

that HEW will allow the universities extra time for bookkeeping work, but will not grant a reprieve from the regulations.

Other arguments heard from university officials are reminiscent of responses offered by employers during the early part of the civil rights movement. Many claim that compensatory hiring to achieve higher ratios of

women employees will lower the quality of their staffs or that they simply do not have the money to correct inequities. Some women have complained to HEW officials of harassment by their academic employers because of participation in feminist activities.

In spite of these similarities with civil rights enforcement, HEW is pushing for women's rights with a zeal

unequaled in many of its efforts on behalf of racial minorities. Dr. Sandler sees the preferred treatment of women's grievances over racial inequities as a serious problem and says that she will not be satisfied until her efforts benefit women of all races. "Too often," she says, "discrimination is thought to affect only black men and white women."—ROBERT J. BAZELL

Taiwan: U.S. Tries One-Man Experiment in "Postaid" Assistance

In recent years American foreign aid planners have had to face up to the question of what to do when a country that has been receiving American aid "graduates" from the program but can still profit from special access to American expertise, particularly in science and technology.

One possible answer to the question has been provided by the activities on Taiwan of an American physicist, Bruce Billings, who for the past 2 years or so has played the role of consultant, confidant, and honest broker to officials of the Republic of China in a way that seems to have delighted both them and Billings' Washington sponsors.

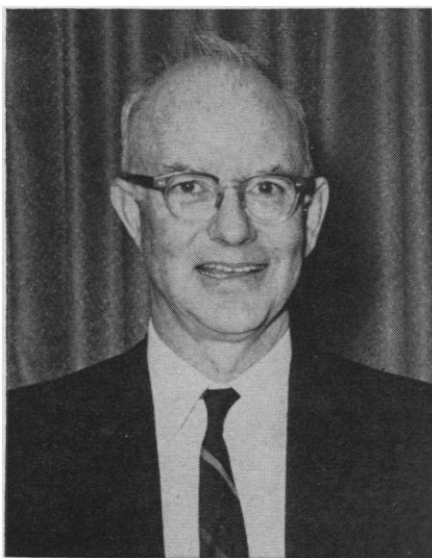
Billings was back in Washington recently on one of the periodic visits by which he maintains contacts in industry, government, and the universities which are a key to his effectiveness. This article is based on interviews here with Billings and with State Department and Agency for International Development (AID) officials who have watched Billings in action and dealt with Chinese officialdom on Taiwan.

In the 15 years after 1949, when Chiang Kai-shek's Nationalist government retreated to the island of Taiwan 90 miles off the Chinese mainland, the United States has given economic aid and technical assistance worth about \$1.5 billion to Taiwan. This aid contributed significantly to Taiwan's own "economic miracle," which has given the island an economic growth rate of 6 to 10 percent a year for the past decade and a per capita income well above the standards of the region.

By 1965 the indices showed that Taiwan could be considered a "semi-

developed" country, the economy was judged to be at the "takeoff" point, and a decision was made to phase out the formal American foreign aid program, although American military assistance to Taiwan was not ended. Some aid programs were "prefunded" to cushion the impact of the phaseout, and one hydroelectric project is still being completed under the auspices of the AID—but the American aid effort was regarded as successfully concluded.

The choice of Billings to be successor to the Taiwan aid program was, on the face of it, improbable, especially since, by his own account, his connection with China had been "minimal." His career as a scientist and science administrator in this country had been a success story on familiar post-World War II lines. And his interest in China



Bruce Billings

had been a very minor thread. One of Billings' roommates at Harvard was an American whose family lived in Canton and whose enthusiasm for China was sufficiently contagious to persuade Billings and two or three other friends to study Chinese for a semester. After Harvard, Billings went to Beirut from 1937 to 1940 to teach at the American School. He returned to begin doctoral studies at Johns Hopkins in 1940, and in 1941 joined Polaroid in Cambridge. The years from 1947 to 1963 he spent mainly in a variety of research and executive tasks with Baird-Atomic in Cambridge, and then in 1963 he joined Aerospace Corporation as vice president and general manager of laboratory operations. At the end of the 1950's he spent 2 years in Washington as deputy director in the Directorate of Defense Research and Engineering. Since 1962 he has served on the Air Force Science Advisory Board. He has remained active in research and in the affairs of the American Optical Society—currently he is president-elect of the society.

