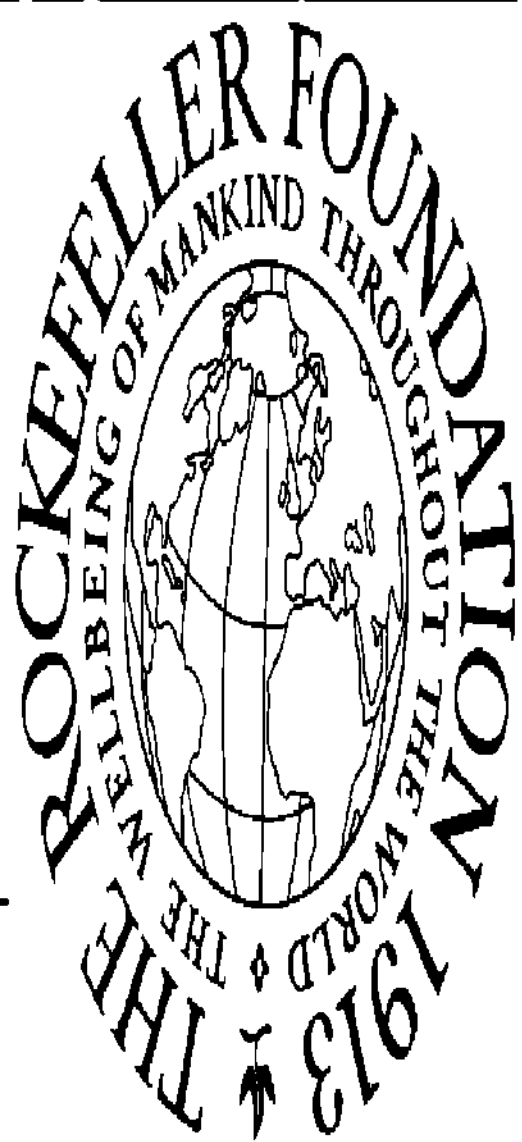


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*readings or informal, keyed-down productions, followed by discussion sessions in which cast and director, dramaturg and author all have their say. A few works—like *Summertime* by Ron Cowen—have gone on to win critical and even commercial success, but more important in the eyes of the Conference's leaders are the near successes, the experiments that teach the playwright his craft as nothing else can. This year, with Rockefeller Foundation support, the O'Neill Center launched the National Theater Institute to provide a training ground and resource center in theatre in cooperation with colleges and universities. Students are selected to spend a semester in residence at the O'Neill, where they follow a rigorous work and study schedule, culminating in the production of two plays for a tour of some of their home colleges. The core staff at the Center is supplemented by part-time faculty drawn from the ranks of theatre professionals, who lecture, conduct workshops and seminars, and guide productions. A highlight of each semester's curriculum is a field trip to New York to attend plays, watch rehearsals, tour scenic design and costume studios, and meet top professionals in all branches of theatre. The semester at the O'Neill, for which the students receive academic credit through Connecticut College, is a new solution to the old problem of fusing academic and professional elements in training for theatre artists and educators—a program that few institutions have the facilities to offer on their own.*



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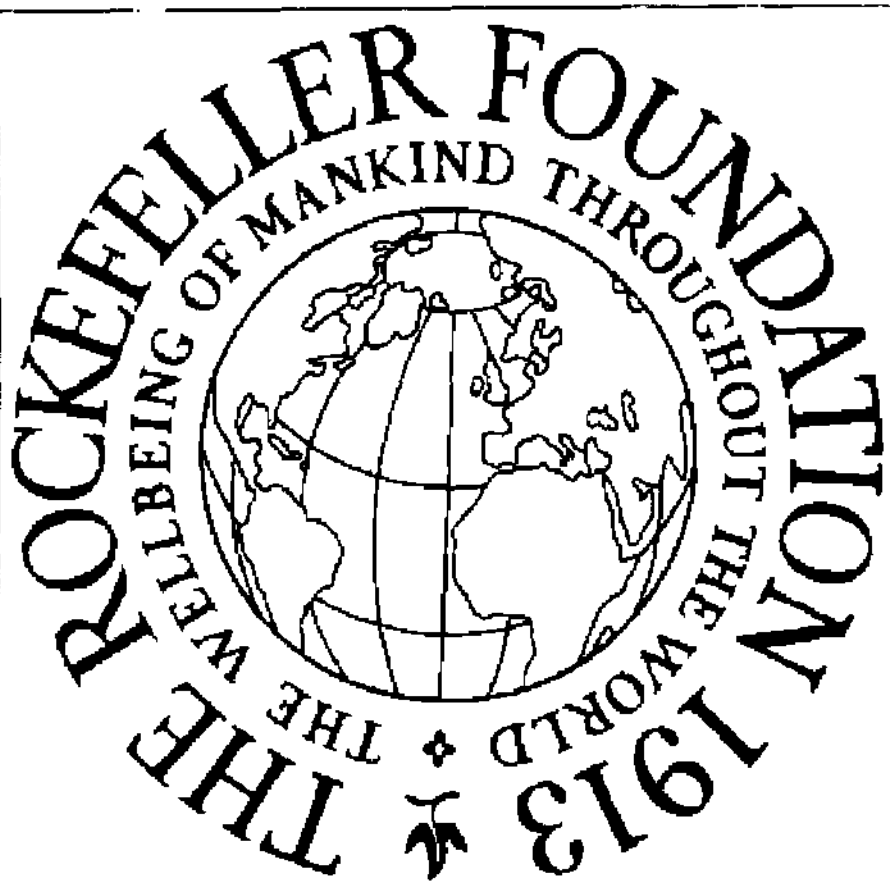


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Work-in-Progress

THE BROOKLYN ACADEMY OF MUSIC

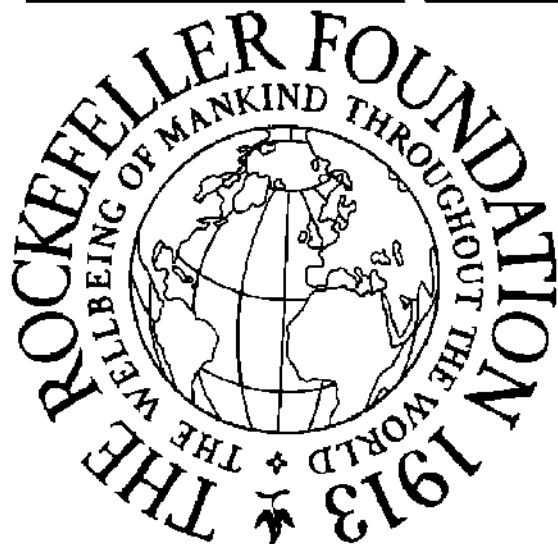
Just a few years ago the Brooklyn Academy of Music was dying—another monument to Edwardian elegance doomed by changing neighborhoods and increased costs. Now, under Harvey Lichtenstein's leadership, it has become a showcase for some of America's greatest dance companies, and a center for the new, the experimental, and controversial in drama. Two years ago, with Rockefeller Foundation support, Lichtenstein began inviting unusually gifted groups to take up residence at the Academy. In 1968, as he has pointed out, no modern dance company in the country had a theatre of its own: in that year, Lichtenstein invited the peerless Merce Cunningham Dance Company to Brooklyn. The Company needed a permanent base of operations, in which it could create new works as well as perform them. The Academy needed new audiences—people from Brooklyn, and people who would travel to Brooklyn. A year later, Eliot Feld, a young choreographer of promise, came to Lichtenstein to see whether he could form a ballet company of his own. Feld needed a group of dancers with whom to work out new compositions



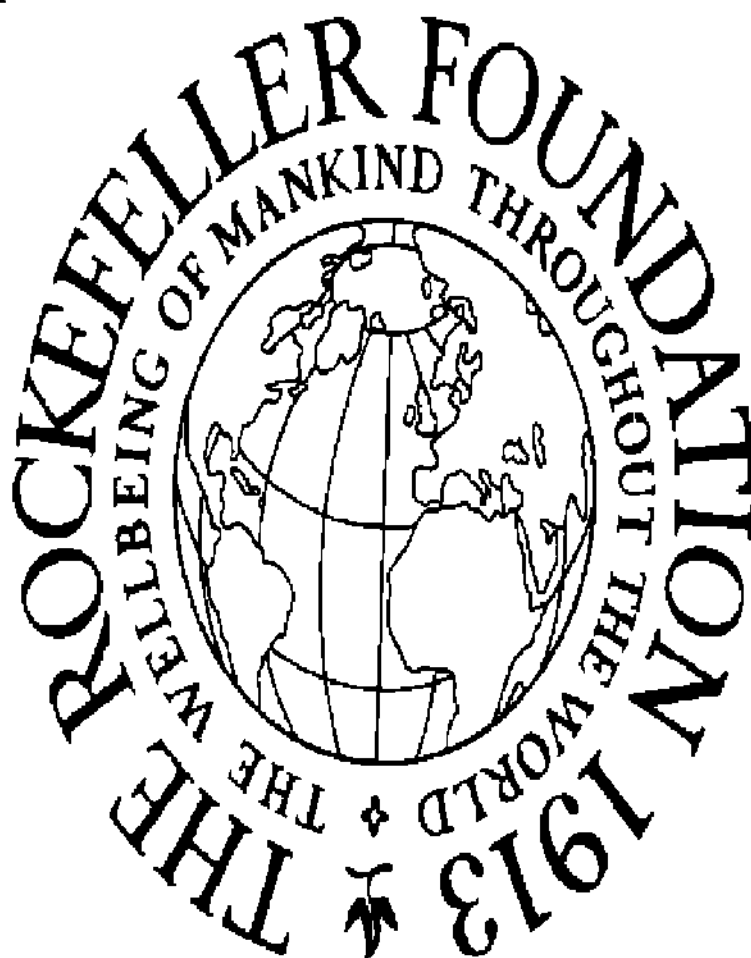
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AMITY LICHTENSTEIN HAS DEVELOPED BROOKLYN'S ACADEMY OF MUSIC INTO A HIGHLY RESPECTED HOME FOR OUTSTANDING THEATRE AND DANCE GROUPS.

—as another artist might work with paint or clay. At the time, Lichtenstein predicted that “Feld has the artistic quality and potential to make his group into a major ballet company—a company of international importance.” Last year, in its first season, Feld’s American Ballet Company more than fulfilled that prediction. Critics called the new company “triumphant,” “exciting,” “brilliant,” and the choreographer “an original and creative personality.” Lichtenstein has said simply, “I wouldn’t have begun a ballet company with anyone else.” Two years ago, the Chelsea Theater Center—an Off-Off-Broadway theatre about to lose its home in Manhattan—was invited to take over the Academy’s Third Theatre (200 seats and a thrust stage). Since then it has been steadily building audiences for new and often savage theatre. This year, LeRoi Jones’s searing spectacle *Slave Ship*, with its relentless beat of music, movement, and sound, won an Obie—Off-Broadway’s highest award—for director Gilbert Moses. Another Obie went to Chelsea Theater Center for “distinguished productions in the Off-Broadway theatre.”



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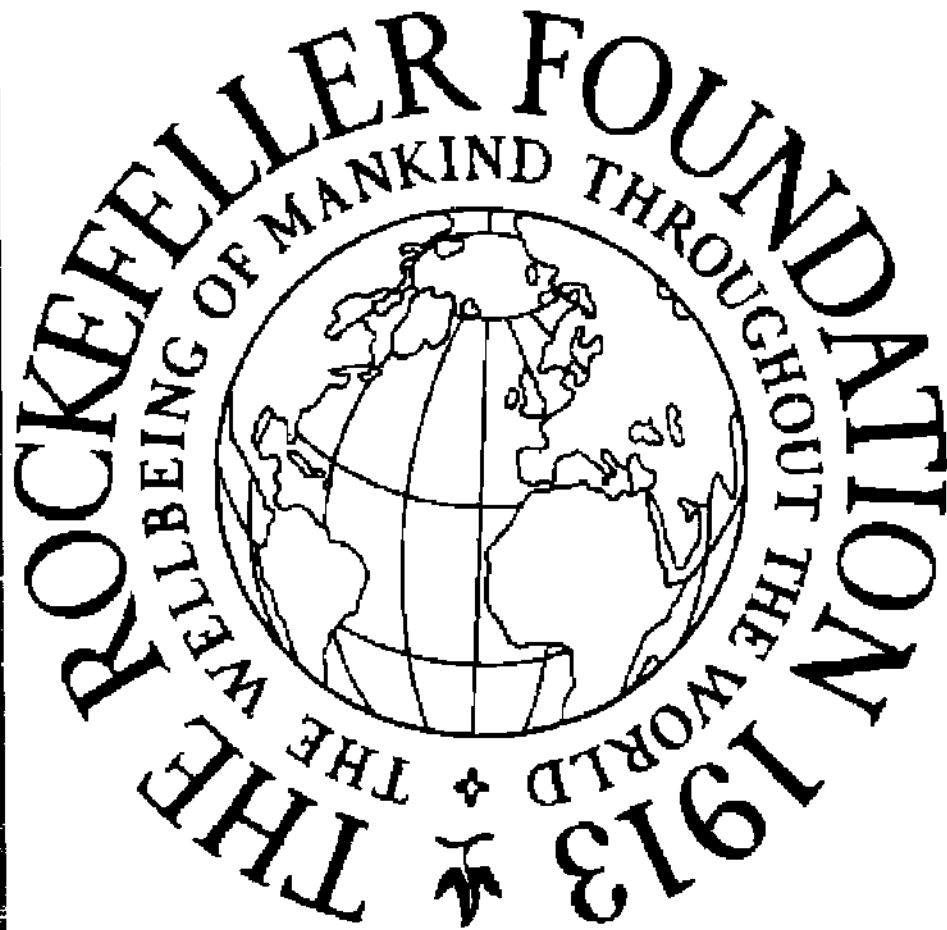


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Work-in-Progress

THE OFFICE FOR ADVANCED DRAMA RESEARCH

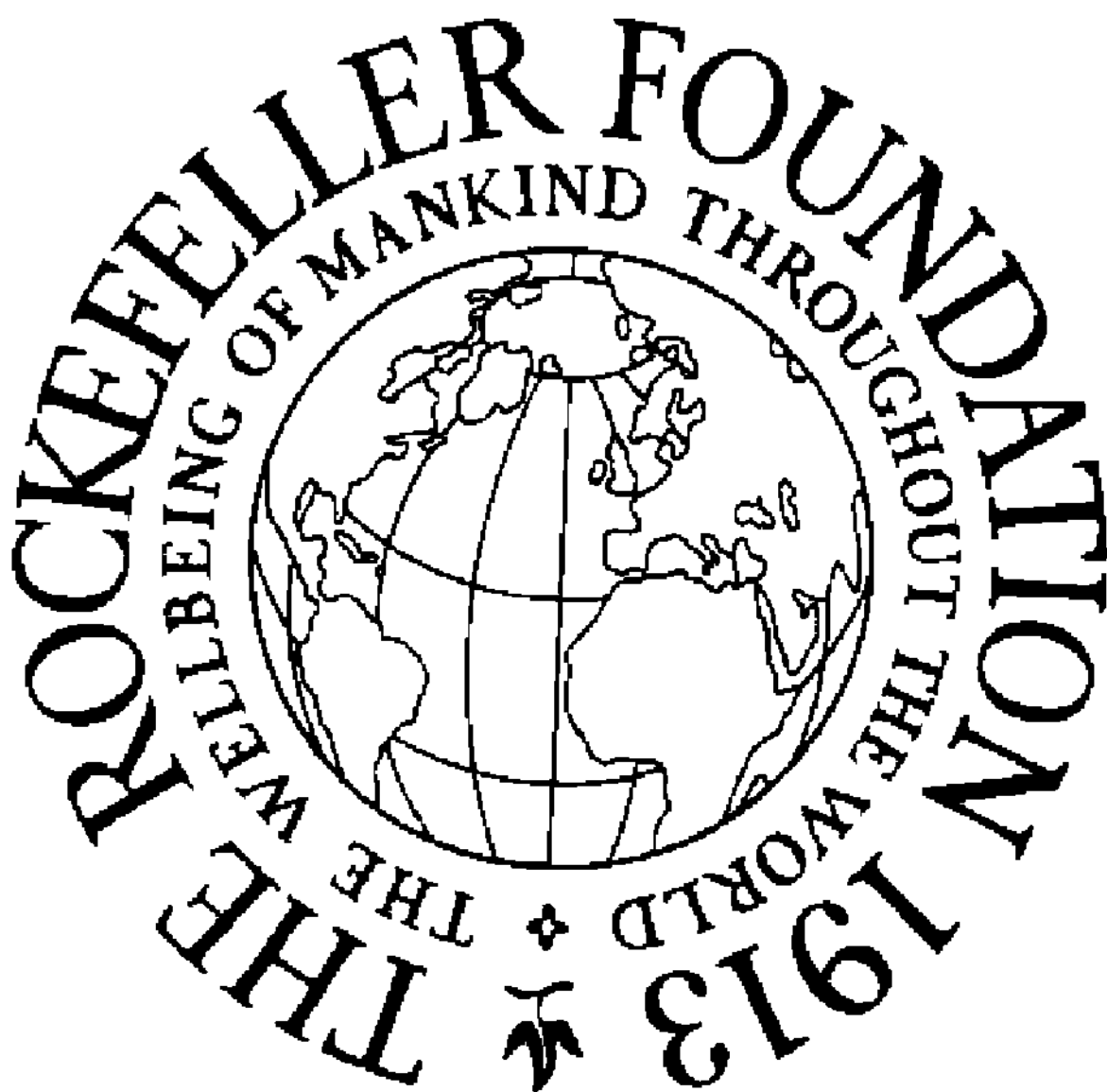
For a playwright to learn his craft, he must be able to see his work performed on stage—not in the sink-or-swim world of the commercial theatre, but in a less highly charged atmosphere that is both professional and experimental. For some years Dr. Arthur Ballet of the University of Minnesota's Office for Advanced Drama Research has been selecting new plays and placing them with community or university theatres in the Twin Cities area. He reads, he says, about a thousand manuscripts a year — an average of three a day. "And I read every play clear through," he points out, "which is — a task." Scripts that are not produced are returned with criticisms, encouragement, and often with recommendations to local resident theatres, New York producers, or television companies. Ballet has said of his skill in finding new playwrights, "I think I have about a .500 batting average." And a surprising number of America's best playwrights — Megan Terry, Sam Shepard, Jean-Claude Van Itallie, Rochelle Owens — were brought to Minneapolis by the Office for Advanced Drama Research very early in their careers. The Office for Advanced



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To Arthur Ballet's office at the University of Minnesota come thousands of scripts from beginning playwrights, the best of which are produced at theatres around the country.

