

opportunities posed by science and technology for the policy-making process were stressed.

Detlev Bronk (Rockefeller Institute; chairman of the meeting) set the stage by summarizing lucidly and succinctly some of the effects of recent scientific advances on the relations among nations.

E. B. Skolnikoff (M.I.T.) presented the first paper which was, in essence, a general summary that offered a structure for the subject. The central thesis was that the technical aspects of foreign-policy issues are crucial variables for more of the major issues in international relations than is generally realized. Furthermore, when they are important, these technical variables tend to be so intimately linked with the political considerations and objectives that they must be integrated at all stages of the policy process if their full relevance is to be perceived and the political opportunities they offer are to be realized.

These points were illustrated first by a discussion of the nature of the technical aspects of specific areas of foreign policy, such as national security, international organizations, and bilateral relations. This was followed by development of the proposition that science and technology could be used in conscious ways to create new choices for the policymaker as he reaches for political objectives. Examples of the latter were cited in policy areas such as bilateral relations, international institution-building, and foreign aid. The paper also included some more abstract typologies intended to provide analytical tools for further study.

Two of the following papers were designed to illuminate the basic thesis by presenting detailed studies of examples of the interaction of science and foreign policy. The first was presented by Lawrence Mitchell (National Academy of Sciences). His subject was the U.S.-U.S.S.R. scientific exchange program, an example of the political problems and opportunities posed by scientific relations between two countries divided by ideology and conflicting aspirations.

Mitchell recounted the history of the exchange program, and gave the meeting a good sense of the many difficulties of a practical nature. More important, he showed quite clearly the different bases from which the United States and the U.S.S.R. approach the

program—the former largely from a desire to establish contacts that will serve the desires of American scientists to meet and keep abreast of relevant work in the Soviet Union, with the hope for long-term political gain; the latter with a much sharper sense of “mission” to gain needed information. Mitchell emphasized the danger to the United States of falling into the habit of establishing scientific relations by governmental agreement rather than by letting contacts occur naturally. He saw no alternative to the present arrangement, but expressed the view that it may be time now to begin to work toward encouraging greater freedom in U.S.-U.S.S.R. scientific contacts.

F. Joachim Weyl (ONR; formerly with the Agency for International Development) presented a paper on science and foreign aid, as the second “case” study. Weyl made several major points, the first being that, for a country that depends so heavily on science and technology and that prides itself on its prowess in those fields, the United States has approached its foreign aid program in a remarkably unscientific way. This is being slowly corrected, in part through the mechanism of a research program within AID. In addition, Weyl advocated the application of some of the recently developed techniques of systems and cost-effectiveness analyses as a means of making clearer the choices open to country planners and to U.S. policy officers in the economic assistance field.

Weyl also discussed at some length the importance of building indigenous scientific capability in the developing countries. In this connection he emphasized, in particular, two pivotal needs. The first one concerns the identification of the indispensable factors in the environment which are required towards such an end and how to provide them. The second one is that American scientists must learn to realize and make clear to their colleagues in the developing countries that the scientific problems encountered in their world can be just as challenging intellectually as the research problems currently popular in the United States and other advanced countries. Otherwise they will be led to try to emulate the sophisticated specialists in American scientific centers, with little value to their own land and perhaps even to science.

Weyl touched finally on a number

of underlying conditions which must be met in the intercourse between societies which offer the teachings of science in the interest of development assistance, and the societies expected to profit from such offers—the establishment of forums and procedures of arbitration restoring some comparability in weight of voice to grossly unequal agents, the meticulous observance of objectivity and truth in the discourse between the haves and the have-nots, and finally the full public acceptance in the former of the long-range intellectual commitment to technical development in full recognition of the uncertainties in its long-term returns and the vicissitudes of short-term difficulties.

Christopher Wright (Columbia University's Council for Atomic Age Studies) summarized the implications of all the papers by discussing the need for new skills in policy-making. In particular, he expressed the view that these new skills involved more than simply scientific training. To date, those operating in this area of interaction between science and foreign affairs did so largely on the basis of experience. More than likely, on-the-job experience will be the primary form of training for this work for many years, but means must be devised for digesting and transmitting this experience to subsequent generations of students.

Wright pointed out that in the long run more deliberate means will have to be developed to prepare scientists or others in this field. He indicated in his paper what he believed were the formidable problems and barriers to developing such formal training programs at the present time.