Billings' appointment to Taipei can be seen, in part, as a product of former Presidential science adviser Donald F. Hornig's diligence as a scientific missionary. After the aid program for Taiwan was terminated in 1965, Chinese officials expressed concern about the state of science and technology in their country. The cadre of scientists, engineers, and administrators that had come from the mainland with the Nationalists was aging, and a younger generation of professionals, educated in the United States and Europe, saw limited opportunities on Taiwan and tended not to return. At the same time, funds for science were being given summary treatment in the budget.

In 1967 Premier C. K. Yen was in the United States and expressed his misgivings to President Johnson. As a result, an American mission, with Hornig heading it, was dispatched to

NEWS IN BRIEF

● **BOOKS FOR THE ORIENT:** The Asia Foundation, which has channeled American contributions of books and money to students in Asia over the past 15 years, seeks donations of books published since 1958 and of professional and technical journals covering 10-year periods, beginning in 1946, for distribution to institutions and individuals in Asia. Further information may be obtained from Books for Asian Students, 451 Sixth Street, San Francisco, Calif. 94103. Telephone: (415)-982-4640.

● **AAS MULTIPLIES:** Scientists in Colombia have formed a Colombian Association for the Advancement of Science (ACAC) in cooperation with the Universidad Industrial de Santander. The ACAC address is Air Mail Box 783, Bucaramanga, Colombia, S.A.

● **YOUTH FOR SST:** Engineering students at the University of Michigan in Ann Arbor have organized a group called "Fly America's Supersonic Transport" (FASST) to "set the record straight on the current SST controversy." FASST plans to publish a national newsletter and hopes to start chapters on other campuses.

● **CALTECH LIBERATED:** The 50-year all-male undergraduate tradition of the California Institute of Technology was broken this fall when 31 women were admitted to the undergraduate population of 756. Women have been accepted as graduate students since 1953.

● **OCEAN POLLUTION:** President Nixon plans to ask the next Congress for laws governing ocean dumping, which are suggested in a report, released last month, by his Council on Environmental Quality. The report cites a "critical need" for a national policy on ocean dumping, calls for an immediate ban on dumping of toxic wastes, and proposes regulations governing all dumping in the oceans, estuaries, and Great Lakes. The bulk of dumped matter consists of dredge spoils—muck from harbor and river bottoms containing industrial, municipal, and other pollutants. Other debris comes from industrial wastes, sewage sludge, construction debris, solid waste, explosives, and radioactive waste. The report, "Ocean Dumping: A National

Policy," can be obtained for 55 cents from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

● **DISARMAMENT RESEARCH:** The National Academy of Sciences (NAS) has announced a 3-year program of grants to support doctoral dissertation research in the social and behavioral sciences related to arms control and disarmament. Funds are provided by the U.S. Arms Control and Disarmament Agency (ACDA). The grants committee hopes to attract a wide range of historical, experimental, theoretical, and observational approaches to the problems of international conflict and arms limitation. Further information may be obtained from the Division of Behavioral Sciences of the NAS, National Research Council, 2101 Constitution Avenue, NW, Washington, D.C. 20418.

● **EXCHANGE WITH FRANCE:** The National Science Foundation (NSF) has announced that six young doctoral scientists will go to France for 5 to 15 months of study and research, and four French scientists will come to the United States under a bilateral exchange program inaugurated last July. Each country will provide its scientists with travel money and stipends, but host institutions will receive funds from their respective governments to pay for space, supplies, and equipment. The program came about as a result of visits early this year between President Nixon and French Premier Pompidou. Recent doctoral scientists interested in future participation in the program may address inquiries to NSF's Division of Graduate Education in Science, Washington, D.C. 20550.