Drama Research was begun in 1963 with a Rockefeller Foundation grant. An additional grant of \$388,500, made in 1969, has allowed the Office to expand its program nationally. New plays—and their authors—are being matched with theatre groups all over the country—in cities as widely separated as Los Angeles, New Orleans, and Washington, D. C. Ballet's resources now permit him to sponsor 15 productions of new plays annually, at whatever theatres he feels can best serve the interest of the playwright. As an example—for one new work he has chosen a good university theatre, because the play "has loose ends; the playwright knows where they are but not what to do about them. . . . For that particular play at this particular moment, a campus situation seems best." Other scripts are sent to professional or semi-professional companies that Ballet thinks will work well with the play and the author. "If the play is good," he says, "if it has something to say, even when it's not what I want a play to say—I think I recognize it. Then I send it to a theatre that I think is able to do it. If they agree with me, then we're in business."

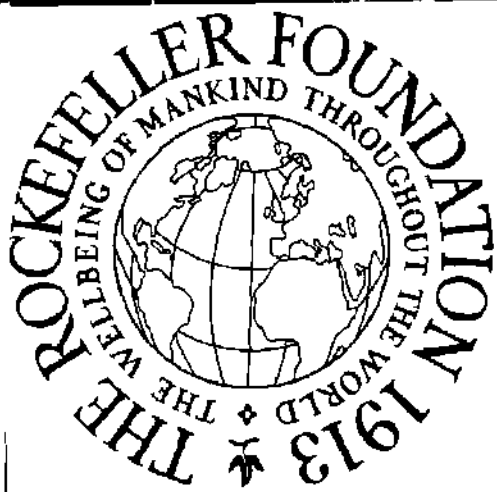


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Work-in-Progress

ARTISTS-IN-TELEVISION AT WGBH

The most direct way to explore the possibilities of television as a medium for artists is to involve artists in television. Under a Rockefeller Foundation grant of \$275,000, station WGBH in Boston invited writers, sculptors, painters, choreographers, film-makers, and musicians into its studios to experiment with techniques and program content to quicken the reflexes of educational TV. The experiment yielded some startling technical inventions whose uses have yet to be inventoried, as well as programs of general interest such as Mary Feldhaus-Weber's "Nine Heroes," which pleased a wide audience, won raves from newspaper critics, and became a candidate for all-time-classic status. Some of the artists concentrated on the physical possibilities of the medium. "TV sculpture" was taped and broadcast; textural illusions and exotic images were created by tampering with the beam in the picture tube; musician Nam June Paik invented an electronic video synthesizer capable of blending color, form, and motion randomly in patterns infinitely



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Boston's public television station encourages artists such as Nam June Paik (far left) to experiment with highly original programs that explore the electronic possibilities of the medium.

malleable and manipulable. Writers and film-makers tried out new idioms and new approaches to concept and content. A highlight was Stan VanDerBeek's collage called "Violence Sonata," in which two tapes were broadcast simultaneously over separate channels and reinforced by live actors, a participating studio audience, and a brace of telephone answerers bringing in messages from outside viewers. Directors Michael Rice and Fred Barzyk (above, right), working with TV journalists Jean Shepherd (above, left) and David Silver, pioneered programs for the minority who want something more arcane than major-network fare—a new tone, temperature, and pace—off-beat subject matter in TV commentary on our times and mores. A stunning archive resulted; some of the programs were seen on NET stations around the country; others, only locally. More important, the notion of art as barrier-blasting invaded television and took on a local coloration, promising new dimensions in the medium and on the viewing screen.

ALLIED INTERESTS

Traditionally The Rockefeller Foundation has concentrated its efforts in a few clearly defined areas; currently most of its work is carried out within the framework of the six major programs described in previous chapters. In addition the Foundation supports a limited number of projects in fields closely allied with these major interests.

COMMUNITY HEALTH CARE

Over the past few years the Foundation has become increasingly involved in the search for effective means of delivering comprehensive health care to the community, whether it be in the developing countries, in urban ghettos, or in middle-class sections. The problem is virtually universal, and solutions will vary with the availability of health resources and budgets to support them, the nature of local health problems, the effectiveness of administrative structures, and many other factors. The Foundation has made a number of grants for planning, research, and training in this field.

Harvard Medical School received funds this year toward development of a system of health care based on a prepaid insurance scheme and backed by its own personnel and technical resources. A clinic capable of handling up to 30,000 outpatients has been established near the Medical School, and insurance companies are offering policies for participation in the plan; it has also been approved for welfare recipients by the Commonwealth of Massachusetts.

One bottleneck in the provision of adequate health services is the lack of professional manpower. Two universities are receiving Foundation aid for programs aimed at alleviating this shortage through training for physician's assistants. Both Duke University and Stanford University are offering a two-year curriculum for paramedical workers, designed to train them in routine skills and basic public health techniques. Duke's program, which has been in operation since 1965, is initiating an experimental community service, in which graduates of the course will work in rural and urban areas deprived of physicians. Under the supervision of the University Medical Center's Department of Community Health Services, the health workers will provide preventive

services, health education, primary medical care, and referral services.

A prototype system for overall medical care in a developing country is being designed in Colombia as a collaborative effort of the World Health Organization, health agencies of the Colombian Government and the state of Valle, the University of Valle, and a number of United States universities. This year the Foundation contributed to planning costs for the initial phase of the work through grants to the University of Valle and to Harvard University.

A number of grants made under the Foundation's Equal Opportunity Program deal with the problem of providing health care for disadvantaged minority groups in the United States and with helping young people from these groups achieve upward mobility through careers in the health professions. The grant to the People-to-People Health Foundation for Project HOPE's work in Laredo, Texas, is an example. In addition, some of the institutions supported under the University Development Program are integrating training of medical and paramedical personnel with pilot programs in health care delivery in developing countries.

Drug dependency has emerged in the last decade as a special health problem of growing seriousness; heroin use among adolescents in particular is causing increasing public and professional concern. Rehabilitation of teen-age addicts through the use of methadone is being attempted on a pilot basis by a team composed of personnel from the Rockefeller University, Cornell University Medical College, and the New York Hospital, starting with treatment of 150 heroin addicts from a local high school. The Foundation made a grant to Cornell this year to support this program.

ARBOVIROLOGY

Studies of the viruses carried by arthropod insects have been supported by the Foundation for nearly two decades; laboratories were established in India, Brazil, Colombia, Trinidad, Nigeria, and California, and virologists trained to staff them. Gradually these units have been integrated with local universities or government

research agencies, and Foundation support and personnel have been concentrated at the central laboratory at Yale University. Support for units at Ibadan, Nigeria; and Cali, Colombia; is still being provided in connection with the University Development Program; support was also made available this year for research in Berkeley, California; and Belém, Brazil. A grant also helped the laboratory at Poona, India, to purchase equipment.

INTERNATIONAL PROBLEMS

International relations is another area of long-standing Foundation interest. This year the Brookings Institution received support for its efforts to bring outstanding young scholars into its Foreign Policy Studies Program. The Institution hopes in this way both to strengthen the international dimension in the thinking of the new generation of scholars and to benefit from the insights they can bring to the analysis of world affairs.

The Overseas Development Council received support for its programs of basic and applied research on the needs of developing countries. The Council's focus is on finding ways of closing the widening gap between rich and poor nations through analysis of economic development and the role of foreign aid and through promotion of a wider understanding of the problems involved.

The Foundation also made funds available to the Carnegie Endowment for International Peace for its program of training for young foreign service officers from the newly independent nations. Since 1960 young diplomats, mainly from Africa, have benefited from studies either at the Graduate Institute of International Studies in Geneva, Switzerland, or at Columbia University's School of International Affairs. The Carnegie Endowment now plans gradually to shift the base of these studies to regional institutes in Africa and the Caribbean area and also to add mid-career training for men slated to assume higher responsibilities.

GRANTS AND PROGRAMS APPROVED IN 1970

INTERNATIONAL

ROCKEFELLER FOUNDATION International Program in Virus Research:

Yale Arbovirus Research Unit	<u>\$233,540</u>
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ROCKEFELLER FOUNDATION Conference and Study Center:

Villa Serbelloni, Italy	<u>\$274,570</u>
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Staff on assignment	\$ 35,700
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Project support	238,870
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ROCKEFELLER FOUNDATION unallocated contingency reserve for International Programs	<u>\$350,000</u>
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SUPPORT FOR INTERNATIONAL SCHOOLS; \$15,000;

UNITED NATIONS: toward the costs of the World Youth Assembly held at the United Nations headquarters, New York; \$25,000;

AUSTRALIA

AUSTRALIAN NATIONAL UNIVERSITY: toward the preparation of a biography of Gilbert Murray by Professor Francis West; \$10,000;

BAHAMAS

MINISTRY OF EXTERNAL AFFAIRS: for the purchase of a collection of basic works in international relations; \$4,200;



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Paul Densen is the director of the Center for Community Health and Medical Care at Harvard University, one of several Foundation-assisted community health projects.

CANADA

UNIVERSITY OF MONTREAL: toward the costs of the Fifth General Conference of the International Association of Universities; \$15,000;

CHILE

CATHOLIC UNIVERSITY OF CHILE: additional expenses of developing a neurological research center, research in marine biology, and research and training in nuclear medicine; \$66;

COLOMBIA

UNIVERSITY OF VALLE: toward the costs of planning an experimental program for the development of a comprehensive system of health planning; \$40,000;

GAMBIA

MINISTRY OF EXTERNAL AFFAIRS: for the purchase of a collection of basic works in international relations; \$4,200;

INDIA

INDIAN COUNCIL OF MEDICAL RESEARCH: for the purchase of equipment and supplies for the Virus Research Centre, Poona; \$15,000;

ITALY

VILLA SERBELLONI CONFERENCE AND STUDY CENTER: *see International, above*;

TRINIDAD

MINISTRY OF EXTERNAL AFFAIRS OF TRINIDAD AND TOBAGO: purchase of a collection of basic works in international relations; \$4,200;

UNITED STATES

AMERICAN ASSEMBLY, New York: toward expenses of the Thirty-seventh American Assembly on the Health of Americans; \$25,000;

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE, Washington, D. C.: toward the costs of televising parts of its 1970 annual meeting; \$5,000;

ASSOCIATION OF AMERICAN UNIVERSITIES, Illinois: to enable it to send a delegation of its members to participate in a joint meeting with the Committee of Vice-Chancellors and Principals of the United Kingdom; \$25,000;

BROOKINGS INSTITUTION, Washington, D. C.: toward the costs of a program of associating outstanding young scholars with its Foreign Policy Studies Program; \$200,000;

CARNEGIE ENDOWMENT FOR INTERNATIONAL PEACE, New York: toward the costs of training programs for young- and middle-level foreign service officers from developing countries; \$130,000;

COLUMBIA UNIVERSITY, New York: for preparation of the memoirs of Dr. E. C. Stakman by the Oral History Research Office; \$7,500;

CORNELL UNIVERSITY, New York: toward costs of an investigation of adolescent drug dependency to be carried out by Cornell University Medical College; \$264,000 for a two-year period;

DUKE UNIVERSITY, North Carolina:

Toward support of the physician's assistant training and experimental health service programs of the Duke University Medical Center; \$150,000 for a three-year period;

Toward the costs of a conference on "The Marginal Revolution in Economics: An Evaluation and Interpretation," held at the Villa Serbelloni Conference and Study Center; \$6,000;

HARVARD UNIVERSITY, Massachusetts:

For use by its Medical School toward the costs of developing the Harvard Community Health Plan; \$200,000 for a two-year period;

To enable its School of Public Health to participate in an experimental program to develop a new system of health planning at the University of Valle, Colombia; \$15,000;

HUNTER COLLEGE OF THE CITY UNIVERSITY OF NEW YORK: toward preparation of a plan of governance to be submitted to general referendum of College faculty and students; \$25,000;

LEAGUE OF WOMEN VOTERS' EDUCATION FUND: toward the costs of establishment of a unified management system for the League, the Education Fund, and the Overseas Education Fund; \$25,000;

MICHIGAN STATE UNIVERSITY: publication of a monograph, prepared by the College of Human Medicine, describing a community-based system of medical education; \$400;

NATIONAL ACADEMY OF SCIENCES, Washington, D. C.: toward expenses of full-time staff and basic operating requirements of the Board on Medicine; \$25,000;

OVERSEAS DEVELOPMENT COUNCIL, Washington, D. C.: toward support of a continuing program of reappraisal, research, and education on the problems and needs of the less-developed countries; 125,000;

ROCKEFELLER ARCHIVES AND RESEARCH CENTER, New York: toward costs of planning, construction, and organization; \$50,000;

STANFORD UNIVERSITY, California: for the costs of planning a physician's assistant program at its Medical Center; \$56,000;

STATE COMMUNITIES AID ASSOCIATION, New York: toward support of a national conference on the facilities and distribution of health and hospital services; \$25,000;

UNIVERSITY OF NORTH CAROLINA: for a supplement to the *Catalogue of Arthropod-Borne Viruses of the World*, to be published in the *American Journal of Tropical Medicine and Hygiene*; \$4,000;

YALE ARBOVIRUS RESEARCH UNIT, Connecticut: see *International, above*.

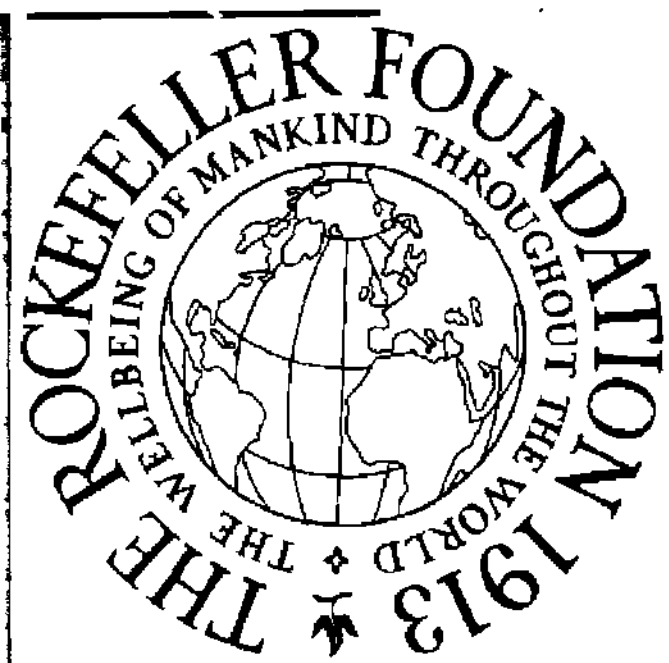


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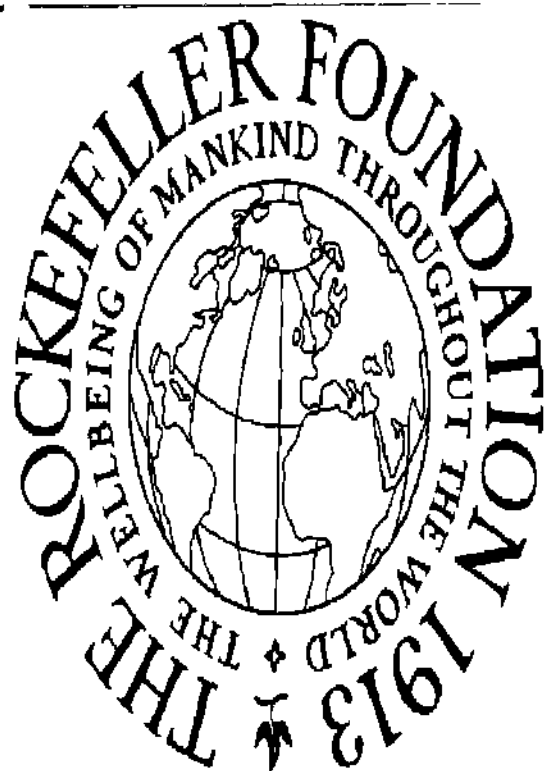
Work-in-Progress

