troop sometimes passed the night near the feeding ground while the rest of the troop went to its usual sleeping place at some distance. Division was complete when the branching troop chose its own sleeping place, distant from that of the main troop and from the feeding ground. Both the leader and the subleaders of the original group remained with the main troop, contrary to our expectation that some of the subleaders might take the initiative in division. Six young males played important roles in the branching, and one of these became the leader.

The other observed case of troop division did not proceed in this peaceful way. It seemed to be the result of a decline in rank of the troop's third leader, whom we had named Saburo. Saburo was initially surpassed in rank by the fourth leader, Siro, who later became the first leader. A few months after Saburo had been mounted by a young male named Take, there was a report of unusually severe fighting. The next day Saburo and one-fourth of the troop did not appear at the feeding ground. A search on the mountain revealed the new troop foraging in the forest, and it never again appeared at the feeding ground. The detached troop has two leaders: Saburo, the former declining leader, and Kuro, promoted from subleader status. After the division, the new troop observed the forms of social etiquette and manners according to rank, such as the down-motion of the tail in the presence of a superior male, more strictly than the original group. It is not clear how the 50 monkeys chose the separate troop. Was there a secret plot among them?

While change in social ranking among leaders is common, the declining leader does not always desert the troop to become a solitary, or try to establish a new troop. In one of the troops we observed there was a retired leader, very old, who still posted himself in the central part, although he was not much concerned with the management of the troop.

The Japan Monkey Center has also succeeded in organizing a new troop with monkeys collected from different natural troops. When a newcomer was added to the artificial group, he or she was recognized at once and warmly accepted by individuals who had come from the same natural troop several months before. The monkey troop is undoubtedly a society of mutual acquaintance; each monkey knows every other monkey—its rank, status, mother-child relationship, and so on. Some of the infants, for example, are ranked high because they are the children of influential mothers. In these senses, each monkey troop has its own troop peculiarity and cultural trend, and each member of the troop differs from the other members in personality and life history.

Thus, nonuniformity is a fundamental characteristic of individuals as well as of troops of the Japanese monkey, and case-by-case observation, with identification and naming of individuals and comparison of troops, is essential in primatological research.

News and Comment

Scientific Migration: Britain Agitated Anew by Research Team's Decision to Move to United States

London. The emigration of scientists across the Atlantic is again a public issue in Britain. In the uneasy lull before the general election, the phenomenon inevitably has political implications. The circumstances of each departure are being examined meticulously, to see whether they support the Labour Party's contention that a succession of Conservative Governments has scandalously neglected science, or the Government's view that the migration of scientists is as natural as that of swallows.

What the newspapers call the "brain drain" has re-emerged with the decision of Ian Bush and eight of his colleagues to move from Birmingham University to the Worcester Foundation for Experimental Biology, Shrewsbury, Massachusetts. In 6 years, Bush, who has specialized in steroid metabolism, has created an outstanding unit for research into the chemical basis of mental disease. His group was one of the most promising of the many small research units financed by the Medical Research Council but located at a university. It is not yet clear whether the work of the unit will survive the departure of its senior members.

This bulk emigration has drawn attention to others. M. H. L. Pryce of Bristol, a distinguished theoretical physicist, is off to Southern California in the summer. John Pople, another theoretical physicist, and the head, at the tender age of 38, of one of the divisions of the National Physical Laboratory, will go to the Carnegie Laboratory at Pittsburgh. E. B. Paul, of Manchester, a Canadian by birth, will be the second professor of experimental nuclear physics in 5 years to have left Rutherford's old laboratory for the United States when he joins the Rice Institute in August. In the last few weeks many less-senior scientists have announced their departure, and there has been a stern grumble from Fred Hoyle that he will pack up for good if he does not quickly get better facilities for his theoretical work on the constitution of stars.