● **IN DEFENSE OF NATURE:** *Environmental Law*, a new journal concerned with the application of law to problems of the environment and ecology, is being published twice yearly by the Northwestern School of Law and Lewis and Clark College in Oregon. Subscriptions are \$6 per year or \$3 per issue (there will be three issues in the first year of publication) and copies may be obtained from the Northwestern School of Law, 10015 S.W. Terwilliger Boulevard, Portland, Oregon 97219.

Taiwan to make a study of scientific resources and needs.

At about the same time Billings' interest in things Chinese had been reactivated when he had been instrumental in getting red tape cut to permit a delegation from the war college on Taiwan to visit Aerospace. This led to an invitation to Billings to come to Taiwan to lecture and to other contacts. One other coincidence was that Billings had known Hornig since the latter was a graduate student.

The Hornig mission to Taiwan had recommended, among other things, that a "continuing point of contact" with the Chinese government be created. And in May of 1968 Billings got a phone call from the White House asking him to take the job. The way it was put was that Billings would be expected to conduct an experiment in inventing ways to increase the flow of science and technology to a country no longer receiving aid. In engineers' jargon, Taiwan would be a "test bed" for postaid countries. Billings accepted the offer and took leave from Aerospace.

In giving Billings his official persona, Washington seems to have been less bound by the bureaucratic book than usual. It was decided, for example, to affiliate him with the State Department rather than with AID or Commerce, presumably because officials gain face by association with State. His title is a double-barreled one. He was made special assistant to the ambassador for science and technology, which gave him a solid footing in the embassy. But probably more important, he was named American commissioner on the Joint Commission on Rural Reconstruction (JCRR). Originally set up by President Truman and Chiang Kai-shek to handle Marshall Plan funds on the mainland, the JCRR administered a successful land reform plan on Taiwan in the early 1950's and served with notable success as a planning and development agency for agriculture, a key sector of the Taiwanese economy. The JCRR has unusual flexibility for a Chinese government bureau and is regarded as an elite agency. Appointment as commissioner gave Billings direct entrée to Chinese government officials.

For Billings, assignment to the JCRR was initially intimidating. He says he felt he had to learn about farm credit, fertilizer, rice, and breeding pigs. And this, he says, was "pretty unnerving for a city boy like me." Billings immediately hit it off well with JCRR

technocrats and found that the commission was facing problems, such as forming larger farming units, mechanization, and developing closer ties with industry, to which his own experience was relevant.

Billings' mode of operation is to

look and listen until he sees a problem to which there may be a scientific or technological solution and then to take the steps to find experts—usually from the United States—who can define ways to solve the problem. He has had a budget of about \$20,000 a year for

consultants, paltry by normal foreign-aid standards, but Billings has also been able to enlist the support of the Asia Foundation to finance the work of some imported consultants. The Asia Foundation is a private foundation, but it disburses AID funds in

POINT OF VIEW

From an address, "Science and Scientists: Obligations and Opportunities," by Philip Handler, president of the National Academy of Sciences, at the University of Houston, 21 October. (A complete text may be obtained from Dean Ernest Henley, University of Houston, Houston, Texas 77004.)

... The crumbling of the scientific enterprise, the slowdown of the economy which no longer readily absorbs the products of our graduate schools, and the disappearing blind faith in the utility of science by a public which never did appreciate the beauty of the intellectual structure of science—all combine to generate a rising sense of apprehension in the scientific community.

Yet in truth, our scientific capabilities were never greater; our scientific productivity remains the marvel of the world, although leadership in some areas of science is slowly moving abroad.

... If there is cause for anguish, it is for lack of funds for new scientific starts, reduced funding of educational programs, and the mission-oriented narrowing of vision of federal agencies. Meanwhile, relatively few academic laboratories known to me have yet been really seriously injured. Only a few major national facilities have been closed and I presume these to have been only marginally productive.

Under these circumstances ... as we struggle to learn to make major decisions in the public sector rather than simply permit them to occur in a free market economy as in the past, as we grope to establish acceptable goals and to develop an appropriate posture vis-à-vis the other nations of the world, what should be the attitudes of scientists?