PHYSICIAN'S ASSISTANTS

In today's overstrained and archaic system of medical care, doctors are struggling under overwhelming caseloads and hundreds of thousands of people have no access to the system at all. At the same time, many young people interested in the health field are going into unrelated jobs. Duke University is making a place in medicine for these young people, with a two-year training program, open to high-school graduates who have some medical experience (usually in the armed forces) which will qualify them to be a new kind of medical worker—a professional assistant to the doctor. "In the course of the five years that the program has been operating, we've learned a great deal about medical education," says Dr. Harvey Estes, chairman of Duke's Department of Community Health Sciences. "One thing is that you don't need four years of college and four years of medical school to learn the skills—the routine tools—of modern medicine." And Dr. Elliott Dixon of Ayden, North Carolina (population 4,000), remarks, "More than 90 percent of my practice is routine. We get people with high blood pressure, diabetes, dog bites. Kids with



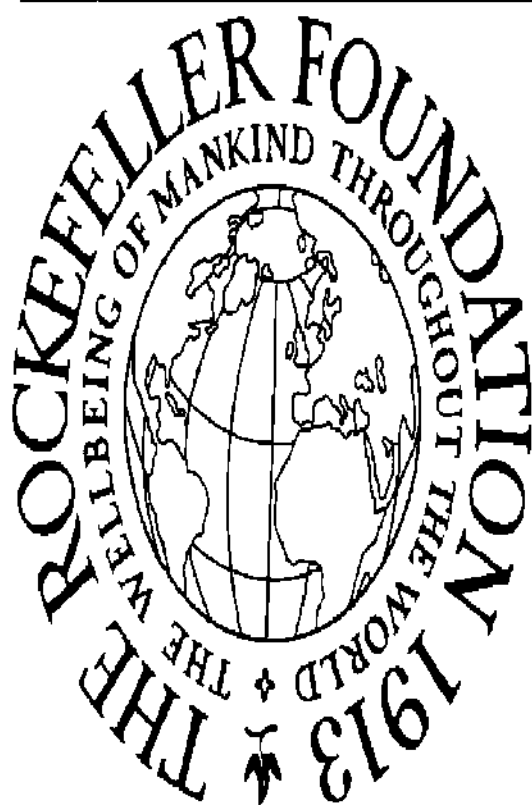
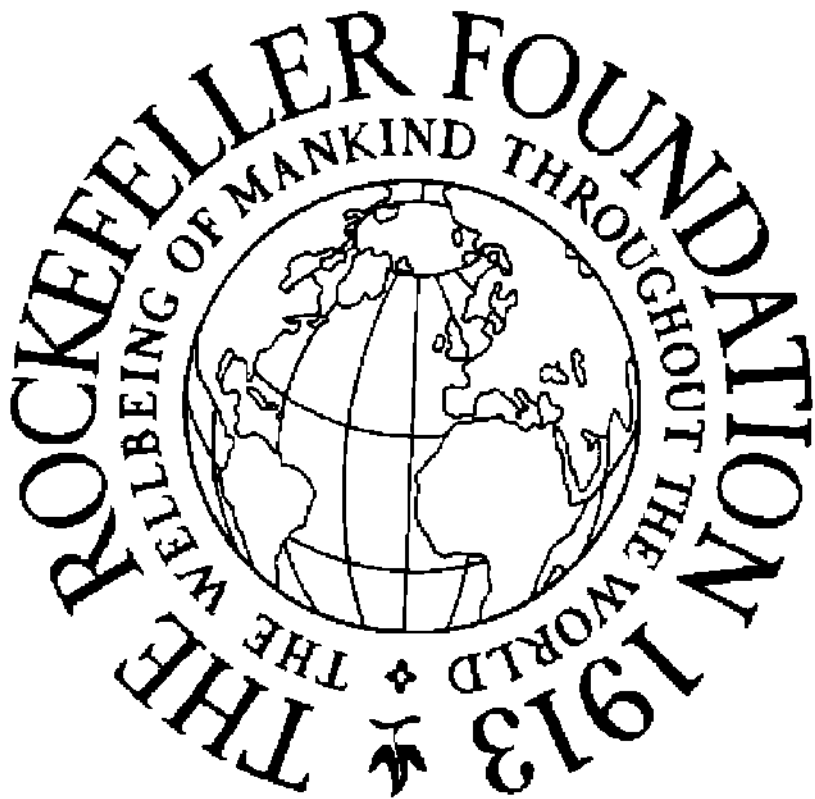
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Overworked physicians such as Dr. Elliott Dixon (right), as well as their patients, are enthusiastic about the physician's assistants trained in Duke University's imaginative program.

nails in their feet." Last year he hired an assistant—Stephen Joyner, a 1968 graduate of the Duke program. "Steve does virtually everything I do, although I supervise," Dr. Dixon says. Since Stephen Joyner has come to Ayden, Dr. Dixon's practice has increased by 50 percent. "But with that 50 percent increase, it's still a 50 percent easier type of practice." Physician's assistants are instructed in the basic life sciences, laboratory and diagnostic techniques, medical administration, and, by rotation through the wards and outpatient clinics of Duke Hospital, in clinical medicine. The first group of assistants had a background only in internal medicine. But as doctors saw them in action, they began asking for assistants trained in their specialties. According to one administrator: "The surgeons said, 'We need somebody,' so we expanded into surgery; the pediatricians said, 'We need assistants, too,' so we expanded into pediatrics. Now it has come to the point where all the other specialists want assistants." The physician's assistants have proved themselves to be so valuable that now it has become a question of keeping up with the demand.



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In Laredo, Texas, Mexican-Americans are learning paramedical skills in order to help both themselves and their community in programs sponsored by Project Hope.

Work-in-Progress

PROJECT HOPE IN LAREDO

Laredo, Texas, is a border town. Most of its people are Mexican-Americans, many of them migrant workers who winter here from October to April. In 1967 the Census Bureau declared Laredo the poorest metropolitan area in the United States. A year later, Project Hope was invited to help improve Laredo's standards of health care. "Hope has mainly worked overseas in developing nations," said Archie Golden, director of Hope's Community Health Programs. "But medically, Laredo is very much like a developing nation. There are the poverty diseases, and the transportation problem, and above all the shortage of health manpower." Hope's first step toward ameliorating that shortage was to assign six graduate nurses and a lay administrator to work with the health programs then in operation: at Mercy Hospital; in the School of Nursing and other departments of Laredo Junior College; and in the Laredo-Webb County Department of Health. After several months of working within the medical system, the Project Hope staff offered its first proposal: a program to train paramedical "health assistants" in a four-month course at Laredo Junior College. The College agreed to provide classrooms, teaching materials, a library; two experienced nursing instructors—Project Hope staff members—were chosen to supervise the health curriculum (mainly community health, hygiene, and basic nursing tech-



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niques). Health assistants must be at least 18 years old, and speak both English and Spanish. They must also have family incomes that are below the poverty line. Beyond that they are chosen on the basis of aptitude and achievement, through tests and personal interviews. Nurses and teachers have high praise for the students. "They're so enthusiastic," one nurse reports, "that there's virtually no absenteeism. They really work hard in class." The first graduating class numbered 20, out of a beginning enrollment of 23—an outstanding record for a group whose general academic preparation was poor, of whom 11 had never finished high school. All 20 graduates are working in Laredo, in the health field. The 12 assistants now working in the Department of Health have more than doubled the number of people who are able to extend their services into the community—and this community is far-flung. Families without cars often cannot travel to clinics, and so nurses and assistants must go to them. A nurse says, "The patients took to the girls right away." And an assistant sums up: "The patients love the attention. They've started to realize that my partner and I can spend time with them when the nurse is too busy helping the really sick people." For many of Laredo's ailing poor, time and attention is the best possible gift.

STUDY AWARDS

The Foundation's study awards are closely integrated with its interests in the agricultural sciences, the biomedical sciences, and the humanities and social sciences so as to bring highly trained people to bear on basic problems. Awards are made internationally to outstanding men and women who have shown promise of making important contributions to their fields of study in their native countries. For 1970 the Trustees approved a fund of \$4,050,000 for fellowships and scholarships. A fund of \$3,810,000 was approved for allocation during 1971.

During 1970 a total of 493 persons held Foundation fellowships and scholarships; 393 awards that began in previous years continued active in 1970, and 100 new awards became active during the year. Their distribution by program is as follows:

	STUDY AWARDS FROM PREVIOUS YEARS CONTINUED INTO 1970	NEW AWARDS IN 1970	NUMBER OF AWARDS ACTIVE IN 1970
Agricultural Sciences	173	35	208
Biomedical Sciences	84	33	117
Humanities and Social Sciences	136	32	168
	<hr/>	<hr/>	<hr/>
	393	100	493

AWARDED BY OTHER AGENCIES
FROM ROCKEFELLER FOUNDATION FUNDS

Population Council	
Demographic	12
Biomedical	3
Technical Assistance	2
Social Science Research Council	31
	<hr/>
	48

Rockefeller Foundation fellows and scholars in 1970¹ came from the following countries:

	PREVIOUS AWARDS	NEW AWARDS		PREVIOUS AWARDS	NEW AWARDS
Argentina	1		Mexico	11	5
Bolivia	1		Nicaragua	1	
Brazil	21	6	Nigeria	38	16
Ceylon	3		Pakistan	1	
Chile	23	5	Paraguay	1	
Colombia	51	14	Peru	25	3
The Republic of the Congo	2		Philippines	48	6
Costa Rica	1		Sudan	2	
Ecuador	11	1	Taiwan	3	
Ethiopia	4		Tanzania	13	9
Ghana	2		Thailand	74	15
Guatemala	1	2	Trinidad	1	
Guyana		1	Turkey	5	2
Honduras	2		Uganda	22	2
India	12	2	United Arab Republic	1	
Iran		1	United States		1
Kenya	10	8	Uruguay	1	
Korea	1			<hr/>	<hr/>
Malawi		1		393	100

FELLOWS AND SCHOLARS: 1970 AWARDS

*F: Fellow; S: Scholar; AGR: Agricultural Sciences;
BMS: Biomedical Sciences; HSS: Humanities and Social Sciences*

BRAZIL

- EGLADSON JOAO CAMPOS D.V.M., Federal University of Minas Gerais, 1961. Poultry Science. Appointed from Federal University of Minas Gerais. Place of study: U.S.A. s-AGR
- FERNANDO IRAJA FELIX DE CARVALHO M.S., Federal University of Rio Grande do Sul, 1969. Agronomy. Appointed from Federal University of Rio Grande do Sul. Place of study: U.S.A. s-AGR
- ANTONIO CARLOS TEIXEIRA FREIRE D.V.M., Federal University of Minas Gerais, 1959. Veterinary Pharmacology. Appointed from Federal University of Minas Gerais. Place of study: U.S.A. s-AGR
- ANTONIO CELSO NOVAES DE MAGALHAES M.S., University of California, Davis, 1967. Plant Physiology. Appointed from the Institute of Agronomy of Campinas. Place of study: U.S.A. s-AGR
- FLAVIO ERNANDES RIBEIRO DA CRUZ D.V.M., Federal University of Minas Gerais, 1965. Agricultural Communications. Appointed from Federal University of Minas Gerais. Place of study: Mexico. s-AGR
- NILTON PENHA SILVA M.S., Federal University of Minas Gerais, 1966. Physics. Appointed from Federal University of Minas Gerais. Place of study: U.S.A. s-BMS

CHILE

- CLAUDIO R. CAFATI KAMPATZKI Ing. Agr., University of Chile, 1967. Plant Pathology. Appointed from Agricultural Research Institute. Place of study: Brazil. s-AGR
- ALBERTO GUILLERMO CUBILLOS PLAZA Ing. Agr., University of Chile, 1957. Plant Breeding. Appointed from Agricultural Research Institute. Place of study: U.S.A. s-AGR
- WALDO G. ESPINOZA M.S., University of Minnesota, 1966. Soil Science. Appointed from University of Concepción. Place of study: U.S.A. s-AGR
- JOSE MANUEL PINERA Ing. Comercial, Catholic University of Chile, 1970. Economics. Appointed from Catholic University of Chile. Place of study: U.S.A. s-HSS
- IGNACIO RUIZ NUNEZ M.S., Virginia Polytechnic Institute, 1967. Agronomy. Appointed from Agricultural Research Institute. Place of study: U.S.A. s-AGR

COLOMBIA

- JAIRO ALVAREZ GAVIRIA M.S., Cornell University, 1967. Mathematics. Appointed from University of Valle. Place of study: U.S.A. s-BMS
- HENRY ARBOLEDA HOME Economista General, Catholic University of Chile, 1967. Economics. Appointed from University of Valle. Place of study: U.S.A. s-HSS
- JULIAN ALBERTO BUITRAGO ARBELAEZ M.S., North Carolina State University, 1968. Animal Science. Appointed from Colombian Institute of Agriculture. Place of study: U.S.A. s-AGR
- FERNANDO CORREA B.S., University of Valle, 1967. Chemistry. Appointed from University of Valle. Place of study: U.S.A. s-BMS
- OSCAR ECHEVERRI CARDONA M.D., University of Valle, 1965. Public Health. Appointed from University of Valle. Place of study: U.S.A. s-BMS
- ERNESTO HUERTAS VEGA M.S., North Carolina State University, 1967. Animal Science. Appointed from Colombian Institute of Agriculture. Place of study: U.S.A. s-AGR

BENJAMIN JIMENEZ APONTE Lic., Pedagogical and Technological University of Colombia, 1965. Botany and Plant Pathology. Appointed from University of Valle. Place of study: U.S.A. s-BMS

URIEL LOZANO RIVERA Lic., University of Antioquia, 1963. Library Science. Appointed from University of Antioquia. Place of study: U.S.A. s-BMS

JOSE DE LA EXPECTACION MULETT Lic., Pedagogical and Technological University of Colombia, 1965. Biology. Appointed from University of Valle. Place of study: Puerto Rico. s-BMS

RAMON NEIRA LEMOS Ing. Quimico, University of Valle, 1966. Chemistry. Appointed from University of Valle. Place of study: U.S.A. s-BMS

TITO NELSON OVIEDO Lic., Pedagogical and Technological University of Colombia, 1962. Linguistics. Appointed from University of Valle. Place of study: U.S.A. s-HSS

JORGE ALBERTO SARAVIA Ing. Sanitario, University of Valle, 1968. Public Health. Appointed from University of Valle. Place of study: U.S.A. s-BMS

JORGE SARMIENTO GAONA Ing. Sanitario, University of Valle, 1970. Sanitary and Environmental Engineering. Appointed from University of Valle. Place of study: U.S.A. s-BMS

MARCO FIDEL SUAREZ R. Lic., National University of Colombia, 1964. Mathematics. Appointed from University of Valle. Place of study: U.S.A. s-BMS

ECUADOR

EDUARDO ALFREDO HERVAS MORENO Veterinarian, Central University of Ecuador, 1965. Animal Science. Appointed from National Agricultural Research Institute. Place of study: U.S.A. s-AGR

GUATEMALA

JOSE RODOLFO ALCARA GUERRA D.V.M., University of San Carlos, 1963. Animal Science. Appointed from University of San Carlos. Place of study: Colombia. s-AGR

CARLOS EUGENIO DEL AGUILA BERNASCONI D.V.M., University of San Carlos, 1966. Microbiology. Appointed from University of San Carlos. Place of study: Colombia. s-AGR

GUYANA

ALGERNON VIVIAN ETON CHIN B.S., University of Nottingham, 1962. Rice Breeding. Appointed from Ministry of Agriculture. Place of study: Philippines. s-AGR

INDIA

M. K. KRISHNAKUMARI Ph.D., University of Mysore, 1969. Biology. Appointed from University of Mysore. Place of study: U.S.A. F-BMS

OM PRAKASH Ph.D., University of Delhi, 1967. Economics. Appointed from University of Delhi. Place of study: U.S.A. F-HSS

IRAN

BEHROOZ SADRI SERESHGI B.S., Pahlavi University (University of Shiraz), 1961. Agronomy. Appointed from Department of Agriculture, Seed and Plant Improvement Institute. Place of study: U.S.A. s-AGR

KENYA

MORRIS SIKI ALALA M.Sc., University of Glasgow, 1966. Mathematics. Appointed from University of Nairobi. Place of study: Scotland. s-BMS

- MICHAEL CHEGE** B.A., University of Nairobi, 1970. Political Science. Appointed from University of Nairobi. Place of study: U.S.A. s-HSS
- PETER GACH** Ph.D., Dalhousie University, 1965. Palaeomagnetism. Appointed from University of Nairobi. Place of study: U.S.A. F-BMS
- SAMUEL MWANZIA KINYALI** B.Sc., University of Uppsala, 1969. Soil Physics. Appointed from East African Agriculture and Forestry Research Organization. Place of study: U.S.A. s-AGR
- ABDUL KADER ABDU MOHAMED** B.Sc., Punjab Agricultural University, 1968. Entomology. Appointed from East African Agriculture and Forestry Research Organization. Place of study: U.S.A. s-AGR
- MOHAMMED SULEIMAN MUKRAS** B.A., University of Dar es Salaam, 1969. Economics. Appointed from University of Nairobi. Place of study: Canada. s-HSS
- DAVID KAKUTA MULWA** B.A., University of Nairobi, 1970. English. Appointed from University of Nairobi. Place of study: U.S.A. s-HSS
- NICHOLAS NYANGIRA** M.A., Syracuse University, 1969. Political Science. Appointed from University of Nairobi. Place of study: U.S.A. s-HSS

MALAWI

- WEDSON V. C. CHIPETA** M.A., Yale University, 1966. Economics. Appointed from University of Malawi. Place of study: U.S.A. s-HSS

