emies are so closely intertwined that it is difficult to determine how much of that is not covered by income from projects being carried out by NAE. NAS president Philip Handler has recently been quoted as estimating an annual NAS subsidy of between $200,000 and $250,000.

NAE officials, however, seem confident that the academy could readily become financially independent. With a view to achieving the necessary "capitalization," a National Academy of Engineering Foundation has recently been formally established. The foundation's role is seen as administering an endowment fund created mainly from contributions from individuals and grants from private foundations.

Finding a formula for an independent academy will not, however, be a particularly easy task. One reason that both sides were reluctant to fracture the existing relationship was that a satisfactory alternative was not in view. The prospect of two separate and equal academies raises possibilities of competition and the duplication of expensive resources, which could undermine the quality of their work. And in practical terms, the scientists and engineers need each other to be most effective. So now, after nearly a decade of having failed to find equality together, it looks as if they must find ways to cooperate apart.—JOHN WALSH

Agriculture: Social Sciences Oppressed and Poverty Stricken

Many years ago in England the industrial revolution resulted in dislocations and social problems that were largely ignored. It has become commonplace to criticize the leaders of that day for their callousness. It may be appropriate to ask whether we who promote today's agricultural revolution may in time come under similar indictment.—DON PAALBERG, former Director of Agricultural Economics, U.S. Department of Agriculture.

The agricultural revolution in the United States has been a gradual, but not a gentle, process. Since 1940, some 30 million people have left their homes in the countryside for the towns, a migration that continues at the rate of 800,000 people a year. Two thousand farms go out of business each week. Over half of those that are left produce sales of less than $5000 a year, which is part of the reason why some 14 million rural Americans live below the poverty line.

The exodus from the countryside has been spurred on in part by steady technical change, brought about by the flow of inventions and improvements pouring from the laboratories of the U.S. Department of Agriculture (USDA) and the land-grant colleges and universities. This cornucopia of new knowledge has increased agricultural productivity, lowered prices for the consumer, raised efficiency and profits for the few large producers who could keep up with the pace of change, and put the handwriting on the wall for the many small farmers who could not.

The USDA has not been a passive observer of the revolution which its research has engendered. Its system of price supports, USDA economists argue, has helped blunt the impact of market forces on marginal farmers and postponed or prevented their demise. Other social scientists contend that USDA professions of interest in saving the family farm have been only rhetoric, and that government policies have, in practice, rewarded bigness at the expense of the small farmer.

Whatever the merits of this debate, it is reasonable to suppose that a strong social science research program could have provided a source of knowledge whereby to cushion the impact of the agricultural revolution on rural people, for example in supplying data and predictions to guide policy decisions or in assessing the consequences of technological changes such as harvest mechanization. The possible benefits of such research are impossible to assess, but there are critics both within and outside the agricultural establishment who believe that the effort invested in social science has matched the need in neither quantity nor quality.

From such critics have recently emerged two reports of a rather different nature. *Hard Tomatoes, Hard Times,** written by Jim Hightower, is the work of the Agribusiness Accountability Project, a Nader-style, public interest research organization based in Washington, D.C. The Pound report on agricultural research† (other parts of which have been reviewed in *Science*, 5 Jan., 27 April, and 4 May) is the labor of a blue-ribbon committee of agricultural and academic scientists. In different language, and by different methods, both studies arrive at the same conclusion—that social science research has not been one of agriculture's finest achievements.

The theme of *Hard Tomatoes, Hard Times* is that agricultural research has been and still is "committed to the technological and managerial needs of the largest-scale producers and of agribusiness corporations and . . . to omit those most in need of research assistance." Less than 5 percent of research conducted at state agricultural experiment stations is devoted to "people-oriented research" (290 scientific man-years out of a 1969 total of nearly 6000) and much of this research is designed to benefit businesses, not rural people. A survey of projects undertaken at Iowa State University on the "housing needs of rural families" showed that two-thirds were concerned with the technical aspects of building construction.

Even the research that is focused on people tends to be of a somewhat trivial nature. A study at Cornell University revealed that "employed homemakers have less time for housekeeping tasks than nonemployed homemakers." Ac-

* J. Hightower, *Hard Tomatoes, Hard Times* (Schenkman, Cambridge, Mass., in press), paperback $4.95, hard cover $8.95. † *Report of the Committee on Research Advisory to the U.S. Department of Agriculture* (National Technical Information Service, 5285 Port Royal Road, Springfield, Va. 22151), PE 21338 (main report) $4.85; PE 21339 (appendices) $9.00.

Scientists Go to Washington

This seems to be the year of the congressional science fellowship. In addition to programs recently announced by the AAAS and the American Physical Society (APS), three other professional organizations have inaugurated or are seriously considering such programs.