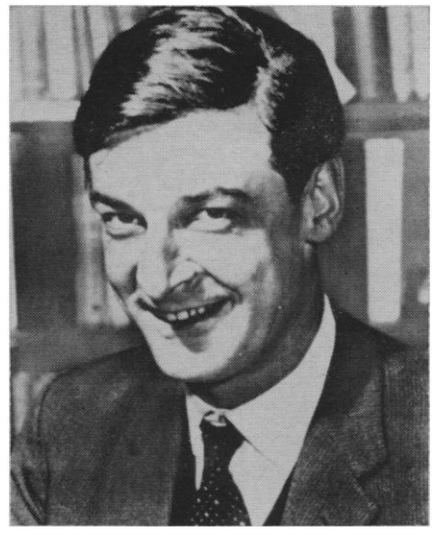
This is the season when appointments are traditionally arranged for the next academic year, and the number now emigrating is not much larger than what the country has recently come to expect. The seniority of the emigrants, however, has come as a shock, as has the chorus of declarations that the United States promises better opportunities for scientific research than do the British universities. The complaint is especially galling when the country is about to embark on a gigantic program of higher education based on the assumption that there is nothing wrong with the universities that expansion will not cure.

The difficulty of getting money for research projects is one of the most common complaints. Funds for most research come not from the general budget of the universities but from bodies such as the Medical Research Council, a non-governmental commit-

tee that channels both government and private money into research. Proposals recognized to be entirely reasonable may nevertheless take many months or even years to win approval. Sometimes restrictive conditions are attached to grants. Thus, Hoyle complains he was required to change from one computer to a cheaper one in the middle of a program of computation, and in the end used free time in the United States instead. Research scientists as a class feel they spend too much energy negotiating with public committees.

Others complain of the squalor of academic life. The universities lack the funds needed to provide backing for research. Secretaries, technical assistants, and equipment for teaching undergraduates are all scarce. The result is that physicists working with equipment costing millions of pounds may still have to write letters in longhand. Bush and Paul complain of the accumulation of these irritations. Their comments betoken a sense of neglect running through British academic life which is irksome to a generation brought up to expect that scientific inquiry should be part of a zestful intellectual adventure.

Some departing scientists, however, make no specific complaint of this kind but say they will be able to do better work in the United States. Pople is in this category. He says that the community of people working in his own field



Ian E. Bush

of molecular physics is more vigorous and more stimulating in the U.S. The question has also been raised of whether the conspicuous lack of graduate schools in Britain may not be a part, but only a part, of this trouble. But in any case these comparisons have been a cruel blow to a country which has fondly imagined that all the more obvious defects of its universities were compensated for by their intellectual virtues.

There are also more material motives for the emigration. Scientists leaving for the United States are shy about saying what salaries they will receive, but these are much higher than in Britain. Pople, for example, has been earning 4085 pounds ($11,438) a year, which is almost as much as any scientist here can hope to earn, whatever his age. In the U.S. he will earn nearly twice as much. At the other end of the scale, many of those who emigrate almost before the ink is dry on their Ph.D. certificates do so to escape several years of deprivation. There is no question that the new pilgrims can enjoy a much more comfortable life in the U.S. than Britain will be able to offer them in the foreseeable economic future.

It is unrealistic to expect that Britain can compete in ways like these, and that is the cornerstone of the Government's defense against its critics. Yet it is hoping to slow down the emigration by giving the universities money toward the overhead cost of graduate education and by creating professorships in the gift of the Royal Society. The Labour Party promises a more expensive remedy, and would distribute up to 30 million pounds ($84 million) a year to the universities for the support of research in the humanities as well as the sciences.

The sociology of the emigration is by no means understood, and it remains to be seen how effective these policies will be. Statistical information is sketchy. Everybody knows that one in eight of

Brain Drain—The View from This Side of the Atlantic

The fact that the British are coming is understandably no source of distress to the American institutions that will benefit from their presence. And the prevailing view among government science advisers is that, in the long run, British science will benefit from the agitation over the "brain drain." "They needed something like this to shake them up," said one administration official in recalling the lamentations he has been hearing for years from British colleagues.

As for the possibility that the U.S. might lend the British a hand in stemming the flow, the answer was succinctly stated by a staff member of the State Department's science office: "What can we do?"

