International Road Federation Fellowship Program

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•OVER THE past several decades planning, research, and training in the highway field have been characterized by a continuous broadening in concept, scope, and method. Advances in mathematics have provided us with greatly improved tools. No less important is the infusion of concepts of sociology, economics, and other social sciences that have afforded new insights into the broader purposes that must be served by transport systems. The increasing use of the motor vehicle, with the resultant traffic conditions in our cities and towns, affects the whole community both socially and economically. This is a natural by-product of the twentieth century world.

Consequently, there has been much discussion in recent years in both academic and industrial circles relating to training of engineers for the current and emerging problems of highways and highway transport. Various formulas have emerged that, in effect, have been unanimous in seeking provision for that form of a broadened curriculum that could help counteract the high degree of specialization the twentieth century has imposed. In the past, the need for an engineer to accumulate an imposing gamut of technical knowledge often caused him, by necessity, to bypass the wider aspects of the humanities. Today, the nineteenth century approach to the education of an engineer is being abandoned and a new one evolved with the twenty-first century in mind. The emerging world community encompasses new philosophies and a new way of life.

Fifty-eight percent of the people now industrially employed in the United States are making their living at jobs that did not exist 50 years ago. The automobile has become a major segment of the economy. Over 150 million vehicles are currently in use. In 1965, free-world expenditures estimated at $26.42 billion were devoted to highways. These are dramatic and compelling figures. Highways are an integral part of the make-up of our civilized society. They are too great an undertaking to be planned, projected, and constructed by less than a highly trained man.

Research and competitive innovation are dictating sweeping changes in our concept of highways and highway transportation. Discovery follows discovery at a startling rate. Today, in fact, we educate for change.

With these factors in mind, and pursuant to its goal to implement the development and improvement of highways and highway transportation internationally, IRF established a fellowship program through which highly qualified graduate engineers from around the world could be brought to the United States for an academic year in one of the major universities or technical institutes. This was to be followed by a post-academic tour which would include visits to highway projects, highway and traffic administrative offices, research laboratories, and industrial installations engaged in the manufacture of roadbuilding and transport equipment. Through its fellowship program for an elite corps of highway and traffic engineers, IRF believed that know-how, which through other sources might take years or even decades to find its way around the world, could be diffused within a relatively short time.

It was IRF's belief that technical assistance in the international field can have lasting effect only in the degree that it improves the ability of another country to do something for itself. Thus, the objective of its fellowship program was to assist other countries in the solution of their transport problems through exposure to academic facilities and industrial experience of the United States. Great care had to be taken to

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avoid the temptation of trying to do too much, too fast. Tractor agriculture cannot quickly be developed in a society that has not yet learned to plow.

Thus it was that the IRF fellowship program was established 18 years ago, and it has continued through the present: 408 engineers from 80 countries have already been trained; fellowship grants totaling almost $1.5 million have been administered by the IRF as of the present.

The 80 countries represented in the fellowship program are geographically distributed to reach the most remote regions of the world as well as the highly developed areas of Europe For instance, the program has included engineers from all the states of Australia and as many as 25 from Colombia and 16 from Nigeria. Areas such as Iraq, Iran, Indonesia, Martinique, Ireland, Nepal, Korea, and Viet Nam likewise have their corps of IRF graduates.

The IRF fellowship engineers who have come, are here at present, and will come in future years, are all placed in universities at which special arrangements have been made to provide them with advanced training in the many disciplines in their field and, further, to tailor their specific studies and observation programs to the problems they will encounter upon return to their home countries.

To the student from abroad proceeding on a course of advanced study in the United States, the greatest value of such a fellowship undoubtedly lies in his active participation in formal graduate study at a university or technological institute. Here, under the guidance of men who rank among the foremost in their specialized fields, new frontiers of knowledge are opened and the engineer gains new perspectives, a new sense of values, and a better understanding of new methods and techniques. Above all, he develops a high degree of confidence in his own judgment. In short, he enjoys every benefit of higher technical education.

At meetings, such as the one at hand, in the classroom, or during guest lectures, he has the opportunity to hear and personally meet leaders in his technical field, men with a deep store of knowledge and experience, and men whose technical publications will in the future appear with an entirely new significance to him.

However, the real value of formal study can be gaged only in conjunction with the second phase of the fellowship program, the practical observation tour. During the university course, and particularly after the course, the student is given the opportunity of observing first-hand the practical applications of the methods and techniques that he has learned in his particular field of study.

The technical benefits from seeing theories in actual application are immense. In addition, his personal contacts with officials responsible for construction projects, traffic and industrial installations, administrative offices, laboratories, and test sites provide him with a roster of experts that he may wish to consult at some later date to supplement the knowledge he has already received.