The most important action a scientist can take is to transfer to his public posture the honesty and integrity which, presumably, necessarily characterize his work in the laboratory. The burden upon the scientist is not to engage in hortatory declamation but to document his statements while being certain that he does not live in a vulnerable glass house. If the scientific community will not constitute the voice of reason in national affairs, whence shall we seek it? ...



Overridingly, it is incumbent on each of us engaged in scientific research or science education to generate opportunities to make known to our fellow citizens our sense of the value of science in the world of tomorrow. If you believe—as I do—that science remains the most powerful tool the mind of man has yet conceived to alleviate the condition of his fellows—please say so. If you believe that the pursuit of science is not merely the expensive hobby of scientists but both the leading edge of our culture and the only rational basis for a better way of life tomorrow—please say so. If you sympathize with our youth as they grope for new insights, for new relations among men, but you also understand that it is the tremendous productivity of the very science-based technology our youth decry that now provides their opportunity to seek new directions and, hence, must not be rejected out of hand—please say so.

... but as you "sell science," understand that support of unrestricted research is provided grudgingly by our society and largely in the hope that the results can be usefully applied in human affairs. The point must be that free research continues to offer surprise and totally unexpected, unpredictable bounties—whereas closely goal-oriented, directed research can offer little promise of success until the time is right and the scientific stage has been set. ... I agree that science is beautiful, I believe it to be the noblest expression of our culture. But if it is to seek support on that ground alone, it must compete with our bankrupt orchestras, museums, and community theaters for public support. But science has a special worthy place because it is not only a great esthetic experience, it is powerfully practical and relevant to the public purpose. ...

The public, particularly the Congress, has long pressed the scientific community to provide some expression of priorities. While the total scientific budget grew exponentially, we could avoid meeting this question. ... But as budgets harden ... can we continue to avoid that question ... ? Is one necessarily a troglodyte if he asks that the wasteful, the incompetent, the nonessential aspects of research be eliminated during a period of restricted funding such as this? Or, is it reactionary to inquire whether America can really aspire to 200 first-line universities with truly significant research enterprises—the path down which we began a few years ago?

Questions such as these torture the academic community. But they cannot long be avoided nor need we fear them. ... If we can give honest, whole-hearted answers to the diverse, broader questions I have raised, we can help in our way to restore public confidence in a vital aspect of our society. ...

"Blacklisted" Adviser Appointed

A psychologist who has figured in the controversy over secret "black-listing" of prospective part-time advisers by the Department of Health, Education, and Welfare (HEW) has accepted an invitation to serve on a review panel from which he had earlier been barred.

Professor Stephan L. Chorover of M.I.T., who is spending this year at Berkeley, has accepted appointment to the Neuropsychology Research Review Committee of the National Institute of Mental Health (NIMH). HEW handling of its relations with Chorover had come to be regarded as something of a test of the department's announced intentions to base advisory appointments on scientific merit. Chorover's experience with the HEW security clearance system had come to fairly wide notice because he had actually served on the neuropsychology panel for several months in 1967 and 1968 and then had been told his appointment had not been approved. Chorover and several colleagues said they believed "political considerations" had prevailed.

After HEW's security clearance procedures came to light in the pages of *Science* and elsewhere in 1969, the Nixon Administration began a review of the system. Revision of the system was provisionally announced last January and formally adopted in September (*Science*, 9 October 1970).

The new procedures dispense with the controversial preappointment check but retain a provision for a postappointment check of FBI and Civil Service files. If adverse information relating to security or "suitability" (which relates to personal behavior) is found, the person involved is given an opportunity to challenge these findings before action is taken to terminate the appointment.

It is understood that the involvement of NIMH director Bertram S. Brown was much more extensive in the Chorover appointment than the customary signing of the invitation and that HEW Secretary Elliot L. Richardson himself gave the requisite OK.—J.W.

making some types of grants. In the later stages of a project, the Chinese central government usually takes over funding.