All three have set up offices in Washington, D.C., within the last year. The American Society of Mechanical Engineers (ASME), the first to get into the act, has posted an engineer, Barry Hyman, with the Senate Commerce Committee for a year. Arrangements for this were stimulated by talks with Representative John Davis (D–Ga.), chairman of the House science subcommittee. Hyman's salary is being paid half by ASME and half by George Washington University, from which he is taking leave.

The Institute of Electrical and Electronics Engineers (IEEE) has hired a man (identity as yet undisclosed) who will start a year as a congressional staffer in September.

Finally, the American Institute of Aeronautics and Astronautics is seriously exploring the possibility of supporting a congressional fellow and is casting around for potential sources of monetary support.

Idea Tossed Around for Years

The idea of installing scientific and technical experts as congressional aides has been bubbling along for several years now. Members of Congress have responded enthusiastically to it as one way of obtaining solid technical input for new legislation, and a 1970 poll indicated that a vast majority of congressmen felt that they were at a significant disadvantage, compared to the Executive Branch, when it came to having ready sources of technical expertise.

The decline of scientists' influence in the top levels of governmental decision-making has undoubtedly given timeliness to the fellowship idea, although as Joel Primack, junior fellow at Harvard and instigator of the APS program points out, the new fellows are supposed to be staff members, not science advisers.

An IEEE official pointed out that fellowships are part of the general expansion of awareness that the job of a scientist is not limited to spending day after day at the bench. The employment crisis for scientists and engineers has done much to persuade technical people that political involvement is appropriate and, indeed, necessary.

Primack believes that scientific societies are finally beginning to develop an expanded sense of responsibility. He cited a letter from W. W. Havens, APS executive secretary, who had had serious doubts about the advisability of a congressional fellows program. He said he was finally won over by the fact that this went a long way toward "legitimizing for physicists activities other than traditional research in universities or industry." In other words, a concept that the "radicals" have fought for for several years has finally become "establishment."

Few Technical Experts in Congress

At present there is one scientist in Congress—Mike McCormack (D–Wash.), a chemist—and a tiny handful of scientist–staff members. McCormack has indicated that Congress could well use the services of up to 100 scientifically trained staff members. While limitations of space and money would prohibit this large an influx of talent, it seems likely that, as legislation related to science and technology becomes increasingly sophisticated and complex, the need for such people will be taken for granted.

Three AAAS fellows will be starting work on Capitol Hill in September. The $50,000 for their stipends is being contributed half by the AAAS and half by a private individual. The APS, which will ante up $30,000 for the support of two fellows, is still forming its selection committee.—C.H.

cording to a cooperative regional research study, "the rural population is dichotomous in racial composition." Hightower draws an unfavorable comparison between the paucity of research devoted to the welfare of rural peoples and the existence of such projects as a Cornell study on cleaning teeth in dogs and a disease-tracking plan devised at Iowa State University that involved tagging every newborn pig with the owner's social security number. Land-grant college research for rural people and places, he says, is a sham.

A not dissimilar verdict is returned by the two Pound committee panels that covered much of the same ground. One panel, directed by Dale E. Hathaway, chairman of the department of agricultural economics at Michigan State University, surveyed the general state of social science research. A second panel, under Daryl J. Hobbs, chairman of the department of sociology and rural sociology at the University of Missouri, made a special study of rural sociological research.

According to Hathaway's panel, a succession of committees, commissions, and advisory groups has recommended a redirection of the USDA's research priorities toward the problems of people and communities, but without effect. Social science research in both the USDA and the state agricultural experiment stations (SAES) is 90 percent economics and only 10 percent sociology. Within the USDA, most social science is conducted by the Economic Research Service (ERS), an agency with a $15 million budget. There are a handful of social scientists in other USDA agencies, including the Cooperative State Research Service (CSRS), which hands out federal monies to the state agricultural experiment stations. The USDA devoted a total of 539 scientific man-years to the social sciences in 1969, of which 18 were in sociology, and the states devoted 477, of which 75 were in sociology.

The ERS staff, the USDA's principal group of social scientists, spend their time in compiling basic economic statistics, in performing policy analysis for the Secretary of Agriculture, and in doing social science research. As far as the first function is concerned, the Hathaway panel notes that the economic statistics relating to food and fibers are of unique quality, but that comparable data have not been developed for matters relating to the welfare of rural people. As for policy analysis,

the panel notes that the ERS is unlikely to publish research that might question current or proposed policies. (Quentin M. West, the new administrator of ERS, admits this is a problem. The ERS does not publish research without the Secretary of Agriculture's imprimatur, which is sometimes withheld, nor would it publish research critical of a program if it were politically inconvenient to do so, West says.)