On returning to his own country the student is not only richer by a vast amount of technical knowledge, greater skill, and better judgment, but he is stimulated to greater efforts. And, he has established contacts of everlasting value that will enable him to keep abreast of new developments in the field—an absolute essential for the modern engineer.

The concept of the fellowship program originated in 1948. The first two grants were awarded for the academic year 1949/50 to engineers from Mexico and Peru. The number of awards has increased annually until 1965/66 saw fellowship awards to 27 engineers from 22 countries. Financial support for the current academic year has been provided, in major part, by United States corporations engaged in oil, rubber, automobile, and road-equipment production, and by the U.S. government through its Agency for International Development.

The method of awarding the fellowships involves the combined effort of public works ministries, engineering schools, national good-roads associations affiliated with the IRF, and, with AID fellowships, a representative of the AID mission concerned.

Once the engineer is selected, he completes the necessary résumé of his professional experience and his academic training to be reviewed by IRF. IRF then selects the academic institution that it feels can provide the particular training program best suited to the purposes of the fellowship engineer.

IRF is proud to review the record of its over 400 fellowship trainees. It is significant that these men are being utilized to the fullest and that they have been afforded every opportunity, upon returning home, to make substantial contributions to their countries' technical development of highways and highway transportation. Several have risen to the position of Highway Director, and two, M. D. Bautista (1953) of the Philippines and John Thijm (1962) of Surinam, became Ministers of Public Works. S. David Nayreau (1962) of Liberia is his country's Undersecretary for Operations in its Department of Public Works.

To mention a few of the graduates specifically, we are proud that in the Americas Camilo Carles (1963) of Panama is Chief Engineer of the Darien Subcommittee of the Pan American Highway Congresses. Dr. Manrique Lara-Tomas (1958) of Costa Rica has become a leading authority in soil-mechanics foundations and lectures annually in Venezuela.

Gustavo Uribe (1952) of Colombia is now one of the outstanding consulting engineers of the Western Hemisphere. He received his Master's degree from Ohio State University and, upon serving his tenure with the National Highway Department, established his own firm of consulting engineers. His contributions to engineering progress in Colombia indicate that the IRF aim to insure the availability of good national talent has been realized.

Enrique Cuellar (1955) of El Salvador is Program Officer with the Central American Bank of Economic Integration; Jose Bodadilla (1958) of Honduras also serves with the Bank.

One of our first two students, Rafael Cal y Mayor (1950), has had a variety of important assignments in his home country of Mexico, in part because of his training under the fellowship program, and is currently Technical Advisor to the Ministry of Public Works.

In Africa, Solomon Audifferen (1959) is Senior Executive Engineer of the Nigerian Federal Ministry of Public Works and Surveys, and Gaston Dossou (1964) is Director of the Regional Training Center for Operators and Mechanics of Heavy Equipment, which is administered by IRF in Lomé, Togo, for French-speaking countries of Africa.

Omar B. B. Sendze (1964) is Executive Director of the Public Works Department Headquarters in West Cameroon, and in Ghana, Emmanuel Lartey (1959) is Coordinator of Industrial Research of the Ghana Academy of Sciences. Also from Ghana, Edward Francois (1961) is Chief Engineer for Roads of the Ghana National Construction Corporation.

In Asia, Sirilak Chandrangsu (1958) holds the position of Deputy Director General of the Royal Thai Highway Department, and Sadamu Mino (1955), Chief of the Tokyo-Nagoya Expressway Department of the Japan Highway Public Corporation, has had the responsibility of negotiating loans for his country with World Bank officials in Washington. Last year he concluded arrangements for a $75 million loan to finance completion of the last section of the expressway between Tokyo and Kobe.

James Coree (1957) has risen to the position of State Engineer of the Public Works Department of the state of Aden, Federation of South Arabia, and has recently been appointed Permanent Secretary to the Ministry of Works and Water of Aden.

One of the greatest responsibilities, from a fiscal standpoint, has fallen on the shoulders of Ekrem Ceyhun (1963) who last year became Director General of Village Roads of Turkey with a budget equivalent to $50 million and an anticipated increase of 100 percent, or $100 million, for 1966.

The majority of today's European traffic engineers are students trained by IRF.

John Hillier (1951), who was graduated from Yale, has worked at Great Britain's Road Research Laboratory since his IRF training.

Giorgio Pellegrini (1957), who was granted an IRF fellowship following his graduation from the University of Rome, is now Chief Research Engineer of Autostrade Concessioni e Costruzioni of Rome; also, he was selected by the World Bank to make the road-communications study of Argentina.

In Belgium, Raoul M. Schaballie (1961) is Chief Engineer of the Road Control and Research Department, Ministry of Public Works, and in Finland, Heikki Salmivaara (1963) is the Traffic Planning Engineer of the City of Helsinki. Five IRF French

grantees are now serving as traffic engineers in France's Ministry of Public Works.