The project in which Billings has been most deeply involved personally grew out of his work with the commission. A report on farm income has been a major input into a 4-year economic plan. Students interviewed farmers, and the data were customarily analyzed by university statisticians. The problem was that there was a lag of up to 2 years in getting final results, and the commission was forced to base its plan on obsolete data.

Billings found that there were about a score of small and medium-sized computers on the island and that computer time was available. Data analysis on the farm income report was soon undergoing computerization, and Billings shifted his attention to larger questions of computer use. The defense and finance ministries were making some use of computers, but other ministries concerned with processing data, such as those dealing with commerce and com-

munications, were not. Billings was acutely aware of the incompatibilities in computer systems that had evolved over a relatively long period, as in the United States, and he saw in Taiwan a "fantastic opportunity" to start with a clean slate.

About 30 percent of Taiwan's output comes from government-owned industry, says Billings (there are government monopolies on sugar and petroleum, for instance, as well as on power and telephone service), and there are great opportunities for direct coupling between government and industry in making economic decisions. And there is broad scope for use of computers—for example, in a unified accounting system.

The Chinese are now putting substantial amounts of their own funds into the computerization project and seem enthusiastic about it. One can only speculate, however, about what the male traditionalists among them thought when one of Billings' first visiting American computer experts turned out to be Ruth Davis from the

National Institutes of Health Lister Hill Center.

Other examples of Billings' problem solving can be found in his advocacy of greater use of aerial photography and photogrammetry to facilitate road building and forest-resource evaluation in Taiwan's mountainous terrain and his interest in oceanography, which is germane to Taiwan's increasingly important and efficient fishing industry. An American oceanographic vessel is now on long-term loan to Taiwan.

Billings, who manages to mix ebullience with modesty, shies away from taking personal credit and would prefer to talk about Chinese accomplishments. The electric power system on the island, for example, he finds considerably more trouble-free than the American system. Taiwan ranked as an economically underdeveloped country but had an infrastructure of roads, railroads, irrigation canals, and schools developed by the Japanese during their half-century occupation of the island after the first Sino-Japanese war in the '90's. Deterioration and damage during World War II affected the island seriously, but now, for example, Taiwan is over 90 percent electrified and telephone service is widespread, although the number of private telephones is relatively low.

In more than 20 years under the Chiang Kai-shek regime, Taiwan has experienced a remarkable period of economic growth and industrialization. Chiang's milder critics call the political stability which has prevailed political stagnation. The rift between the mainlanders, who dominate the army and the government, and the native Taiwanese, who exercise an increasing hold over business and industry, is far from healed. And the formula that the island is simply the Province of Taiwan and provisional capital of the Republic of China and that a victorious return to the mainland is imminent puts a progressively greater strain on one's sense of reality. The question of what happens to Taiwan after Chiang, who is now 82, is a very important question for the United States and for the State Department. As for Billings, his job is to work on practical problems that need solving, as he says, "without worrying about the infrastructure."

Although Billings is not an old China hand, many of the officials with whom he deals are old America hands in the sense that they received part of their education in the States and in some cases worked here for some time.

Tax-Exempt Litigation: IRS Rescinds

The Internal Revenue Service announced on 12 November that it would again issue tax exemptions, under a new set of guidelines, to organizations that litigate in the public interest. The announcement of the new guidelines, which impose few restrictions, ends an investigation launched by IRS on 9 October that had aroused strong opposition from conservation, consumer, and several other interests (*Science*, 13 November).

IRS Commissioner Randolph W. Thrower said that he knew of no organization now engaging in public interest litigation which could not easily conform to the new guidelines. These guidelines primarily insure that tax-exempt litigation does not benefit private interests, and they bear little resemblance to the areas of concern which IRS had specified upon undertaking the investigation. Thrower admitted that IRS never should have considered whether individual lawsuits were in the public interest, an issue that generated some of the strongest opposition.

William Butler, counsel for the Environmental Defense Fund, called the IRS action "total capitulation," while representatives of several groups affected by the decision agreed that IRS had backed down under pressure.—R.J.B.