Though the prepared papers took the full three hours, the audience paid the panel the great compliment of staying virtually without defection for an additional hour of lively discussion. E. B. SKOLNIKOFF, *Program Chairman*

Social and Economic Sciences (K)

National Institute of Social and Behavioral Science (K5)

A session for contributed papers on 28 December constituted the program of the National Institute of Social and Behavioral Science. Alvin Cohen (Lehigh University) evaluated the role of the elite in the economic development

of Peru. Since technological growth elicits formation of a middle class, the elite in many developing countries tend to preserve national stability and the power structure by directing the pattern of development. Class tensions often cause the formation of a conservative new elite with social interests, challenging a more traditional elite, and this heterogeneity of the elite is fundamental to growth. In these respects, Peruvian society is becoming less static. The success of the growth process will depend upon obtaining mutual interest and support on the part of the dynamic elite and the national administration in Peru—all as the alternative to direct Communist hegemony against the traditional elite and ultimately against the Peruvian national interest itself. An understanding of such particular areas of political sociology relative to growth economics is basic to foreign aid policy formulation.

Thomas E. Drabek (Ohio State University) presented the results of ongoing research by himself and his colleagues on the theory of organizational stress. Basic concepts in this theory center about the interrelationships of an organization as an interaction system, the performance structure, normative structure, interpersonal structure, internal and external resources, organizational capability, external demands, demand-relevant cues, organizational strain, and organizational stress. Changes in the relationships of these concepts occur in disaster conditions. The hypotheses of the theory outline further a general framework for analyzing of organizational stress.

The topic of Jack E. Gelfand (Temple University) concerned the aggregate supply function in macroeconomic equilibrium analysis. This function is a highly neglected concept in economics. The shape of the function is relevant to public policy considerations, and its analytical treatment is the key to long-run analysis of macroeconomic equilibrium, which at the present time does not exist in economic theory. The study introduces an aggregate production function uniquely relating employment and output, and an employment function relating employment to income. It concludes that the development of an aggregate supply function recognizes an independent aggregate production function which has the advantage of

relating a given level of expenditures simultaneously with specific levels of employment, output, and general price levels. And finally, wage rates are not confused with general price levels or employment with output, and indicators can be measured realistically in units of account.

Problems of labor force commitment in early stages of industrialization were discussed by Subbiah Kannappan (Michigan State University). The development of a stable wage-earning labor force is necessary to the modernization of new national economies. The difficulties involved in attaining such a work force are more those of mobility and adaptability rather than of skills. Other problems are the reluctance of laborers to enter wage earning work, their unstable work attachment, the anomic and irrational character of protest, inadequate development of labor markets, paucity of supervisory skills, and limited urban development. Corrective measures include improvement of work conditions and urban living facilities, investment in the development of the labor market, planned migration and urban settlement, and efforts to rationalize and legitimize protest. The difficulties of commitment are not because people in poor countries are "different," although there is no scope for complacency divorced from the complexities of observed behavior. There is a need nonetheless for imaginative innovation toward improved commitment of the labor force in developing economies.

Herbert I. Schiller (University of Illinois) presented research on the radio spectrum as an unexplored natural resource for economic development. The radio spectrum provides a valuable natural resource, particularly for the emerging and semideveloped countries. Communications can assist in the developmental process if its messages are in harmony with a national program for economic growth and social change, and if it assists people to understand the new directions. The system of commercial American broadcasting is extending its influence globally in the widespread international dissemination of American programming material, some of which may be less than adaptable. But for the radio spectrum to contribute its full potential to developing nations, its utilization must proceed quite differ-

ently from that prevailing in developed states. With reference to some problems and practices in the United States, the study concludes that "it would be an irony of history, but a hopeful turn of events, if a second chance to utilize the radio spectrum meaningfully in the public interest should be provided to the world's most developed nation as a result of the pressing necessities facing the least developed ones."

The Schiller presentation was videotaped as one of three "AAAS Specials," which are on file with the N.E.T. in New York City. Harold D. Lasswell (Yale University; vice president and chairman of Section K and a consultant of the National Institute) presided. Selected papers of the session and perhaps from others in the K series will be published by the NISBS in its *Symposia Studies Series*.

DONALD P. RAY, *Program Arranger*

History and Philosophy of Science (L)

History of Science Society (L1)

The symposia were of the highest caliber of any meeting we have had in Section L during my service as secretary. This is largely due to the imagination and industry of John Murdoch. We should certainly have him serve Section L as a committeeman-at-large.

We brought Gwil Owen from Oxford University; he delivered a splendid paper on the mechanics of Aristotle. This meeting was attended by a very large audience, sprinkled with a large number of professional scientists. In general, I have never seen the meetings of Section L so well attended. In particular, the symposium concerned with recent advances in theoretical physics—to which Klein, Bork, Jammers and Holton contributed so admirably—was jammed with interested listeners.

NORWOOD RUSSELL HANSON, *Secretary*

Society for General Systems Research (L2)

This was the largest meeting ever held by the society. It featured a symposium, chaired by John H. Milsum, on a particular concept, positive feedback, applied to many different fields. The morning session started with a

Science

National Institute of Social and Behavioral Science (K5)

Donald P. Ray

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