MEXICO

- MAXIMINO ARTURO ALCALA DE STEFANO** M.S., Texas A & M University, 1964. Agronomy. Appointed from International Maize and Wheat Improvement Center. Place of study: U.S.A. s-AGR
- HELIODORO DIAZ** M.S., National School of Agriculture, 1967. Agricultural Development. Appointed from International Maize and Wheat Improvement Center. Place of study: U.S.A. s-AGR
- RAMON JAVIER GODOY CALLEROS** B.S., University of Coahuila, 1965. Agronomy. Appointed from International Maize and Wheat Improvement Center. Place of study: U.S.A. s-AGR
- FEDERICO TORRES ARROYO** Lic. en Economía. National University of Mexico, 1969. Urban Studies. Appointed from Colegio de México. Place of study: England. s-HSS
- CARLOS TORRES-BERNAL** M.S., University of Wisconsin, 1967. Soil Science. Appointed from National Institute of Agricultural Research. Place of study: U.S.A. s-AGR

NIGERIA

- HAROUN AL-RASHID ADAMU** B.A., Yale University, 1970. Political Science. Appointed from University of Ibadan. Place of study: U.S.A. s-HSS
- LINUS NWACHUKWU AJABOR** M.R.Ch.B., University of Bristol, 1961. Human Reproduction. Appointed from University of Ibadan. Place of study: U.S.A. F-BMS
- EKUNDAYO O. AKEREDOLU-ALE** M.Sc., University of London, 1967. Sociology. Appointed from University of Ibadan. Place of study: England. s-HSS
- MAKANJUOLA OLASEINDE ARIGBEDE** M.B.B.S., University of Ibadan, 1968. Neuroanatomy. Appointed from University of Ibadan. Place of study: U.S.A. F-BMS
- OLUFEMI FOLORUNSO AKINKUM ASHLEY-DEJO** M.B.B.S., University of Ibadan, 1964. Public Health. Appointed from University of Ibadan. Place of study: U.S.A. s-BMS
- IBRAHIM ALKALI AYAGI** B.Sc., Ahmadu Bello University, 1970. Economics. Appointed from Ahmadu Bello University. Place of study: U.S.A. s-HSS

- JOHNSON A. EKPERE M.S., Michigan State University, 1966. Economics. Appointed from University of Ibadan. Place of study: U.S.A. s-HSS
- FOLORUNSO AGBOOLA FAYINKA B.S., Kansas State University, 1967. Animal Science. Appointed from Nigerian Ministry of Agriculture. Place of study: U.S.A. s-AGR
- ABDU DIKKO GIDADO B.Sc., Ahmadu Bello University, 1970. Political Science. Appointed from Ahmadu Bello University. Place of study: U.S.A. s-HSS
- DANIEL CHUKUDUM ISIKA B.A., University of Ibadan, 1969. Geography. Appointed from University of Ibadan. Place of study: U.S.A. s-HSS
- AKINBOLAJI P. IWAYEMI B.Sc., University of Ibadan, 1969. Economics. Appointed from University of Ibadan. Place of study: U.S.A. s-HSS
- AYUBA YAFFA KADZAI B.Sc., Ahmadu Bello University, 1970. Political Science. Appointed from Ahmadu Bello University. Place of study: U.S.A. s-HSS
- OLUFEMI A. ODEKUNLE M.A., University of Pennsylvania, 1970. Sociology. Appointed from University of Ibadan. Place of study: U.S.A. s-HSS
- SUBQAT OLUDAYISI ODUNTAN M.B.B.S., University of Ibadan, 1961. Public Health. Appointed from University of Ibadan. Place of study: U.S.A. s-BMS
- RAZAQ OLOPOENIA B.Sc., University of Ibadan, 1969. Economics. Appointed from University of Ibadan. Place of study: U.S.A. s-HSS
- OLUMUYIWA SERIKI M.B.Ch.B., University of Edinburgh, 1955. Pediatrics. Appointed from University of Ibadan. Place of study: U.S.A. F-BMS

PERU

- GUSTAVO JAVIER TORRES Ing. Agr., Agrarian University, 1958. Genetics. Appointed from Ministry of Agriculture and Fisheries. Place of study: Mexico. s-AGR
- FERMIN DE LA PUENTE CIUDAD M.S., University of Wisconsin, 1966. Plant Science. Appointed from Agricultural Research and Extension Service. Place of study: U.S.A. s-AGR
- SVEN VILLAGARCIA H. Ing. Agr., Agrarian University, 1958. Soil Science. Appointed from Agrarian University. Place of study: U.S.A. s-AGR

PHILIPPINES

- ARTURO CARINO ALPEREZ M.S., College of Agriculture, University of the Philippines, 1968. Agronomy. Appointed from University of the Philippines. Place of study: U.S.A. s-AGR
- PAULINO S. CRUZ M.D., University of the Philippines, Quezon City, 1965. Medicine. Appointed from University of the Philippines. Place of study: U.S.A. s-BMS
- EMETERIA PASCUAL LEE M.Ed., University of Hawaii, 1964. Education. Appointed from University of the Philippines. Place of study: U.S.A. s-HSS
- LUPO ABAQUITA MONTECILLO M.S., College of Agriculture, University of the Philippines, 1969. Soil Mineralogy. Appointed from University of the Philippines. Place of study: U.S.A. s-AGR
- AMADO PUNSALANG, JR. B.S., University of the Philippines, Quezon City, 1966. Medical Microbiology. Appointed from University of the Philippines. Place of study: Thailand. s-BMS
- SAMUEL KONG TAN M.A., University of the Philippines, Quezon City, 1966. History. Appointed from University of the Philippines. Place of study: U.S.A. s-HSS

TANZANIA

- FREDERICK JAMES KAIJAGE B.A., University of Dar es Salaam, 1969. History. Appointed from University of Dar es Salaam. Place of study: England. s-HSS

- SADIKIEL N. KIMARO M.A., Syracuse University, 1968. Economics. Appointed from University of Dar es Salaam. Place of study: U.S.A. s-HSS
- JUSTIN HUMPHREY MAEDA Fil. Kand., University of Stockholm, 1969. Political Science. Appointed from University of Dar es Salaam. Place of study: U.S.A. s-HSS
- AUGUSTINE PHILIP MAHIGA B.A., University of Dar es Salaam, 1970. Political Science. Appointed from University of Dar es Salaam. Place of study: Canada. s-HSS
- JOHANNES ANGELO MASARE Lic., Lovanium University, 1966. Political Science. Appointed from University of Dar es Salaam. Place of study: U.S.A. s-HSS
- KETO ELITABU MSHICENI B.Sc., University of Dar es Salaam, 1969. Botany. Appointed from University of Dar es Salaam. Place of study: U.S.A. s-BMS
- MARK RUGEMALIRA MUJWAHUI B.A., University of Dar es Salaam, 1969. Geography. Appointed from University of Dar es Salaam. Place of study: U.S.A. s-HSS
- DELPHIN GATAYA RWEGASIRA B.A., University of Dar es Salaam, 1970. Economics. Appointed from the Bank of Tanzania, Dar es Salaam. Place of study: U.S.A. s-HSS
- BONAVENTURE S.D.W. SWAI B.A., University of Dar es Salaam, 1970. History. Appointed from University of Dar es Salaam. Place of study: England. s-HSS

THAILAND

- CHAIRERG MANEEPHONG M.S., Iowa State University, 1966. Agronomy. Appointed from Kasetsart University. Place of study: U.S.A. s-AGR
- HANSA CHANSANG B.Sc., Mahidol University, 1970. Marine Biology. Appointed from Ministry of Agriculture, Bangkok. Place of study: U.S.A. s-BMS
- JINDA JAN-ORN M.S., University of Hawaii, 1969. Agronomy. Appointed from Ministry of Agriculture, Bangkok. Place of study: U.S.A. s-AGR
- KHANNIKA YONGCHAROEN B.Sc., Mahidol University, 1966. Nursing. Appointed from Mahidol University. Place of study: U.S.A. s-BMS
- KRAISID TONTISIRIN M.D., Mahidol University, 1968. Clinical Nutrition. Appointed from Mahidol University. Place of study: U.S.A. s-BMS
- LERT CHANTANAPARB M.S., University of the Philippines, 1968. Forestry. Appointed from Kasetsart University. Place of study: U.S.A. s-AGR
- MALEE LERDMALEEWONG B.Sc., Mahidol University, 1966. Nursing. Appointed from Mahidol University. Place of study: U.S.A. s-BMS
- MATHUROS MONGKOLSUK B.Sc., University of Liverpool, 1970. Pharmacology and Toxicology. Appointed from Mahidol University. Place of study: U.S.A. s-BMS
- MONTIEN SOMABHI M.S., University of Georgia, 1967. Agronomy. Appointed from Ministry of Agriculture, Bangkok. Place of study: U.S.A. s-AGR
- NAIPHINICH KOTCHABHAKDI B.Sc., Mahidol University, 1970. Biological Sciences. Appointed from Mahidol University. Place of study: U.S.A. s-BMS
- POONSIN VERAPRASERT B.A., Thammasat University, 1969. Library Science. Appointed from Mahidol University. Place of study: U.S.A. s-BMS
- PRAMOTE NAKORNTHAB M.A., University of Pennsylvania, 1967. Political Science. Appointed from Thammasat University. Place of study: U.S.A. s-HSS
- SOMBOON KHUNNOIY M.S., University of Michigan, 1966. Anatomy. Appointed from Mahidol University. Place of study: U.S.A. s-BMS
- SOMCHIT HANUCHARURNKUL B.Sc., Mahidol University, 1967. Nursing. Appointed from Mahidol University. Place of study: U.S.A. s-BMS

SOMKIAT TITATARN B.Sc., Kasetsart University, 1964. Plant Pathology. Appointed from Ministry of Agriculture, Bangkok. Place of study: Philippines. s-AGR

TURKEY

ALI BAYRAKTAR B.S., Aegean University, 1963. Farm Crops. Appointed from Ministry of Agriculture, Diyarbakir. Place of study: U.S.A. s-AGR

POLAT SOLEN B.S., Aegean University, 1965. Plant Breeding. Appointed from Ministry of Agriculture, Ankara. Place of study: U.S.A. s-AGR

UGANDA

HILDA MARY KABUSHENGA B.A., Makerere University, 1970. Sociology. Appointed from Makerere University. Place of study: England. s-HSS

YUSUFU MPAIRWE M.D., Makerere University, 1970. Medical Microbiology. Appointed from Makerere University. Place of study: England. F-BMS

UNITED STATES

DAVID WHITMAN HAMILTON Ph.D., University of Cambridge, 1963. Reproductive Biology. Appointed from Harvard University Medical School. Place of study: England. F-BMS

ORGANIZATIONAL INFORMATION

MEETINGS

The annual meeting of the Corporation and a regular stated meeting of the Board of Trustees were held on April 1; a special meeting of the Corporation was held on May 22; and a stated meeting of the Board was held on November 30 and December 1. Six regular meetings and one special meeting of the Executive Committee of the Trustees were held to take actions within the general policies approved by the Board.

TRUSTEES AND PRINCIPAL OFFICERS

Dr. Ralph J. Bunche, Under-Secretary General for Special Political Affairs of the United Nations, retired from the Board of Trustees on June 30. Dr. Bunche, who has been with the United Nations since 1948, won the Nobel Peace Prize in 1950. He had been a Trustee since 1955, serving on both the Executive and Nominating Committees.

Lord Franks of Headington, Provost of Worcester College, Oxford University, since 1962, also retired as a Trustee on June 30. Lord Franks was British Ambassador to the United States from 1948 to 1952 and Chairman of Lloyds Bank from 1954 to 1962. He became a member of the Board in 1961.

At the April 1 meeting of the Corporation, Mr. Cyrus R. Vance was elected a Trustee, effective July 1. Mr. Vance, who served as Secretary of the Army for two years under Presidents Kennedy and Johnson and was Deputy Secretary of Defense from 1964 to 1967, rejoined the law firm of Simpson, Thacher, and Bartlett in New York in 1967.

Dr. Clifton R. Wharton, Jr., was also elected a Trustee at the April meeting, effective July 1. An agricultural economist who is now President of Michigan State University, Dr. Wharton had been associated for twelve years with the Agricultural Development Council, serving in Southeast Asia and in the United States.

Dr. Will M. Myers, a Vice-President of the Foundation since February 1, 1967, died on July 26. An authority on plant genetics and international agricultural development, Dr. Myers had served the Foundation's Agricultural Sciences program as a consultant and as a temporary staff member from 1954 to 1960 and from 1962 to 1964. He returned to the Foundation on a full-time basis in 1965 as Associate Director and Director-designate of the International Institute of Tropical Agriculture, Nigeria.

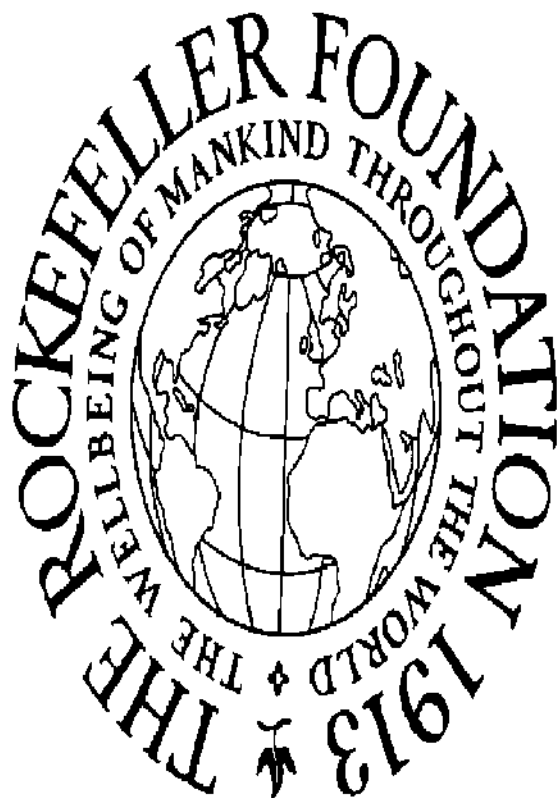
Dr. Allan C. Barnes was elected a Vice-President at the April meeting, effective August 3. Since 1960 Dr. Barnes had served as Professor and Chairman of the Department of Gynecology and Obstetrics of the Johns Hopkins University School of Medicine and Gynecologist-Obstetrician-in-Chief of the Johns Hopkins Hospital, and, since 1966, as Consultant in Population to the Department of International Health of the Johns Hopkins School of Hygiene and Public Health.

Dr. Sterling Wortman was elected a Vice-President at the November 30-December 1 meeting of the Trustees, effective December 1. He had served the Foundation from 1950 to 1955 as a geneticist with the corn improvement program in Mexico and from 1960 to 1964 he assisted in the establishment of the International Rice Research Institute, as its Associate Director. In 1966 he was elected Director for Agricultural Sciences.

Also at the November 30-December 1 meeting, Dr. John A. Pino, an animal scientist, was named to succeed Dr. Wortman as Director for Agricultural Sciences, effective December 1. He had been associated with the Mexican Agricultural Program from 1955 to 1965, when he was appointed Associate Director for Agricultural Sciences.



Photograph Excised Here



Photograph Excised Here

Ralph J. Bunche

Lord Franks of Headington

FINANCIAL STATEMENTS 1970

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SUMMARY

Expenditures made by the Foundation are authorized by the Trustees by means of appropriations. Such appropriations are of three types. First, grants which are announced to the recipient immediately after the Trustee appropriation has been made. Second, appropriations for grants, fellowships and scholarships subject to future allocation or release by the officers, which are reported to the recipient when the funds are allocated or released. Third, appropriations for New York program expenses and general administrative expenses in the following year.

GRANTS

During the year the Foundation announced grants totaling \$47.9 million; they are listed on pages 17-155. These included \$14 million released by the officers from current and prior years' appropriations and \$33.9 million in new appropriations by the Trustees for direct grants not requiring release by the officers. Grants were distributed among the Foundation's major areas of interest as follows (in millions of dollars) :

Conquest of Hunger	10.5
Population	15.0
University Development	6.6
Quality of the Environment	3.4
Equal Opportunity for All	5.8
Cultural Development	4.3
Allied Interests	2.3
	<u>47.9</u>

APPROPRIATIONS

The total of new appropriations approved by the Trustees during 1970 was \$53.9 million (\$50.8 million after lapses and refunds). Of that total, \$33.9 million was appropriated for the direct grants mentioned above, \$14.3 million was appropriated for future release by the officers, \$2.6 million for 1971 New York program expenses and \$3.1 million for 1971 general administrative costs.

PAYMENTS

Some grants are paid almost immediately upon approval by the Trustees or release by the officers; others are paid over a number of months or years, or at some future time when matched by other funds. Payments during the year totaled \$47.1 million, of which \$29.1 million came from the Foundation's income of \$30.3 million from which \$1.2 million was deducted for Federal Excise Tax. This tax was imposed for the first time this year. The remaining \$18 million was taken from principal.

During the 57 years of its existence, The Rockefeller Foundation has appropriated a total of \$1 billion 90 million. Total payments during this period were \$998 million, of which \$822 million was paid from income, while \$176 million was paid from principal.

The financial statements and the opinion of Haskins & Sells, independent public accountants, are presented on the following pages:

ACCOUNTANTS' OPINION

HASKINS & SELLS

CERTIFIED PUBLIC ACCOUNTANTS

TWO BROADWAY
NEW YORK 10004

February 17, 1971

Board of Trustees,
The Rockefeller Foundation,
111 West 50th Street,
New York, N.Y. 10020.