Many Chinese at the ministerial level have Ph.D.'s from American institutions. And this is one reason, perhaps, why Billings says politics creates "no problems because that's the way technical people are."

As an American official overseas, Billings works from an almost unique position of strength. He was picked by the White House and maintains a tie with the Office of Science and Technology in the Executive Office of the President. Under the new Administration his activities fit neatly into the Nixon Doctrine's formula of using American expertise and foreign partner's resources in cooperative development efforts. In Taiwan Billings apparently has good relations with the ambassador and a post on the JCRR which gives him a functional tie with Chinese officials.

His background in industry gives him experience with management and with large-scale problem solving which few academics could match. And Billings has taken care to maintain his wide contacts by taking trips back to the United States every 5 or 6 months.

There is, of course, a more personal quotient. Billings is a man of intimidating energy. When he is in Washington, he runs on a heavy schedule and the interview for this article was conducted in fragments in taxis, across a luncheon table, along the State Department's long corridors, and in the anteroom of a health unit where Billings was sum-

moned for a yellow fever shot. It is the kind of energy that has taken him several times to Quemoy, the offshore island that was for a long time a target in a Communist-Chinese shooting gallery, and to the Pescadores islands to see a prawn breeding project. In Taipei Billings is tutored in Chinese for 1½ hours daily but denigrates his linguistic ability. All in all, for competence and self-deprecation Billings meets the standards of the most demanding mandarin.

By March, Billings will have to decide whether he wishes to extend his 3 years on Taiwan to a fourth year. His work there seems to have reversed the usual experience of foreign aid where large investments often bring small returns, and he is decidedly persona grata in Taiwan's top government circles.

The Billings experiment in Taiwan is accounted a success, and so in a similar set of circumstances we are likely to see an attempt at replicating it.

—JOHN WALSH

RECENT DEATHS

Benjamin Boss, 90; retired director, Dudley Observatory, Albany, N.Y.; 17 October.

Lester O. Gilmore, 60; associate chairman, dairy science department, Ohio Agricultural Research and Development Center; 21 August.

Lawrence W. Hanlon, 55; associate

dean, Cornell University Medical College; 25 September.

Heinz Hartman, 75; former president, International Psychoanalytic Association; 17 May.

Everett E. Hawkins, 64; professor of economics and sociology, University of Wisconsin; 31 August.

Samuel Hemley, 72; professor emeritus of orthodontics, New York University; 29 August.

Prynce Hopkins, 85; former professor of psychology, Claremont College; 16 August.

John H. Hoyt, 41; associate professor of geology, University of Georgia Marine Institute; 6 September.

Darrell S. Hughes, 66; professor of physics, University of Texas, Austin; 10 September.

Howard E. Jensen, 81; former chairman, sociology and anthropology, Duke University; 26 August.

Joseph M. Keller, 59; professor of physics, Iowa State University; 13 October.

Paul Kimmelstiel, 70; professor of pathology, University of Oklahoma Medical Center; 7 October.

Joseph S. Landa, 78; professor of prosthodontics and cleft-palate rehabilitation, New York University; 3 September.

Rema Lapouse, 55; professor of psychiatry and community and preventive medicine, New York Medical College; 23 August.

James W. Laurie, 67; former president, Trinity University; 9 September.

Reba S. Mosby, 61; professor of sociology, Harris Teachers College; 25 August.

Siemon W. Muller, 70; professor emeritus of geology, Stanford University; 9 September.

Herman Nunberg, 86; member of the Vienna Psychoanalytic Society; 20 May.

Anthony Payne, 59; assistant director-general, World Health Organization and former chairman, epidemiology and public health department, Yale University; 14 October.

Russell Potter, 76; director of the former Institute of Arts and Sciences, Columbia University; 6 October.

Doran S. Thorn, 76; former professor of operative dentistry and director of clinics, Georgetown University; 19 September.

Erratum: On page 516 (30 October), Jerome B. Wiesner, provost of M.I.T., was erroneously reported as being present at a meeting of labor leaders and academics at Harvard on 16 October. Although invited, Wiesner declined to attend the meeting and is not a member of the continuing group.