In Spain, Mario Romero (1958), who formerly headed up the Traffic Planning Department in the Public Works Ministry, is now Secretary General of the Federal Council on Land Transport. The outstanding work in Spanish traffic problems of José Puy Huarte (1962) is known throughout Spain and Europe as well.

Evidence of the merits of the IRF fellowship program may be seen in the later work of these engineers in connection with our Research and Development Inventory. Among the various people who have contributed to this program are: Prof. Nicolas Manasseh (1956) who inventoried Germany and Spain this year while on leave from the American University of Beirut where he is Professor of Highway Transportation; Luiz R. Soares (1957) who provided the data covering Brazil where he is Coordinator for Scientific Activities of the National Road Research Institute; Dr. Gordon Campbell (1955), Director of Technical Services of the Canadian Good Roads Association, another IRF graduate; and José Zúñiga (1960), who has not only been active on the research and development program, but is also IRF's staff engineer.

Among others who have gone on to the international field are J. P. A. D. Fernando (1958) of Ceylon, now with the United Nations in Kuwait, and Marcel Martin (1962) of Haiti, who is Transport Officer for the United Nations in Luluabourg, Congo Republic (Leopoldville). Jorge Ernesto Erdmenger (1956) of Guatemala has become prominent in the field of international land communications through positions with the Central American Common Market and also LAFTA.

The IRF fellowship program has not been restricted to men. Miss Rainusso (1958) of Uruguay is a traffic engineer with the Uruguayan State Highway Department; Miss Antillon of Guatemala (1959) is a bridge design engineer with her country's National Highway Department; and Miss Hong (1962) is an engineer of Planning and Programming with the Highway Department of Viet Nam in Saigon.

IRF this year, for the first time, is collaborating with the Automotive Safety Foundation in underwriting a new type of "specialist" program. The aim is to train two engineers, one from Spain and one from the United States, under a joint program of data collection relative to systems used in municipal and state agencies for factual analysis of highway data. The program is now under way, administered through the Department of Civil Engineering at the University of Washington. It will cover three months of academic work and three months of observation and practical training and is expected to be mutually beneficial, both by providing faculty and graduate students at the University the opportunity to become acquainted with international highway and traffic problems and, at the same time, providing the Spanish engineer technical guidance.

In closing, we wish to point out that the perpetuation of the knowledge gained by these fellowship participants is realized not only as they take up their professional positions, but also in their many academic and publication activities that inevitably ensue. IRF's method is thus to select and help train this elite corps of highly qualified engineers and then, by evangelism and a sort of mental capillary attraction, their new knowledge takes root, spreads, and the expanded program is under way.

In each of the 80 countries from which they come there are at least some IRF fellows teaching part time in engineering institutions. Still more impressive, however, are the dozen or so former students who now hold full-time professorships in their national universities. Among others, these include the National University of Cuyo in Argentina, the Technical University of Graz in Austria, the University of Waterloo in Canada, the National University of Bogota in Colombia, the Technical University of Berlin, the American University of Beirut, the National University of Lima, the University of the Philippines, and the Central University of Venezuela.

The list of technical publications in the highway and traffic-engineering fields that have been written by members of the IRF fellowship group is imposing. It includes the first manual of traffic engineering to be printed in the Spanish language prepared by Guido Radelat (1961) in collaboration with many of the other fellowship students whose specialities varied slightly from his own; Topografia, co-authored by Eduardo Villate B. (1964); El Arte del Trazado de Carreteras, by Luis Vera (1960); and Tratamientos Asfálticos Superficiales y Macadam a Penetración, published under the direction of Dr. Jacob Carciente (1961).

In addition to the fellowship program emanating from IRF-Washington, many of the national affiliates, recognizing the value of such a program, have established programs of their own modeled after the IRF-Washington experience. The Good Roads Association in Canada, for instance, has from 10 to 12 grantees a year who study in either Canada or the United States, and the same is true of the Mexican Highway Association. We expect that in the near future additional national programs will be established.

The Federation hopes, through its fellowship program, to assist in equipping a fraternity of experts around the world with a vastly improved capability for solving the increasingly more complex transport problems. This means planning or design of international transport assistance on a level of refinement unknown in earlier decades; it means the training of well-chosen men who will be in a position to return to their home countries to put into effect the techniques they have learned; it means also the placing of a premium on the results of research and analysis, for the transport world moves at such a rate that we no longer can have the luxury of a long period of trial and error.

IRF feels that we learn as much from the visiting trainees as they may learn from us during their training year. Such mutuality of interests and problems creates a channel in which the best that is developed in one country may be passed along for application elsewhere. This is the essence of the International Road Federation's objectives and the fellowship program is its thesis in operation.