Dear Sirs:

We have examined the balance sheet of The Rockefeller Foundation as of December 31, 1970 and the related statements of income and appropriations, principal fund, and appropriations and payments for the year then ended, and the supplemental schedules of marketable securities held at December 31, 1970 and transactions therein for the year then ended. Our examination was made in accordance with generally accepted auditing standards, and accordingly included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

In our opinion, such financial statements and supplemental schedules present fairly the financial position of the Foundation at December 31, 1970 and the results of its operations for the year then ended, in conformity with generally accepted accounting principles applied on a basis consistent with that of the preceding year.

Yours truly,

Haskins & Sells

BALANCE SHEET—DECEMBER 31, 1970

ASSETS

MARKETABLE SECURITIES—at cost or market value at date of gift or receipt (quoted market value, \$767,110,763)	\$377,544,212
CASH	906,885
ADVANCES AND ACCOUNTS RECEIVABLE	1,037,794
PROPERTY—at nominal or depreciated amount	72,464
TOTAL	<u>\$379,561,355</u>

FUNDS AND OBLIGATIONS

PRINCIPAL FUND	\$285,739,217
UNPAID APPROPRIATIONS	92,289,736
FEDERAL EXCISE TAX PAYABLE	1,214,146
ACCOUNTS PAYABLE	245,792
PROPERTY FUND	72,464
TOTAL	<u>\$379,561,355</u>

STATEMENT OF INCOME AND APPROPRIATIONS

FOR THE YEAR ENDED DECEMBER 31, 1970

INCOME RECEIVED		
Dividends		\$ 28,817,848
Interest		<u>1,823,481</u>
		30,641,329
Less investment expenses		<u>287,691</u>
Income before taxes		30,353,638
Less Federal Excise Tax on income received during the year		<u>1,214,146</u>
Income available for appropriations		29,139,492
APPROPRIATIONS		
During the year	\$ 53,932,035	
Less refunds and lapses of unexpended balances	<u>3,087,142</u>	<u>50,844,893</u>
EXCESS OF APPROPRIATIONS OVER INCOME		
(Charged to Principal Fund)		<u>\$ 21,705,401</u>

STATEMENT OF PRINCIPAL FUND

FOR THE YEAR ENDED DECEMBER 31, 1970

BALANCE, JANUARY 1, 1970		\$284,219,222
ADD:		
Excess of proceeds from sales of securities over ledger amount		21,422,244
Contributions received		<u>1,803,152</u>
		307,444,618
DEDUCT:		
Excess of appropriations over income		<u>21,705,401</u>
BALANCE, DECEMBER 31, 1970		<u>\$285,739,217</u>

APPROPRIATIONS AND PAYMENTS

FOR THE YEAR ENDED DECEMBER 31, 1970

UNPAID APPROPRIATIONS, JANUARY 1, 1970		\$ 88,560,617
APPROPRIATIONS		
During the year	\$ 53,932,035	
Less refunds and lapses of unexpended balances	<u>3,087,142</u>	<u>50,844,893</u>
		139,405,510
PAYMENTS ON APPROPRIATIONS		
For programs and grants	44,296,723	
Less refunds on closed appropriations	<u>14,855</u>	
	44,281,868	
For general administrative expenses	<u>2,833,906</u>	<u>47,115,774</u>
UNPAID APPROPRIATIONS, DECEMBER 31, 1970		<u>\$ 92,289,736</u>

SUMMARY OF TRANSACTIONS IN MARKETABLE SECURITIES

FOR THE YEAR ENDED DECEMBER 31, 1970

Ledger amount of securities, January 1, 1970		\$371,590,850
Purchased	\$107,795,601	
Otherwise acquired	6,072,909	113,868,510
		485,459,360
Sold	63,897,455	
Redeemed at maturity	39,575,453	
Otherwise disposed of	4,398,366	
Amortization of bond premiums	43,874	107,915,148
Ledger amount of securities, December 31, 1970		\$377,544,212

TRANSACTIONS IN MARKETABLE SECURITIES

FOR THE YEAR ENDED DECEMBER 31, 1970

PURCHASED:		LEDGER AMOUNT
\$ 20,000,000	U. S. Treasury Bonds (under Repurchase Agreements)	\$ 20,000,000
	U. S. Treasury Bills	
1,000,000	due April 22, 1970	991,927
1,000,000	due August 6, 1970	990,200
	Federal National Mortgage Association Notes	
1,000,000	due October 13, 1970	974,826
1,000,000	due November 10, 1970	969,187
2,000,000	Federal National Mortgage Association 8.45% Debentures due October 12, 1971	2,000,000
502,600	American Telephone & Telegraph Company 8¾% Debentures (With Warrants) due May 15, 2000 (175,926 Rights were received on account of the ownership of Common Stock and exercised)	502,600
	Duke Power Company Notes	
3,000,000	due April 2, 1970	2,958,208
1,000,000	due May 13, 1970	993,333
2,000,000	due June 24, 1970	1,986,666
1,000,000	due August 12, 1970	985,781
1,000,000	Marine Midland Banks Inc. Note due May 7, 1970	991,979
	The Mountain States Telephone & Telegraph Company Notes	
1,000,000	due February 10, 1970	998,139
1,000,000	due July 15, 1970	992,100
1,000,000	due August 14, 1970	996,771
	New England Telephone & Telegraph Company Notes	
1,000,000	due October 5, 1970	995,052
1,000,000	due October 26, 1970	990,737
	Ohio Bell Telephone Company Notes	
2,000,000	due April 13, 1970	1,984,417
1,000,000	due September 23, 1970	997,473
1,000,000	due November 18, 1970	986,344

TRANSACTIONS IN MARKETABLE SECURITIES *continued*

FOR THE YEAR ENDED DECEMBER 31, 1970

PURCHASED: <i>concluded</i>		LEDGER AMOUNT
\$ 1,000,000	The Pacific Telephone & Telegraph Company Notes due February 4, 1970	\$ 992,458
1,000,000	due February 24, 1970	994,806
1,000,000	due July 6, 1970	994,131
1,000,000	due August 24, 1970	983,073
2,000,000	due December 28, 1970	1,994,750
1,000,000	Southern Bell Telephone Company Note due April 28, 1970	994,132
1,000,000	Southern New England Telephone Company Note due January 7, 1971	995,819
222,000	Xerox Corporation 6% Convertible Debentures due November 1, 1995 (111,000 Rights were received on account of the ownership of Common Stock and exercised)	222,000
114,299	shares American Electric Power Company, Inc.	2,866,405
24,100	" Aqua-Chem, Inc.	1,421,127
95,400	" Armstrong Cork Company	3,138,604
75,000	" Bristol-Myers Company	3,920,385
48,600	" Burroughs Corporation	4,851,263
16,300	" Computer Sciences Corporation	460,386
11,666	" Consumers Power Company (210,000 Rights were received on account of the ownership of Common Stock and exercised)	309,149
3,334	" Consumers Power Company	93,352
54,000	" Control Data Corporation	2,111,406
81,200	" Diamond International Corporation	3,117,158
61,200	" Hewlett-Packard Company	3,392,927
71,000	" International Telephone & Telegraph Corporation	4,028,571
59,800	" Kresge (S.S.) Company	3,116,260
95,400	" Merck & Company	8,414,650
100,000	" Morgan & Company (J.P.)	6,669,742
9,000	" Public Service Electric & Gas Company (90,000 Rights were received on account of the ownership of Common Stock and exercised)	186,750
1,000	" Public Service Electric & Gas Company	23,125
11,000	" Sav-A-Stop, Inc.	383,283
75,000	" Sears, Roebuck & Company	5,237,550
27,000	" Texas Instruments Inc.	2,596,599
		<u>\$107,795,601</u>

OTHERWISE ACQUIRED:		LEDGER AMOUNT
19,062	shares Coca-Cola Company received in exchange for 25,000 shares Aqua-Chem, Inc. owned of record May 8, 1970 in accord- ance with Exchange Offer	\$ 1,464,613
31,900	" Hewlett-Packard Company received in a stock split on 31,900 shares owned of record February 25, 1970	—
165,000	" International Telephone & Telegraph Corporation \$2.25 Cumulative Convertible Preferred Series "N" received in exchange for 165,000 shares of Hartford Fire Insurance Company Common in accordance with Exchange Offer	2,933,753
1,112	" Lucky Stores, Incorporated received as a stock dividend on 37,080 shares owned of record June 5, 1970	—

TRANSACTIONS IN MARKETABLE SECURITIES *continued*

FOR THE YEAR ENDED DECEMBER 31, 1970

OTHERWISE ACQUIRED: <i>continued</i>		LEDGER AMOUNT
15,000	shares Sav-A-Stop, Inc. received in a stock split on 30,000 shares owned of record February 9, 1970	—
11	" Georgia-Pacific Corporation received as a stock dividend on 1,185 shares owned of record November 2, 1970	—
450	" Coca-Cola Bottling Company of New York received in a stock split on 450 shares owned of record October 21, 1970	—

OTHERWISE ACQUIRED—BY CONTRIBUTION:

330	shares Aluminum Company of America	\$ 23,182
1,500	" American Cyanamid Company	41,051
750	" American Telephone & Telegraph Company	39,340
660	" Anheuser-Busch, Inc.	48,262
270	" Caterpillar Tractor Company	11,171
450	" Coca-Cola Bottling Company of New York	13,500
150	" Corning Glass Works	38,728
600	" General Electric Company	42,075
450	" General Motors Corporation	31,725
450	" General Public Utilities Corporation	11,362
1,185	" Georgia-Pacific Corporation	59,936
450	" International Business Machines Corporation	159,581
750	" International Nickel Company of Canada, Ltd.	31,172
285	" Kaiser Aluminum & Chemical Corporation	10,206
225	" Minnesota Mining & Manufacturing Company	25,439
450	" Northrop Corporation	16,818
750	" Standard Oil Company (New Jersey)	42,222
1,215	" Texaco, Inc.	33,838
450	" Texas Instruments Inc.	55,546
675	" Union Oil Company of California	26,030
750	" Warner-Lambert Company	50,859
1.725%	Interest in "Lambert Contract" covering royalties on sales of Listerine	862,500
		<u>\$ 6,072,909</u>

SOLD:		PROCEEDS	LEDGER AMOUNT
\$ 26,750,000	U. S. Treasury Bonds (under Repurchase Agreements)	\$ 26,750,000	\$ 26,750,000
2,000,000	U. S. Treasury 4% Bonds due August 15, 1970	2,004,531	1,934,375
	Duke Power Company Notes		
1,000,000	due June 24, 1970	993,333	993,333
1,000,000	due August 12, 1970	985,781	985,781
1,000,000	Pacific Telephone & Telegraph Company Note due December 23, 1970	997,375	997,375
1,000,000	Southern New England Telephone Company Note due January 7, 1971	995,819	995,819
330	shares Aluminum Company of America	16,788	23,182
1,500	" American Cyanamid Company	45,562	41,051
31,400	" American Standard, Inc.	1,085,625	1,264,938
660	" Anheuser-Busch, Inc.	46,695	48,262
177,000	" Boeing Company	2,633,384	13,055,840
210,700	" Burlington Industries, Inc.	7,417,126	8,908,302

TRANSACTIONS IN MARKETABLE SECURITIES *continued*

FOR THE YEAR ENDED DECEMBER 31, 1970

SOLD: <i>concluded</i>		PROCEEDS	LEDGER AMOUNT
270	shares Caterpillar Tractor Company	\$ 9,686	\$ 11,171
900	" Coca-Cola Bottling Company of New York	21,150	13,500
500,000	" Continental Oil Company	12,953,980	1,528,474
1,500	" Corning Glass Works	293,085	242,985
450	" General Public Utilities Corporation	8,380	11,361
1,196	" Georgia-Pacific Corporation	63,826	59,936
285	" Kaiser Aluminum & Chemical Corp.	9,334	10,206
38,192	" Lucky Stores, Inc.	1,243,450	982,921
450	" Northrop Corporation	7,797	16,818
335,250	" Standard Oil Company (New Jersey)	18,497,018	1,709,325
3,334,500	rights Standard Oil Company (New Jersey)	640,696	640,696
1,215	shares Texaco Inc.	39,639	33,838
300,000	" Trans Union Corporation	7,488,748	2,561,012
675	" Union Oil Company of California	21,938	26,030
750	" Warner-Lambert Company	48,844	50,859
	Fractional rights and shares	109	65
		<u>\$ 85,319,699</u>	<u>\$ 63,897,455</u>

REDEEMED AT MATURITY:		PROCEEDS	LEDGER AMOUNT
	U. S. Treasury Bills		
\$ 1,000,000	due April 22, 1970	\$ 991,927	\$ 991,927
1,000,000	due August 6, 1970	990,200	990,200
3,000,000	Federal Home Loan Banks 5.80% Bonds due May 25, 1970	3,000,000	3,000,000
5,875,000	Federal National Mortgage Association 6.60% Debentures due June 10, 1970	5,875,000	5,875,000
	Federal National Mortgage Association Notes		
1,000,000	due October 13, 1970	974,826	974,826
1,000,000	due November 10, 1970	969,187	969,187
	Duke Power Company Notes		
1,000,000	due January 12, 1970	991,979	991,979
3,000,000	due April 2, 1970	2,958,208	2,958,208
1,000,000	due May 13, 1970	993,333	993,333
1,000,000	due June 24, 1970	993,333	993,333
1,000,000	Marine Midland Banks Inc. Note due May 7, 1970	991,979	991,979
	The Mountain States Telephone & Telegraph Company Notes		
1,000,000	due February 10, 1970	998,139	998,139
1,000,000	due July 15, 1970	992,100	992,100
1,000,000	due August 14, 1970	996,771	996,771
	New England Telephone & Telegraph Company Notes		
1,000,000	due October 5, 1970	995,052	995,052
1,000,000	due October 26, 1970	990,737	990,737
	Ohio Bell Telephone Company Notes		
2,000,000	due April 13, 1970	1,984,417	1,984,417
1,000,000	due September 23, 1970	997,473	997,473
1,000,000	due November 18, 1970	986,344	986,344

TRANSACTIONS IN MARKETABLE SECURITIES *concluded*

FOR THE YEAR ENDED DECEMBER 31, 1970

REDEEMED AT MATURITY: <i>concluded</i>		PROCEEDS	LEDGER AMOUNT
	The Pacific Telephone & Telegraph Company Notes		
\$ 1,000,000	due January 5, 1970	\$ 993,925	\$ 993,925
1,000,000	due January 21, 1970	990,035	990,035
1,000,000	due January 26, 1970	989,062	989,062
1,000,000	due January 28, 1970	988,576	988,576
2,000,000	due February 4, 1970	1,979,333	1,979,333
1,000,000	due February 24, 1970	994,806	994,806
1,000,000	due July 6, 1970	994,131	994,131
1,000,000	due August 24, 1970	983,073	983,073
1,000,000	due December 28, 1970	997,375	997,375
1,000,000	Southern Bell Telephone Company Note due April 28, 1970	994,132	994,132
		<u>\$ 39,575,453</u>	<u>\$ 39,575,453</u>

OTHERWISE DISPOSED OF:		PROCEEDS	LEDGER AMOUNT
25,000	shares Aqua-Chem, Inc. owned of record May 8, 1970, exchanged for 19,062 shares Coca-Cola Company in accordance with Exchange Offer	\$ 1,464,613	\$ 1,464,613
165,000	" Hartford Fire Insurance Company common exchanged for 165,000 shares International Telephone & Telegraph Corporation, \$2.25 Cumulative Convertible Preferred Series "N", in accordance with Exchange Offer	2,933,753	2,933,753
		<u>\$ 4,398,366</u>	<u>\$ 4,398,366</u>

SCHEDULE OF MARKETABLE SECURITIES

DECEMBER 31, 1970

FIXED INCOME SECURITIES	LEDGER AMOUNT	QUOTED MARKET VALUE
U. S. Government Obligations	\$ 2,389,062	\$ 2,436,094
U. S. Government Agency Obligations	16,404,964	16,412,031
Corporate Obligations	2,679,600	2,770,323
	<u>21,473,626</u>	<u>21,618,448</u>
OTHER INVESTMENTS	<u>862,500</u>	<u>862,500</u>
PREFERRED STOCKS	5,370,391	12,906,750
COMMON STOCKS	349,837,695	731,723,065
	<u>355,208,086</u>	<u>744,629,815</u>
TOTAL	<u>\$377,544,212</u>	<u>\$767,110,763</u>

FIXED INCOME SECURITIES	PAR	LEDGER AMOUNT	QUOTED MARKET VALUE
<i>U. S. Government Obligations:</i>			
Bonds			
4%—February 15, 1972	\$ 1,500,000	\$ 1,436,250	\$ 1,479,844
4½%—November 15, 1973	1,000,000	952,812	956,250
	<u>2,500,000</u>	<u>2,389,062</u>	<u>2,436,094</u>