The panel found it hard to assess the quality of research work, the third main function of the ERS, although the economic papers published by the staff appear to receive a fair share of awards. Yet despite having the largest budget for economic research in the world, the ERS has few large-scale research programs. The trouble seems to be that the ERS's funds are not freely disposable, but have to be spread widely "in order to maintain a wide base of administrative and congressional support."

Turning to the state agricultural experiment stations, the Hathaway panel concludes that SAES research efforts are "fragmentary, duplicative, nonadditive, and usually without the 'critical mass' necessary to achieve significant results." This is partly the fault of the CSRS, the USDA agency that channels federal money to the SAES and that is supposed to review and coordinate the SAES research supported by the money. (The CSRS provides about 22 percent of the SAES research funds; the rest comes from state legislatures and other government agencies.) According to the Hathaway panel, the CSRS review system is "inadequate to screen effectively for duplication and does not judge scientific merit. If it were really effective as a coordinating mechanism, it would then be unacceptable to SAES directors." In other words, the CSRS is in essence a check-writing outfit.

The panel made a special study of rural development, concluding that the relevant USDA and SAES research "is not effectively serving the needs of either private or public decision-makers." The reasons are various. No agenda of critical research questions has been produced at any level in the USDA or SAES. The research that has been done is generally descriptive of past trends rather than analytical, and it "does not seem to be building any significant body of knowledge." The USDA's in-house research on rural development problems is inadequate in both quantity and quality and, like that of the SAES, is dispersed geographically in small, descriptive projects. So small, in fact, that the average manpower for all USDA-SAES social science projects is 0.4 of a scientific man-year.

The level of support for research on human resources and rural institutions is "totally inadequate," but without a complete reorganization of research, the Hathaway panel considers, more money would only produce more of the same descriptive, uncoordinated, and insubstantial research.

Although this verdict may be hard, it does not seem to be considered unjust by those who administer the system. M. L. Upchurch, former administrator of ERS, commented in a letter to Hathaway written in November 1971 that he agreed in general with most of the observations made in a draft version of the panel's report. "I admit great inadequacies in our present program. Our current resources are so inadequate compared with the number and scope of the problems that one understandably could conclude that we are pecking futilely at the edges of important problems."

Low Impact on Policy

The Hobbs panel of the Pound committee, looking specifically at rural sociological research in the USDA and SAES, found much the same state of debility as that described by the Hathaway panel. Neither the quality of rural sociological research nor its effectiveness, as measured by impact on public policy, has fulfilled its potential. Although the USDA in its public pronouncements has "constantly reiterated" a commitment to rural development, the Hobbs panel finds little evidence that these pronouncements have been backed with an increase in research funds, unless it be that the percentage of the USDA-SAES research budget committed to sociology has increased from six-tenths of one percent in 1966 to seven-tenths of one percent in 1970.

The Hobbs panel found several reasons for the poor state of rural sociology within the agricultural research system. One is that the problems to be researched have too often been defined by administrators. The research that ensues is "much of it superficial and descriptive." More of the decision-making should be made by active researchers and administrators close to the programs, the panel opines.

Another problem is the tendency for research emphases to be shifted from one topic to another as political priorities alter. These rapid changes "virtually guarantee a flow of superficial and descriptive research that seldom advances explanation and solution." There is a certain cyclic aspect to these changes. The present emphasis on rural development is not new, but a "recurrence brought on by failure to make a sufficient commitment to its solution in the first place."

A third roadblock for rural sociology is the "excessive orientation toward production agriculture in USDA's definition of problems," a philosophy which the Hobbs panel believes should be modified to include study of the social consequences of technological change and the impact of a highly efficient production agriculture on the quality of life.

Why have the social consequences of the agricultural revolution been apparently so neglected? One reason seems to lie with Congress, whose interest in sociological studies has not been beneficent. The agriculture committees in Congress have long been dominated by southerners, who, sociologists say, did not encourage research that would reflect on social conditions or race relations in their states. The USDA's willingness to explore this territory was permanently eroded when Congress killed off the large and vigorous Bureau of Agricultural Economics in 1948. Since then, the USDA has never had more than 20 sociologists on its staff. "The fear of what congressmen might object to has led the USDA to discourage, or not to encourage, certain kinds of sociological research," says Thomas R. Ford, chairman of the sociology department at the University of Kentucky and president of the Rural Sociological Society. "Whitten is one of these congressmen. I wouldn't want to single him out, but he singles himself out," Ford says. Since 1949, Jamie L. Whitten, a Mississippi Democrat, has been chairman of the House appropriations subcommittee that votes the USDA's budget and, as a cursory glance at the committee's hearing record will evidence, he rules the USDA with a whim of iron. Few initiatives are taken in the USDA without considering what Whitten's reaction will be. Sociology, never regarded as central to the USDA's mission, has not apparently been worth doing battle for. Says Ford, "You always get the feeling that they are protecting the major portion of their funds and that this is the one lamb that can be thrown to the wolves."