SCHEDULE OF MARKETABLE SECURITIES *continued*

DECEMBER 31, 1970

FIXED INCOME SECURITIES <i>concluded</i>	PAR	LEDGER AMOUNT	QUOTED MARKET VALUE
<i>U. S. Government Agency Obligations:</i>			
Export-Import Bank Participation Certificate 6½%—September 19, 1971	\$ 3,000,000	\$ 3,022,917	\$ 3,018,750
Federal Land Banks Bonds			
6%—October 20, 1971	1,000,000	1,000,938	1,000,000
5.70%—February 15, 1972	1,000,000	1,000,000	995,000
Federal National Mortgage Association Debentures			
6%—March 11, 1971	2,000,000	1,998,750	2,001,250
8.45%—October 12, 1971	2,000,000	2,000,000	2,042,500
Participation Certificates			
6%—February 1, 1971	4,375,000	4,375,609	4,369,531
5.20%—January 19, 1972	3,000,000	3,006,750	2,985,000
	<u>16,375,000</u>	<u>16,404,964</u>	<u>16,412,031</u>

Corporate Obligations:

Bonds

American Telephone & Telegraph Company With Warrants 8¾%—May 15, 2000	502,600	502,600	638,930
General Motors Acceptance Corporation 5%—August 15, 1977	1,000,000	975,000	877,500
International Bank for Reconstruction and Development 3½%—October 15, 1971	1,000,000	980,000	980,000
Xerox Corporation 6%—November 1, 1995	222,000	222,000	273,893
	<u>2,724,600</u>	<u>2,679,600</u>	<u>2,770,323</u>
TOTAL FIXED INCOME SECURITIES	<u><u>\$ 21,599,600</u></u>	<u><u>\$ 21,473,626</u></u>	<u><u>\$ 21,618,448</u></u>

OTHER INVESTMENTS

	LEDGER AMOUNT	MARKET VALUE
1.725% Interest in "Lambert Contract" covering royalties on sales of Listerine at fair market value	<u>\$ 862,500</u>	<u>\$ 862,500</u>

PREFERRED STOCKS

	SHARES	LEDGER AMOUNT	QUOTED MARKET VALUE
International Telephone & Telegraph Corporation Convertible Preferred Series "K"	15,000	\$ 1,401,294	\$ 1,338,750
International Telephone & Telegraph Corporation Convertible Preferred Series "N"	165,000	2,933,753	10,498,125
Jim Walter Corporation \$1.60 Cumulative Convertible Voting Fourth Preferred	27,000	1,035,344	1,069,875
TOTAL PREFERRED STOCKS		<u>5,370,391</u>	<u>12,906,750</u>

1970 PAYMENTS ON PROGRAMS AND GRANTS

INTERNATIONAL

Cooperative programs of The Rockefeller Foundation

Conquest of Hunger—field staff in the Agricultural Sciences	\$1,887,277
University Development—field staff	1,747,166
Virus Research Program—field staff	267,097
Field Research in Medical Sciences—field staff	158,810
International Development and Conference Centers—field staff	81,571
Support for international schools	22,066
Preparation and distribution of publications	80,545

Conferences at the Villa Serbelloni Conference and Study Center

Conferences held on East Coast fever and trypanosomiasis of cattle, economic aspects of modernization, and population growth and economic development	14,834
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Organization of American States

Inter-American Institute of Agricultural Sciences, Costa Rica

Library improvement	9,000
Support for the secretariat of the Latin American Association of Plant Science	12,847

United Nations

Travel expenses of participants in the World Youth Assembly	25,000
<i>Food and Agriculture Organization of the United Nations</i>	
Training awards for Middle Eastern wheat specialists	46,739

ARGENTINA

Torcuato di Tella Institute

Support of the Latin American Center for Advanced Musical Studies	80
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Other support

Fellowships and scholarships for individuals	9,408
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AUSTRALIA

Australian National University

Preparation of a biography of Gilbert Murray	3,500
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BARBADOS

Ministry of External Affairs

Purchase of a collection of basic works in international relations	205
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BOLIVIA

Purchase and distribution of a book on Bolivian plants—refund	(39)
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Other support

Fellowships and scholarships for individuals	4,313
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BRAZIL

Aflatoxin studies at the Belém Virus Laboratory	7,702
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Brazilian Society of Genetics

General support	3,767
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1970 PAYMENTS ON PROGRAMS AND GRANTS

BRAZIL (cont'd)	
Federal University of Minas Gerais	
General development—refund	(1,100)
Federal University of Pará	
Equipment for the Laboratory of Genetics	2,349
Federal University of Rio de Janeiro	
Equipment for research in genetics	1,459
Federal University of Viçosa	
General support	750
Institute of Biology of the Secretariat of Agriculture	
Greenhouse equipment	570
Instituto Butantan	
Equipment and supplies for research in genetics	804
Rural University of the State of Minas Gerais	
Development of its School of Domestic Science and study of native plants	2,784
Purchase of library materials	493
University of Paraná	
Laboratory equipment	400
University of Santa Maria	
Laboratory equipment for the Department of Plant Improvement	200
University of São Paulo	
General support	750
Equipment for the Laboratory of Human Genetics	3,750
Research at the School of Agriculture, Piracicaba	43,940
Cooperative program	
Belém Virus Laboratory	71,848
Other support	
Fellowships and scholarships for individuals	178,240
CANADA	
McGill University	
General support	2,250
Study of uncommitted nations—refund	(1,371)
Visiting faculty assignments in Africa, Asia, and Latin America	53,559
University of Manitoba	
General support	1,500
Research in wheat-rye hybrids	25,949
University of Montreal	
Fifth General Conference of the International Association of Universities	15,000

1970 PAYMENTS ON PROGRAMS AND GRANTS

University of Toronto	
General support	1,500
Visiting professor of economics at the Atlanta University Center	592
Visiting faculty assignments in Africa, Asia, and Latin America	130,039
University of Waterloo	
Schistosomiasis and fascioliasis studies	35,796
CEYLON	
Fellowships and scholarships for individuals	19,966
CHILE	
Agricultural Research Institute	
General support	231
Catholic University of Chile	
Continued support for research	66
University of Chile	
Protein malnutrition study	15,000
Support of the Faculty of Sciences	1,227
Support for the Graduate School of Economics and the Institute of Economics	4,023
Research and action programs in family planning	46,470
Cooperative program	
International Development Center, Santiago	16,943
Other support	
Fellowships and scholarships for individuals	177,895
COLOMBIA	
Colombian Association of Faculties of Medicine	
Support of its program	37,600
Colombian Institute of Agriculture	
Consultation on its soil program	600
Equipment and supplies for agronomy programs	18,584
Field and laboratory apparatus for the Agricultural Engineering Department	6,150
General support	6,000
Library development	1,206
Support of the graduate program in plant pathology	6,928
Teaching, research, and extension programs	357,207
International Center of Tropical Agriculture	
Toward the costs of constructing and equipping its headquarters facilities at Palmira	419,906
Presentation of findings at the International Congress of Nutrition in Czechoslovakia—refund	(212)
Equipment for its Feed Mixing and Crop Processing Plant	17,500
Equipment for the Veterinary Medicine Laboratory	80,633
General support	81,287
Inter-American Swine Program	36,504

1970 PAYMENTS ON PROGRAMS AND GRANTS

COLOMBIA (cont'd)

National Institute of Nutrition	
Nutrition study using opaque-2 corn	19,767
Pan-American Federation of Associations of Medical Schools	
Development of regional research and training centers	250,000
University of Antioquia	
Support of the School of Library Science	24,699
University of Valle	
Cooperation with the schistosomiasis control project, St. Lucia	5,308
Development of the Department of Music	1,576
Development of teaching materials in economics	7,485
Equipment for Central Administration	352
Equipment for a chemistry research project	12,984
Equipment for the Department of Physiological Sciences	1,323
Equipment and supplies for the Division of Engineering	19,114
Support of the Division of Health Sciences	97,843
Equipment for the Division of Humanities	55
Equipment and structural changes in laboratories for the Faculty of Architecture	1,237
Equipment and supplies for the School of Nursing	964
General support	520,850
Microfilming of regional archives for historical research	2,968
Planning costs for an experimental program in delivery of health services	25,190
Population studies and development of the University Hospital and Medical School	73,159
Equipment for the Department of Biology	7,479
Research and teaching in agricultural economics and farm management—refund	(114)
Research and teaching equipment for the Division of Pharmacology	543
Research in grains and other products in cooperation with the Colombian Institute of Agriculture and the Palmira experiment station	37,467
Research programs in the Faculty of Philosophy, Letters, and History	1,411
Support of the Department of Preventive Medicine	5,628
Support of the language laboratory	12,227
Support of the University Hospital	957
To enable a School of Nursing staff member to attend a family planning congress in Chile—refund	(434)
Toward costs of a building for virologic and other programs	400
Toward costs of research on production economics and farm management in the Cauca Valley	8,050
Toward a graduate program in the School of Nursing	2,742
Toward staff salaries in the Faculty of Philosophy, Letters, and History	14,908
Travel by a faculty member to learn new methods of steroid analysis in the United States	1,900
Appointment of a visiting professor in the Division of Engineering	9,029
Cooperative programs	
Colombian Agricultural Program	12,461
University Development Program Center (University of Valle)	71,928
Virus laboratory, Cali	67,517
Visiting faculty (University of Valle)	70,298

1970 PAYMENTS ON PROGRAMS AND GRANTS

Other support	
Fellowships and scholarships for individuals	361,339
Prior year travel grants to individuals	385
CONGO	
Fellowships and scholarships for individuals	7,266
COSTA RICA	
Fellowships and scholarships for individuals	8,779
ECUADOR	
National Agricultural Research Institute	
Development of experiment stations and strengthening of research and training programs	43,192
Cooperative program	
Cooperative project in agriculture	14,332
Other support	
Fellowships and scholarships for individuals	51,957
EL SALVADOR	
Foundation for the Development of Cooperatives	
Programs for increasing agricultural productivity	33,500
ETHIOPIA	
Haile Sellassie I University	
Evaluation of the culture and productivity of teff	3,200
Schistosomiasis research program	29,000
Staff development	466
Other support	
Fellowships and scholarships for individuals	29,337
GAMBIA	
Ministry of External Affairs	
Purchase of a collection of basic works in international relations	2,485
GHANA	
University of Ghana	
Laboratory equipment for the Medical School	190
Other support	
Fellowships and scholarships for individuals	12,967
GUATEMALA	
Fellowships and scholarships for individuals	13,972

1970 PAYMENTS ON PROGRAMS AND GRANTS

GUYANA	
Ministry of External Affairs	
Purchase of a collection of basic works in international relations	25
Other support	
Fellowships and scholarships for individuals	3,145
HONDURAS	
Fellowships and scholarships for individuals	9,160
INDIA	
All India Institute of Medical Sciences	
Support of the teaching hospital	75
Central Rice Research Institute	
Research equipment	7,317
Indian Agricultural Research Institute	
General support	121,690
Indian Council of Medical Research	
Equipment and supplies for Council-sponsored projects	2,434
Equipment for the Virus Research Centre	4,672
Seth Gordhandas Sunderdas Medical College	
Teaching and research	737
University of Delhi	
Advanced library training	4,000
Support of the Department of Botany	619
Uttar Pradesh Agricultural University	
Experiment station development	266
Hostel for foreign agricultural students	5,000
Cooperative programs	
Indian Agricultural Program	350,601
Laboratory for grain research at the Indian Agricultural Research Institute	700
Other support	
Fellowships and scholarships for individuals	94,218
Prior year travel grants to individuals	6,922
INDONESIA	
Fellowships and scholarships for individuals	151
IRAN	
Fellowships and scholarships for individuals	5,545

1970 PAYMENTS ON PROGRAMS AND GRANTS

ISRAEL

Hebrew University of Jerusalem

Comparative analysis of processes and problems of modernization	2,500
Study of Israel's relations with the great powers—refund	(422)

Other support

Fellowships and scholarships for individuals	231
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ITALY

University of Rome

General support	750
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Villa Serbelloni Conference and Study Center

Activities of the Center	235,754
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JAMAICA

Association of Caribbean Universities and Research Institutes

Conference on the university and health services	7,000
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University of the West Indies

Ph.D. project by a staff member of the Research and Control Department, St. Lucia	7,500
Support of the Faculty of Medicine	11,942

JAPAN

Kihara Institute for Biological Research

Wheat and rice research program	5,000
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Other support

Fellowships and scholarships for individuals	124
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KENYA

East African Community

East African Agriculture and Forestry Research Organization

Sorghum research	40,000
General support	13,000

East African Veterinary Research Organization

Teaching and research in veterinary science	32,000
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Ministry of Agriculture and Animal Husbandry

Maize improvement program—refund	(2,023)
Support of the Agricultural Education Commission	1,175
Support of the Plant Breeding Station	12,934

University of Nairobi

Activities of the Institute for Development Studies	98,205
Appointment of a deputy director of the Social Science Division, Institute for Development Studies	2,543
Appointment of a junior research fellow in the Department of Geography	4,522
Appointment of a research fellow in the Social Science Division, Institute for Development Studies	3,248

1970 PAYMENTS ON PROGRAMS AND GRANTS

KENYA (cont'd)

University of Nairobi (cont'd)

Development of the library of the Department of History	48
Fascioliasis research project in the Faculty of Veterinary Science	11,112
Study in university administration—refund	(120)
Library materials for the Department of Sociology	33
Planning costs of establishing a Faculty of Agriculture	1,010
Research and teaching assistantship in the Department of Government	1,915
Research in the Cultural Division, Institute for Development Studies	10,000
Research by a faculty member in the United States and Europe on Kenyan political development	1,885
Study on blood characteristics of cattle	9,300
Study on the pathogenesis of East Coast fever	9,000
Support for three East African graduate assistants in economics	15,000
Support for the Staff Development Program	2,000
Visiting lecturer in development administration	10,700

Cooperative program

University Development Program Center for Kenya, Tanzania, and Uganda	76,940
Visiting faculty (University of Nairobi)	163,844

Other support

Fellowships and scholarships for individuals	82,798
Prior year travel grants to individuals	965

KOREA

Fellowships and scholarships for individuals	8,465
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LEBANON

American University of Beirut

Books and equipment for a neuropathology laboratory	476
Academic program support	201,200

MALAWI

Fellowships and scholarships for individuals	3,358
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MALTA

Ministry of Commonwealth and Foreign Affairs

Purchase of a collection of basic works in international relations	3,475
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MAURITIUS

Ministry of Foreign Affairs

Purchase of a collection of basic works in international relations	191
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MEXICO

Colegio de México

Research in demography	47,000
Support for the Latin American Regional Conference on Population	10,000

1970 PAYMENTS ON PROGRAMS AND GRANTS

International Maize and Wheat Improvement Center	
Compilation of a list of Latin American agricultural science journals	6,500
Completion of bibliographies on corn and wheat	8,500
Cooperation in wheat improvement in the Near East and North Africa	15,000
Development of its headquarters facilities	2,480,910
General support	529,000
International Potato Improvement Project	76,292
Maize improvement program in Kenya	8,750
Maize insect research in Thailand	2,160
Meetings of the Wheat and Maize Germplasm Resources Committees	13,800
Pilot program in corn production in the state of Puebla	89,110
Protein quality laboratory	38,651
Potato program in West Pakistan and related training in Mexico	57,961
International Potato Improvement Project for use by the Experiment Station of Teluca Valley	10,000
Purchase of land for use in wheat and potato work	96,000
Research project on daylength insensitivity in wheat	15,000
Training in wheat breeding for two Middle Eastern scientists	9,000
Two conferences on the Puebla Project	24,600
Spring-Winter Wheat Breeding Program	35,213
Scholarship program	50,000
Central American Food Crop Improvement Program—refund	(1,655)
Latin American Association of Higher Agricultural Education	
Conference on higher agricultural education	7,500
National School of Agriculture	
General support for the Graduate School	100,750
Technological Institute of Monterrey	
Extension of graduate studies in the School of Agriculture	88,338
General support	3,000
University of Sonora	
Research on agricultural systems and crop yields	95,074
Other support	
Fellowships and scholarships for individuals	98,368
NICARAGUA	
Fellowships and scholarships for individuals	6,765
NIGERIA	
Ahmadu Bello University	
Cereal research program	44,557
International Institute of Tropical Agriculture	
General support	227,300
University of Ibadan	
Appointment of a biostatistician in the Department of Preventive and Social Medicine	14,000

1970 PAYMENTS ON PROGRAMS AND GRANTS

NIGERIA (cont'd)

University of Ibadan (cont'd)

Community mental health project	28,350
Equipment for neurosurgical research	4,281
General support	1,500
Lectureships in the Department of Agriculture	15,598
Medical training posts in the Department of Preventive and Social Medicine	13,207
Research appointments in the Departments of Animal Science and Agricultural Biology	7,970
Research fellowship in the Department of Veterinary Medicine	14,803
Research on hemoglobins	2,245
Research on histochemistry	7,856
Research projects in the Department of Agricultural Economics	10,360
Study of contemporary Nigerian legal systems	10,100
Research projects of the Departments of Geography, Economics, and Sociology	45,564
Research in rural pediatrics and nutrition—refund	(8,444)
Virology research program in the Faculty of Medicine	89,286
Study leaves for three senior staff members	1,150
Study of migration within Nigeria	1,860
Support of the language laboratory	15,000
Support of the Reading Centre	68,579
Teaching assignment in the United States for a faculty member	3,318
Research by a faculty member in the United States	1,000
Visiting appointment in the Faculty of Agriculture	957

University of Ife

Conference on teaching and research in public administration	15,000
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Cooperative programs

University Development Program Center (University of Ibadan)	48,965
Visiting faculty (University of Ibadan)	46,901
Project support for staff assigned to Ahmadu Bello University	37,999

Other support

Fellowships and scholarships for individuals	303,265
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PAKISTAN

Fellowships and scholarships for individuals	9,376
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PARAGUAY

Fellowships and scholarships for individuals	4,137
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Prior year travel grants to individuals—refund	(63)
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PERU

Agrarian University

Cooperative research with the Agricultural Research and Extension Service	2,396
Research and teaching in agricultural economics and rural sociology	40,231

Agricultural Research and Extension Service

Cooperative program with the Agrarian University	1,085
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1970 PAYMENTS ON PROGRAMS AND GRANTS

University of San Marcos	
Support for an international graduate program in the Faculty of Veterinary Medicine	7,120
Other support	
Fellowships and scholarships for individuals	168,935
Prior year travel grants to individuals	2,600
 PHILIPPINES	
International Rice Research Institute	
General support	494,000
Joint Ph.D. training program with the Indian Agricultural Research Institute	15,000
Research and training on cropping systems	52,205
Training and extension program—refund	(7,286)
 University of the Philippines	
Corn and sorghum research and training project at the College of Agriculture	25,000
Equipment for the Institute of Hygiene	3,962
Equipment and supplies for the Department of Biochemistry, College of Medicine	1,043
Establishment of a graduate program in physiology in the College of Medicine	815
Research project on international trade—refund	(563)
Return travel from the United States for a staff member	545
Rural community health teaching service	51,607
Scholarship program in the College of Agriculture	30,000
Scholarship, research, and library support	40,100
Toward the costs of constructing and equipping a hostel and training center for the College of Agriculture	23,993
 Cooperative programs	
Comprehensive Community Health Program	2,469
University Development Program Center (University of the Philippines)	13,723
Visiting faculty (University of the Philippines)	65,647
 Other support	
Fellowships and scholarships for individuals	320,600
 ST. LUCIA	
Cooperative program in schistosomiasis research and control	175,158
 SUDAN	
Fellowships and scholarships for individuals	14,647
 SWAZILAND	
Department of Foreign Affairs	
Purchase of a collection of basic works in international relations	205
 SWITZERLAND	
Graduate Institute of International Studies	
Training and research in international relations	20,260

1970 PAYMENTS ON PROGRAMS AND GRANTS

TAIWAN

Joint Commission on Rural Reconstruction

Continuation of a study of downy mildew of corn	5,500
Fish culture research	75,000
Nutrition studies	22,581

Other support

Fellowships and scholarships for individuals	18,841
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TANZANIA

Ministry of Health and Labour

Training program for rural physicians	1,718
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University of Dar es Salaam

Activities of the Social Science Council	11,480
Appointment of a research fellow in its Bureau of Resource Assessment and Land Use Planning	1,500
Developmental programs in the Departments of Political Science and History	12,120
Economic research	46,126
Research and teaching in geography	70,848
Research in Swahili literature--refund	(995)

Cooperative program

Visiting faculty (University of Dar es Salaam)	78,458
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Other support

Fellowships and scholarships for individuals	109,030
Prior year travel grants to individuals	1,426

THAILAND

Kasetsart University

Advisory services by visiting agricultural specialists	5,000
Experiment station development	72,303
Rice and corn-sorghum research programs	22,228
Support of graduate assistantships	6,750
Support of the international training facility at Farm Suwan	43,733

Local Consulting Committee

Consultation on graduate training in nutritional sciences	101
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Mahidol University

Applied nutrition research program	14,664
Community health program	6,337
Equipment, supplies, and research materials for the Faculty of Science	251,942
Teaching equipment and materials for the Ramathibodi Faculty of Medicine	19,162

Thammasat University

Graduate study grants in the School of Economics	6,000
Library development in the Faculty of Economics	322
Research on promotion of tourism	1,200
Research on Thai history at the University of Michigan by a faculty member	8,350
Study on economic change in Thailand	950

1970 PAYMENTS ON PROGRAMS AND GRANTS

Cooperative programs	
Inter-Asian Corn Program	16,694
Rice and corn-sorghum programs	38,340
Study of nutritional status and mental development in Thai children	3,417
University Development Program Center (Universities in Bangkok)	241,005
Visiting faculty (Universities in Bangkok)	125,553
Other support	
Fellowships and scholarships for individuals	482,906
Prior year travel grants to individuals	124
 TRINIDAD	
Ministry of External Affairs of Trinidad and Tobago	
Purchase of a collection of basic works in international relations	3,471
 University of the West Indies	
Food crop research and graduate program	97,387
Support of the Trinidad Regional Virus Laboratory	9,622
Other support	
Fellowships and scholarships for individuals	7,934
Prior year travel grants to individuals—refund	(65)
 TURKEY	
Cooperative regional wheat program in the Near East and North Africa	
	20,695
Other support	
Fellowships and scholarships for individuals	37,029
 UGANDA	
Makerere University	
Appointment of an assistant liaison officer—refund	(8,266)
Appointment of a visiting professor of political science	15,735
Conference of deans of African university faculties of agriculture	4,170
Continuation of its course for the Diploma in Drama	2,300
Exchange of history department staff with the University of Ibadan	2,100
Faculty development and research in the Faculty of Agriculture	153,967
Readership in comparative economic systems	11,700
Research on economic development problems of East Africa	36,400
Research on schistosomiasis—refund	(276)
Support of graduate teaching assistants in the Faculty of Social Sciences	4,200
Teaching program in the Department of History	14,560
 Cooperative program	
Visiting faculty (Makerere University)	91,567
Other support	
Fellowships and scholarships for individuals	134,497
Prior year travel grants to individuals	1,461

1970 PAYMENTS ON PROGRAMS AND GRANTS

UNITED ARAB REPUBLIC	
Fellowships and scholarships for individuals	6,579
 UNITED KINGDOM	
<i>England</i>	
Institute for Strategic Studies	
Research on strategic problems in non-Atlantic areas	10,668
Liverpool School of Tropical Medicine	
Consultation on health programs in Nigeria by a faculty member	2,225
London School of Economics and Political Science	
Expansion of its demographic training program	8,073
University of Birmingham	
General support	1,500
University of Cambridge	
General support	2,250
University of Essex	
General support	750
University of London	
General support	6,750
Preparation of teaching materials on West African politics	5,407
University of Oxford	
General support	3,000
University of Sussex	
Assignment of scholars to universities abroad	48,563
General support	3,000
Research in agricultural economics in Tanzania	2,692
Research and conferences by the British Committee on the Theory of International Politics	2,410
University of Warwick	
General support	1,500
Victoria University of Manchester	
General support	3,750
Other support	
Prior year travel grants to individuals	144
 <i>Scotland</i>	
University of Edinburgh	
General support	3,750
University of Glasgow	
General support	1,500

1970 PAYMENTS ON PROGRAMS AND GRANTS

UNITED STATES	
<i>Alaska</i>	
University of Alaska	
Development of educational television in Alaska	24,645
<i>Arizona</i>	
Arizona State University	
Development of educational programs for minority-group students	15,000
Program of internships in university administration	14,000
Navajo Community College	
Salary and travel expenses of the head of the development office	15,000
University of Arizona	
Research on agricultural systems and crop yields	131,565
<i>California</i>	
Berkeley Unified School District	
In-service training in problems of multi-racial education	100,000
California Institute of Technology	
General support	1,500
California State College at Los Angeles	
Cooperative program with the Alain LeRoy Locke High School*	19,185
Support of its Community Relations Office	45,218
Center for Advanced Study in the Behavioral Sciences	
Fellowship for an African scholar	15,000
Center Theatre Group of Los Angeles	
Playwright-Directors Development Program of the Mark Taper Forum	40,000
Claremont Graduate School	
General support	3,000
Mills College	
Development of a center for the creative and performing arts	37,000
Multi-Culture Institute	
Toward operating costs	15,000
Training program for teachers and administrators	239,024
Oakland Symphony Orchestra Association	
Composer-in-residence with the orchestra	236
Performing Arts Society of Los Angeles	
Staff for its writing and performance workshops	13,560
Salk Institute for Biological Studies	
Research in reproductive biology	100,000
San Diego City Schools	
Administrative training internship	58,232
Experimental programs in community education	100,000

1970 PAYMENTS ON PROGRAMS AND GRANTS

UNITED STATES (*cont'd*)

San Francisco Conservatory of Music

Awards to talented students from the United States 28,295

Stanford University

Appointment of a Kenyan doctoral candidate to the University of Nairobi
as a research fellow 9,458

Creative writing project 7,000

General support 15,000

Graduate program in Afro-American studies 47,000

Training program for physician's assistants 56,000

University of California

Berkeley

Conference on patterns of American prejudice—refund (133)

General support 64,500

Preparation of a religious art exhibition 14,970

Research on insect pheromones 25,000

Research on pesticide chemicals 50,000

Davis

Research on rat control 25,284

Research and training programs in environmental studies 152,620

Study of tomato germplasm and the ecology of the tomato 5,775

Travel of an Indian scientist to pesticide residue laboratories in the
United States—refund (675)

Irvine

Educational reinforcement programs 5,000

Riverside

Activities of the Dry-Lands Research Institute 19,849

Genetic studies of wheat 3,822

Research on pesticide chemicals 49,730

San Diego

Training and research in reproductive biology 375,672

Santa Cruz

Creative writing project 6,200

University of Southern California

General support 3,000

Establishment of a West Coast branch of the Congress of Strings 30,000

The university orchestra program with the Los Angeles Philharmonic Orchestra 10,000

Urban Affairs Foundation

Precollege leadership development program 16,160

Watts Labor Community Action Committee

Paramedical training program 169,931

Cooperative program

Research in virology 26,663

1970 PAYMENTS ON PROGRAMS AND GRANTS

Colorado

Colorado State University

General support 3,000

Music Associates of Aspen

Program of advanced teacher training 35,000

University of Colorado

Education project in environmental quality and population control 4,500

University of Denver

Assignment of social science scholars to universities abroad 665

Consultations for a program in theatre—refund (1,071)

Professional program in theatre 30,000

Young Life Campaign

Urban Leadership Training Program on New York's Lower East Side 62,500

Connecticut

Connecticut College

Creative project in choreography 3,000

Experimental summer school program for talented disadvantaged high school graduates 20,757

Research project on a biography of Doris Humphrey 4,450

Eugene O'Neill Memorial Theater Center

Toward establishment of the National Theater Institute 70,000

University of Connecticut

General support 1,500

Yale Arbovirus Research Unit

Equipment for research in reproductive biology 3,359

Yale University

Advanced training program for African students at the Law School 7,437

General support 4,500

Assignment of scholars to universities abroad 115,429

Research and training program in virology—refund (4,171)

Completion of two works on constitutional order and change 11,500

Establishment of a research workshop in theatre 25,000

Initiation of a Black Studies program and a cooperative community development activities program 30,000

Research on the history of the British Parliament 2,100

Support of the School of Drama 223,876

Transitional-year program for disadvantaged students 25,000

Writing of a comprehensive history of the Weimar Republic 12,000

District of Columbia

Agricultural Research Service of the United States Department of Agriculture

Support for a pulse seed increase program 15,000

American University

Research on social reform and nationalism in India—refund (4,740)

1970 PAYMENTS ON PROGRAMS AND GRANTS

UNITED STATES (*cont'd*)

Americans for Indian Opportunity	
Design of university programs on American Indian culture	15,000
Brookings Institution	
Foreign Policy Studies Program	10,086
Georgetown University	
Population studies	100,288
General support	750
George Washington University	
Preparation of corn and wheat bibliographies	36,703
General support	1,500
National Academy of Sciences	
Summer Study on environmental problems—refund	(1,070)
Support of its Board on Medicine	23,813
Studies in water resource problems in Africa—refund	(1,613)
National Foundation for the Improvement of Education	
Support for the Four-State Institute on Changing Urban Education	15,000
Overseas Development Council	
Support of a program of research and education	125,000
Pan American Health Organization	
Population-nutrition studies in the Caribbean area	32,150
Population Association of America	
Travel of American specialists to an international conference—refund	(300)
Population Reference Bureau	
Latin American educational program	30,000
Resources for the Future	
Research on environmental quality	200,000
Smithsonian Institution	
Studies in the oceanography of Indonesian waters	12,000
Urban Coalition	
General support	200,000
Washington Urban League	
Support of new appointments	78,303
Florida	
University of Florida	
General support	10,500
Preparatory graduate education program for black students	116,368
Georgia	
Atlanta Symphony Orchestra	
Composer-in-residence with the orchestra	7,500

1970 PAYMENTS ON PROGRAMS AND GRANTS

Atlanta University Center Corporation	
General development	100,000
Support of the post of executive secretary	37,500
Emory University	
Student assistance program	38,012
Morehouse College	
Individual project on the social history of the South	13,150
Southeastern Academy of Theatre and Music	
Development and expansion of its program in theatre	75,000
Southern Regional Council	
General support	35,000
University of Georgia	
Consultations of a faculty member at agricultural institutions abroad	2,261
<i>Hawaii</i>	
Oceanic Foundation	
Fish biochemistry program of its Oceanic Institute	50,000
Research in its Brackish-Water Fish Culture Laboratory	50,000
University of Hawaii	
Assignment of scholars to universities abroad	32,107
General support	1,500
Second International Symposium for Tropical Root and Tuber Crops	8,000
Studies of bacterial blight of rice	14,000
<i>Illinois</i>	
Art Institute of Chicago	
Activities of its Goodman Theatre and School of Drama	28,900
Associated Colleges of the Midwest	
Transitional-year program for disadvantaged students	58,205
Association of American Medical Colleges	
Operating costs of its Division of International Medical Education	25,000
Chicago Urban League	
Activities on Chicago's West Side	75,000
Community Consolidated School District No. 65, Cook County	
Administrative training internship	30,000
Evaluative study of its integration program	109,640
Community Renewal Society	
Leadership training program	34,775
Ecumenical Institute	
Support of the leadership training program of its Urban Academy	130,000
Illinois State University	
Schistosomiasis research by a faculty member	6,000

1970 PAYMENTS ON PROGRAMS AND GRANTS

UNITED STATES (cont'd)	
Industrial Areas Foundation	
Training Institute program for community organizers	75,000
Institute of Food Technologists	
Support for the Third International Congress of Food Science and Technology	25,000
National Guild of Community Music Schools	
Toward costs of operating its executive office	15,000
Northwestern University	
General support	4,500
Southern Illinois University	
<i>Carbondale</i>	
General support	750
<i>Edwardsville</i>	
Development of a performing arts company	23,020
University of Chicago	
Study of American Indian education	2,500
Development of a family planning service	56,006
General support	14,250
Program to foster the composition and performance of contemporary music	30,000
Research in the Center for the Study of American Foreign and Military Policy	8,281
Research on poverty	57,412
Research and training on the economics of population and family decision making	4,698
University of Illinois	
Cereal crops breeding project	25,000
General support	16,500
Research on pesticide chemicals	49,800
Indiana	
Ball State University	
Community school programs	45,000
Board of Education of the School City of East Chicago	
Activities of the Superintendent's Task Force	25,000
Gary Community School Corporation	
Leadership training program of its Reciprocal Education Program Council	25,000
Support for its Reciprocal Education Program Council	50,000
Indiana University	
General support	3,750
Purdue University	
General support	21,750
University of Notre Dame	
Assignment of scholars to universities abroad	129,893
English translation of proceedings of a seminar on monasticism held in Thailand	6,000

1970 PAYMENTS ON PROGRAMS AND GRANTS

<i>Iowa</i>	
Grinnell College	
Cooperative program with the Milwaukee Repertory Theatre	13,682
Discovery and support of talented minority-group students	147,209
Iowa State University	
Research project on intergeneric plant crosses	15,000
General support	21,000
University of Iowa	
Assignment of scholars to universities abroad	43,998
Establishment of a Center for the New Performing Arts	61,000
Research in the Nigerian market	9,500
<i>Kansas</i>	
Kansas State University	
General support	1,500
University of Kansas	
General support	2,250
<i>Kentucky</i>	
Berea College	
Puppetry project for the rural poor	10,050
Thomas More College	
Scholarship support	15,000
University of Kentucky	
General support	750
<i>Louisiana</i>	
Free Southern Theater	
Development of its Ensemble and Drama Workshop	50,000
Louisiana State University	
Creative writing project	10,000
Research on production of edible single-cell protein	44,120
General support	6,000
New Orleans Philharmonic Symphony Orchestra	
Composer-in-residence with the orchestra	6,000
Instrumental and orchestral youth training program	18,500
Southern University	
Creative writing project	5,000
Tulane University	
Family planning program	293,572
General support	3,000
Latin American legal and social science research and training—refund	(2,151)
Student assistance program	87,328

1970 PAYMENTS ON PROGRAMS AND GRANTS

UNITED STATES (*cont'd*)

Maine

Bowdoin College

Recruitment and assistance of talented minority-group students 48,400

Maryland

Baltimore City Public Schools

Internship Program for Minority-Group School Administrators 60,000

Center Stage Associates

Creative program in children's theatre 12,500

Human Relations Task Force

Operations of a pilot project of counseling and placement services—refund (10,713)

Johns Hopkins University

General support 4,500

Publication of a monograph on rat ecology 2,600

Seminars for young diplomats 10,392

Schistosomiasis research 15,000

Teaching and consultation assignment to the University of Valle 660

Peabody Institute of the City of Baltimore

Awards to talented students from the United States 56,666

University of Maryland

General support 750

Massachusetts

Association of American Universities

Conference with British university leaders 25,000

Berkshire Theatre Festival

Creative and educational theatre programs in the New England area 75,000

Boston College

Establishment of a consortium of colleges and universities in cooperation with the Opera Company of Boston 24,600