In the last two or three years, the climate for sociological research seems to have improved, partly in step with the social changes taking place in the South, and projects on race relations, migration off the farm, or the social mobility of the poor are now approved without question. "I think we have greater opportunities to do work without being impeded or suppressed," says one official intimate with the history of USDA sociological research.

With the passing of the rural development act last year, the USDA has for the first time been given formal responsibility for the welfare of rural people. Little else seems to have been accomplished. The ERS has been reorganized by its new administrator, but neither the agency nor its division of human resources (now transferred to the Rural Development Service) has received any extra support to speak of. The division holds the USDA's major concentration of in-house sociology—five sociologists and three political scientists. In the whole of the CSRS, there is at present one sociologist to review, coordinate, and direct all sociological work supported by federal funds in the 50 states. Since 1971, Congress has earmarked an annual $3 million for rural development, but whether or not because it has to be spread so thin under the formula system, the new largesse seems to have little impact yet on departments of rural sociology.

Social scientists, including those on the Hobbs and Hathaway panels, are not likely to underestimate the potential value of their subject for policy-makers, nor is it clear to what extent social scientists could have helped to soften the impact of the agricultural revolution on rural peoples. But whatever opportunities there may have been, Congress and the USDA and the SAES directors seem to have designed a system that has passed most of them up, and continues to do so.

—NICHOLAS WADE

Cancer News: Cancer Society Makes It with Style

A few weeks ago, the American Cancer Society (ACS) launched its annual fund-raising drive with a seminar for science writers which generated some 300 news stories about progress against cancer. That is a lot of news.

Although the writers' seminar and the fund-raising campaign are not formally tied together, there is no doubt that the timing that links them is deliberate. The ACS, which has a masterful public relations operation, goes on the assumption that donations will be highest if people are exposed to good news about cancer shortly before a society volunteer comes knocking at the door. The idea is to let the public know that there is hope that cancer can be cured.

Whether the spring surfeit of news about cancer actually prompts more people to give, or give more, is moot. Alan C. Davis, ACS vice president and director of the seminar, says there has never been a good analysis of the situation. Certainly, many donors would contribute whether they were inundated by news stories or not. Nevertheless, there is a general feeling among cancer society officials that the news from the seminar contributes to the success of the campaign and that the $20,000 to $25,000 that the society spends on the meeting is a worthwhile investment. This year, the ACS hopes to raise $85 million—most of it by the beginning of summer—and there is no reason to think that it will fail. Someone has suggested that the ACS's slogan should be "Give 'til it cures." The society's rallying cry for now is "We want to wipe out cancer in your lifetime."

Over the years, the ACS writers' seminar, whose origins go back to 1949, has become quite an established—and marginally controversial—institution that attracts a wide range of journalists and scientists, each coming for a variety of reasons. There is no science meeting like it.

The Promise of News

In a preseminar memo to reporters this year, Davis observed that "Public interest and governmental action against this disease—one of mankind's most relentless enemies—has experienced unprecedented growth during the past three years." Mentioning work in immunology, chemotherapy, and molecular biology, he promised that "Progress in all of these areas will be presented by the scientists who are making this progress. Exciting developments are ready for reporting. The findings are fresh, new, and significant." Sixty-eight writers showed up to hear about them from the 55 scientists whom Davis invited to the meeting at Rio Rico Inn in Nogales, Arizona.

Davis, who in addition to running the seminar handles some of the society's business in Washington, including liaison with the National Cancer Institute (NCI), spends months tracking down investigators to ask to participate. The process officially begins in the fall, when letters go out to all past participants (there are about 600 alumni) asking them to recommend persons for the next meeting. Davis looks for scientists whose work, in either basic or clinical research, is relatively new. But by and large, he is not looking for things that have never been reported anywhere else. "People usually have reported their findings before the seminar," Davis says, "even if only at a very small meeting of some sort. I think that kind of peer review provides a safety valve for us. We don't want weirdo stuff."

According to Davis, in the last few years scientists have been increasingly willing to come to the seminar and to suggest persons who might be good participants. Five years ago, he recalls, only 50 past participants bothered answering the letter asking them for ideas. This year, more than 150 answered.

In addition to soliciting ideas by mail, Davis himself travels extensively throughout the year, attending meetings, ranging from the select Gordon conference on cancer to the mammoth gathering of the Federation of American Societies for Experimental Biology, and scouring university campuses. There is nothing haphazard about the way this seminar is put together.

As always, the cast of characters at