Boston Philharmonic Society

Rehearsals of contemporary music for performance in the Boston area 15,000

Boston Symphony Orchestra

Fellowship and scholarship program of the Berkshire Music Center 35,000

Boston University

General support 3,000

Remedial program for high school students planning to study nursing 34,276

Brandeis University

General support 1,500

Clark University

Research on agricultural drought by a faculty member 14,884

1970 PAYMENTS ON PROGRAMS AND GRANTS

Elma Lewis School of Fine Arts	
Support of dance programs	170,000
Harvard University	
Development of the Harvard Community Health Plan	165,000
General support	11,250
Health Careers Summer Program for minority-group students	50,000
International Agribusiness Coordination Project	6,000
International legal studies and advanced training for Africans	26,158
Population studies in India by its Center for Population Studies	30,554
Programs in community health	71,873
Fixed equipment and installations in the Laboratory of Human Reproduction and Reproductive Biology	39,500
Research on insect control	42,500
Research on racial attitudes in the United States	99,712
Research project in the Department of Preventive Medicine	60,022
Study in Chile on family planning services	24,334
Support of the Center for Population Studies	70,837
Training program for minority-group school administrators	30,000
Massachusetts Institute of Technology	
General support	12,000
Study on humanistic problems in Western culture	15,000
Partial support of the Summer Study on critical environmental changes	25,000
Participation in the Clean Air Car Race	25,000
New England Hospital	
Health careers training for the disadvantaged	450,000
Store-Front Learning Center	
General operating costs	15,000
University of Massachusetts	
Creative writing project	8,400
WGBH Educational Foundation	
Experimental television workshop	149,000
Williams College	
Activities of the Center for Environmental Studies	70,000
Assignment of scholars to universities abroad	3,000
Program in music education and performance	4,000
Michigan	
Higher Education Opportunities Committee	
Student counseling and college assistance programs in Detroit's inner-city schools	20,000
Michigan State University	
General support	19,750
Program on water quality management	250,000
Publication of a monograph describing a medical education system	400
Support for the Presidential Commission on Admissions	15,000

1970 PAYMENTS ON PROGRAMS AND GRANTS

UNITED STATES *(cont'd)*

Monroe County Community College

Program to train environmental control technicians 21,248

University of Michigan

Appointment of a research associate in the Population Studies Center 29,036
 Assignment of scholars to universities abroad 186,497
 Establishment of a performing group for contemporary music 24,213
 General support 10,500
 Population Studies Center programs 500,000
 Preparation of a book on modern Southeast Asian history 2,696
 Programs in environmental quality 150,000
 Research on urban-rural wage differentials in Nigeria 8,000

Wayne State University

General support 1,500

Minnesota

Carleton College

Discovery and support of talented minority-group students 168,417

Minneapolis Public Schools Special School District No. 1

Administrative training internship 28,800
 Expansion of the community-school centers program 34,400

University of Minnesota

Minneapolis

Advanced creative work in theatre 129,500
 Assignment of scholars to universities abroad 73,413
 General support 10,500
 Research on economic development and food demand 7,500
 Research on participatory ecology 15,000

St. Paul

Research on frost resistance in basic food crops 40,047

Mississippi

Gulf Coast Research Laboratory

Toward construction of a small research building 20,000

University of Mississippi

Family planning program in rural counties 70,701

Missouri

Arts and Education Council of Greater St. Louis

Experimental program of cultural enrichment in inner-city areas—refund (65)

Board of Education of the City of St. Louis

School-community programs in ghetto areas 160,000

Saint Louis University

Development of the Anemia and Malnutrition Research Center,
 Chiang Mai, Thailand 164,743

1970 PAYMENTS ON PROGRAMS AND GRANTS

University of Missouri	
General support	6,000
Washington University	
General support	3,000
<i>Nebraska</i>	
Magic Theatre Foundation	
Development of new works for theatre	5,000
University of Nebraska	
General support	3,750
Research on modification of tropical corn germplasm	8,727
Research on sorghum improvement	163,922
<i>New Hampshire</i>	
Dartmouth College	
ABC programs in public high schools	42,063
Completion of a study on macropolitics	6,380
Research on the impact of new rice strains	9,000
Gordon Research Conferences	
International conference on lysosomes	3,500
<i>New Jersey</i>	
Princeton University	
Afro-American Studies Program	33,000
Assignment of scholars to universities abroad	118,300
General support	6,000
Investigation of possibilities of cooperation with the University of Botswana, Lesotho, and Swaziland	4,733
Research in ecology	23,951
Support of the Office of Population Research	200,000
Support of the Princeton Cooperative Schools Program	30,273
Research and preparation of a book on United Nations peace-keeping activities	15,000
Rutgers, the State University	
General support	750
Research on early American solo songs	4,056
Woodrow Wilson National Fellowship Foundation	
Graduate fellowship program for Negro veterans	308,210
Teaching internship program	82,389
<i>New Mexico</i>	
University of New Mexico	
General support	750
<i>New York</i>	
Academy of American Poets	
To establish an educational advisory council of writers, artists, and editors	13,500

1970 PAYMENTS ON PROGRAMS AND GRANTS

UNITED STATES *(cont'd)*

Afro-American Total Theatre Arts Foundation	
Development of new works	10,850
Agribusiness Council	
Study of food grain problems in Pakistan—refund	(5,960)
American Assembly	
Support of the American Assembly on the Health of Americans	25,000
American Place Theatre	
General support	9,336
Writers development program	50,000
American Theatre Laboratory	
Toward establishment of the Lyric Theatre Company	21,900
Association of American Dance Companies	
Toward operating expenses	3,500
Ballet Theatre Foundation	
Development program for young choreographers	12,000
Bank Street College of Education	
Support of the Division of Field Action	295,047
Briarcliff College	
Project on the summer theatre movement	9,675
Brooklyn College of the City University of New York	
Training program for theatre technicians	25,000
Brooklyn Institute of Arts and Sciences	
Toward activities of resident performing companies	125,000
Carnegie Endowment for International Peace	
Training program for foreign service officers from developing countries	29,180
Center for the Arts at Ithaca	
Program of the Ithaca Festival Theater	15,000
Columbia University	
Comparative study of libraries—refund	(1,904)
General support	10,500
Preparation of the memoirs of a retired Foundation officer	228
Program in the Graduate School of Journalism on urban racial problems	84,725
Program of professional associates in theatre	10,550
Research in family planning at the Harlem Hospital Center	92,212
Research on international organizations in the School of International Affairs—refund	(3,525)
Research in reproductive biology	162,800
Studies on environmental pollution	25,000
Support of its Group for Contemporary Music	15,000
Toward establishment of the Columbia Library Development Center	25,000

1970 PAYMENTS ON PROGRAMS AND GRANTS

Cornell University	
Cooperation with the University of the Philippines in the humanities and social sciences	21,945
General support	50,250
Training program in plant breeding	81
Preparation of a book on the population problem of Latin America	25,000
Research on pesticide chemicals	50,000
Research on insect pheromones	25,000
Research project on cold tolerance in maize	14,000
Summer program in economics for minority-group undergraduates	21,576
Travel by a faculty member to collect potato germplasm in Latin America	1,375
Travel of four faculty members of the Division of Biological Sciences to the University of Valle—refund	(603)
Recruitment and assistance of talented minority-group students	100,062
Research and teaching in biology at the University of Valle by two graduate students	11,000
Research on nutritional and agricultural implications of rapid urbanization in tropical Africa—refund	(2,645)
Education and World Affairs	
Study of talent migration—refund	(3,720)
<i>Encyclopaedia of the Social Sciences</i> —refund	(3,457)
Experiments in Art and Technology	
Technical service program	25,000
Film Society of Lincoln Center	
Programs in film education	15,000
Freedom House	
International consultation on university unrest	5,000
Hunter College of the City University of New York	
Preparation of a plan of governance	25,000
Institute of International Education	
International education program	40,000
Study of graduate agricultural education in Latin America	20,900
Toward costs of a meeting of the Council on Higher Education in the American Republics—refund	(1,205)
Institute of Society, Ethics, and the Life Sciences	
Studies of social and ethical issues	15,000
International Planned Parenthood Federation—Western Hemisphere Region	
Education in family planning in Latin America and the Caribbean	50,000
LaMama Experimental Theatre Club	
Experimental workshop in music, dance, and cinema	50,000
Support for playwrights	7,620
Martha Graham Center of Contemporary Dance	
Concerts and residencies at various New York colleges and universities	25,000

1970 PAYMENTS ON PROGRAMS AND GRANTS

UNITED STATES (cont'd)

Metropolitan Applied Research Center	
Study of urban ghettos	87,500
Mount Sinai School of Medicine	
Study of motivation for family planning	80,528
NAACP Legal Defense and Educational Fund	
Program of its Division of Legal Information and Community Service	50,000
NAACP Special Contribution Fund	
Leadership development program	78,000
General support	500,000
National Black Theatre Workshop	
Development of new works	14,700
National Urban League	
Leadership development program	284,226
Veterans Affairs Program	500,000
New Dramatists Committee	
New playwrights program	15,000
New Lafayette Theatre and Workshop	
Support for its activities	100,000
New York Public Library	
Notation of a dance work	500
New York Shakespeare Festival	
Activities of the Public Theatre	162,500
New York University	
General support	3,000
Professional training and creative work in theatre arts	105,000
New York Urban League	
Program of street workers for problem-area high schools	49,321
Open Theater	
Development work in creative aspects of theatre	15,000
Paper Bag Players	
Preparation of programs for ghetto children	12,300
Planned Parenthood Federation of America	
Toward costs of its Center for Family Planning Program Development	150,000
Planned Parenthood of New York City	
Development of a family planning training center	61,500
Population Council	
Support of its Technical Assistance Division	900,000
General support	300,000

1970 PAYMENTS ON PROGRAMS AND GRANTS

Pro Arte Symphony Orchestra Association	
Performance of new music	15,000
Repertory Theater of Lincoln Center	
Activities of the Forum theatre	50,000
Research Foundation of the State University of New York	
General support	2,250
Training grants for foreign nurse-midwives	32,981
Rochester City School District	
Administrative training internship	28,300
Support of the World of Inquiry School	120,000
Rockefeller Archives and Research Center	
Toward costs of establishing the Center	46,156
Rockefeller Foundation	
Miscellaneous costs of a fellowship directory	700
Rockefeller Foundation—New York program costs	
Agricultural Sciences	491,716
Arts and Humanities	134,551
Biomedical Sciences	444,920
Social Sciences	488,381
Interdisciplinary	830,827
Society for Strings	
Summer program for strings teachers	7,590
State Communities Aid Association	
National conference on the facilities and distribution of health and hospital services	25,000
State University of New York at Buffalo	
Expansion of the Center for the Creative and Performing Arts	24,000
State University of New York, College at Brockport	
Program development of the Center for Philosophic Exchange	15,000
Research project on government and economics in tropical Africa	10,000
State University of New York, College at New Paltz	
Summer residence program of environmental theatre by the Performance Group	7,000
Syracuse University	
General support	3,750
Theatre Incorporated	
Support of its New Phoenix program	25,000
University of Rochester	
General support	6,000
Yeshiva University	
Programs in community health	291,657

1970 PAYMENTS ON PROGRAMS AND GRANTS

UNITED STATES *(cont'd)*

North Carolina

College of the Albemarle

Experimental project in education and development in a depressed rural area 249,350

Converse College

Musical training in depressed areas of the Southeast 20,600

Duke University

General support 4,500

Physician's assistant training and experimental health service programs 50,000

Student assistance programs 58,706

Toward costs of filming a dance series 25,000

Visiting faculty assignments in Africa, Asia, and Latin America 39,789

North Carolina School of the Arts

Creation of a professional dance company 24,300

North Carolina State University

Conference on pest management 15,000

General support 12,750

University of North Carolina

Arbovirus catalogue supplement 3,400

Cooperative program in population studies with Mahidol University 58,221

Educational materials on population and computerized information service 83,925

Family planning unit 66,631

General support 4,500

Research program in the Carolina Population Center 81,680

International conference on rodent control research 5,343

Study of acceptance of family planning 85,000

Toward operating expenses of a center for research in reproductive biology 988,694

North Dakota

North Dakota State University

General support 14,250

Ohio

Antioch College

Discovery and support of talented minority-group students 67,116

Case Western Reserve University

Research on schistosomiasis 16,667

Teaching and research program in population 21,000

Cleveland Institute of Music

Awards to talented students from the United States 25,000

Cleveland Public Schools

Administrative training internship 21,290

Community activities in the Glenville area 44,695

1970 PAYMENTS ON PROGRAMS AND GRANTS

Karamu Foundation	
Consultants for community arts and humanities centers	10,000
Oberlin College	
Discovery and support of talented minority-group students	94,765
Follow-up program for its summer school program for junior high school students	30,000
Summer workshops for public school music teachers	80,650
Ohio State University	
General support	4,500
Ohio University	
General support	1,500
University of Akron	
Research on the development of molluscicide formulations	2,389
Oregon	
Oregon State University	
Research and training program in wheat improvement for the Near East and North Africa	43,800
General support	8,250
Reed College	
Discovery and support of talented minority-group students	70,920
Establishment of a humanities research center	9,921
University of Oregon	
General support	1,500
Pennsylvania	
Academy of Natural Sciences of Philadelphia	
Research in freshwater ecology	92,642
American Friends Service Committee	
Support for its family planning programs	77,210
Bryn Mawr College	
General support	1,500
Carnegie-Mellon University	
General support	1,500
Haverford College	
Internship in college administration	9,000
Post-baccalaureate program	112,050
Swarthmore College	
Discovery and support of talented minority-group students	93,186
Temple University	
Portal School Program in the Philadelphia school system	24,030
Teaching fellowships in music	60,933

1970 PAYMENTS ON PROGRAMS AND GRANTS

UNITED STATES *(cont'd)*

University of Pennsylvania

Construction of facilities for the community family planning program	500,000
General support	13,500
Studies in urban design—refund	(196)

University of Pittsburgh

English language program at universities in Bangkok	148,195
General support	11,250
Research and training in radiation health	1,879

Washington and Jefferson College

Creative writing project	4,000
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Puerto Rico

University of Puerto Rico

General support	1,500
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Rhode Island

Brown University

Preparation of a course on standard English—refund	(3,480)
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Tennessee

Commission on Religion in Appalachia

Poverty program	15,000
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Fisk University

Completion of its master plan for campus and buildings and landscape design	14,500
Faculty appointments	141,100
Planning meetings	2,200
Staff recruitment costs and student assistance grants	145,342

George Peabody College for Teachers

General support	750
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University of Tennessee

Exchange program with the Faculty of Medicine of the University of Valle, Colombia	55,000
General support	1,500

Vanderbilt University

Development of community support of the arts in Nashville—refund	(3,679)
General support	3,000
Student assistance program	143,532

Texas

Austin College

Creative writing project	5,000
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Baylor University

Family planning program in its College of Medicine	97,800
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1970 PAYMENTS ON PROGRAMS AND GRANTS

Houston Baptist College	
Scholarships for nursing candidates	18,650
People-to-People Health Foundation	
Project HOPE health programs in Texas	27,240
Southern Methodist University	
General support	750
Texas A & M University	
General support	5,250
Research and training in tropical veterinary medicine	67,874
Texas Christian University	
Creative writing project	3,600
University of Texas	
General support	3,000
<i>Utah</i>	
Project Necessities	
Improvement of education for American Indian children	12,950
University of Utah	
Support of the Children's Dance Theatre	7,500
General support	1,500
Modern dance repertory company	24,000
Utah State University	
General support	3,000
<i>Vermont</i>	
Marlboro School of Music	
Contemporary music program	16,666
Windham College	
Creative writing project	8,250
<i>Virginia</i>	
Virginia Polytechnic Institute	
Discovery and support of talented minority-group students	84,327
General support	3,000
University of Virginia	
Assignment of scholars to universities abroad	42,832
<i>Washington</i>	
University of Washington	
Activities of the Contemporary Performing Group	32,755
Development of a Division of Family Planning and Education	81,201
General support	3,750
Guest directors program at the School of Drama	10,000

1970 PAYMENTS ON PROGRAMS AND GRANTS

UNITED STATES *(cont'd)*

Washington State University

Support for the Second International Barley Genetics Symposium	2,995
General support	1,500

Western Washington State College

Educational program for disadvantaged junior high school students	14,601
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West Virginia

West Virginia University

Program to alleviate poverty in Appalachia	106,042
Recruitment of professors in agriculture to serve in East Africa—refund	(12,756)

Wisconsin

University of Wisconsin

Assignment of scholars to universities abroad	160,205
Follow-up of its Summer Laboratory School—refund	(1,124)
General support	24,750
Population research	10,000
Research and training in the breeding, genetics, and pathology of the potato	14,792
Support for the Center for Research on the Economic and Social Impact of Disease	12,935
Visiting faculty assignment in communications at the Graduate School of the National School of Agriculture, Mexico	25,000

United States—General

Creative writing grants to individuals	3,000
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Internship Program for Training at the Superintendent Level for Minority-Group School Administrators

Orientation conference for candidates	4,195
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Fellowships for individuals	12,262
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Prior year travel grants to individuals	1,866
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Research grants to individuals	14,790
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URUGUAY

Fellowships and scholarships for individuals	4,379
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Miscellaneous domestic and foreign payments	150
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TOTAL --1970 Net Payments on Programs and Grants	\$44,281,868
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(Parenthetical items represent refunds on prior year payments)

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