At the Worcester Foundation, destination of the Bush team, executive director Hudson Hoagland offered the view that "Bush's departure may do some good for Britain." He added that Bush and his colleagues are expected to arrive about 1 September and that they will occupy a research building now under construction.

"They will be supported with our own funds at first," he explained, "but we hope that they will soon receive an NIH grant to continue their work"—a prospect that may lead the British to conclude that the U.S. Government is not altogether disassociated from the westward migration.

The arrangement for Bush to join Worcester was completed about a year ago, according to Gregory Pincus, research director of the institution. "Bush is an old friend of mine," he said. "He remarked to me that he was about ready to leave England, and I said, 'Why not come to us?' And that was that."

At the governmental level, the only action so far has been to bring some of the migration numbers up to date. These show that the number of British scientists and engineers seeking citizenship here totaled 575 in 1961; 664 in 1962, and 912 in 1963.

The view that the exodus may be a blessing in disguise is not particularly palatable to the British Government. As Winston Churchill said when told that his electoral defeat in 1945 might really be a blessing in disguise: If it is, it is very well disguised.—D.S.G.

the country's Ph.D.'s goes abroad, but nobody knows how many of them return. There is no information about the visitors to Britain from abroad, though it is plain that until recently Britain has attracted scientists from the Commonwealth almost as easily as the United States is now attracting academics from Britain. It is, however, known that the present migration is not confined to scientists. Of the 160 university teachers who went abroad last year, one-third were humanists, one-third pure scientists, and one-third technologists.

The less tangible questions are even more poorly understood. How serious is the loss if scientists working in pure research move to the United States to work more effectively? Given the close cultural links between Britain and the U.S., perhaps the migration should even be welcomed. Certainly there is no doubt that the migration from Britain, however serious its consequences, is a necessary part of belonging to the western world. Perhaps the real cause for regret is that Britain seems not to be attracting scholars from abroad in numbers commensurate with her wish not to become an intellectual backwater. There is much that governments, American as well as British, could do to correct the imbalance. Nobody will in the long run profit if British universities lose their self-respect and their vitality after having made so many conspicuous contributions to western culture for so many centuries.

—JOHN MADDOX, Science Correspondent, *Guardian of Manchester*, England.

Tobacco Report: Agencies Ponder Action; Congress Takes the Lead with a $5-Million Research Plan

Reaction to the *Smoking and Health* report of the Surgeon General's advisory committee so far seems most evident in the private sector, among smokers debating with themselves on whether or not to quit, while the federal response is still in the "planning" stage.

The open-ended finding by the advisory committee that "cigarette smoking is of sufficient importance in the United States to warrant remedial action" has the responsible agencies pondering what remedies are appropriate. As for a projected second and follow-up phase of the Public Health Service study, which was to provide recommendations for specific measures, the word thus far is "no action."

Clues to the likely course of official action, however, were detectable in hearings held in late January before the tobacco subcommittee of the House Agriculture Committee on a proposal to fund a major program of research on "quality and health factors" of tobacco and other cigarette ingredients. A $5-million appropriation for the first year will probably be requested.

Some saw a causal relation between the tobacco report and the hearings which followed hard upon it, especially since the chairman of the Agriculture Committee, Representative Harold D. Cooley, and the subcommittee chairman, Representative Watkins M. Abbitt, are from North Carolina and Virginia, respectively, and are naturally concerned about the economic effects of smoking.

Support for Research

One knowledgeable Capitol Hill observer said that the industry and its friends had "nowhere to go but research." But however valid the lightning-rod theory may be, the idea of research in the cause of making smoking safer appears to be an acceptable one in Congress. The proposal sailed through the subcommittee and was reported out unanimously by the committee. The resolution seems ticketed for early passage in the House and is expected to receive sympathetic treatment in the Senate.

The subcommittee hearings revealed no prohibition sentiment against tobacco, nor any sign of a movement to curtail or dismantle existing programs of crop research, price support, and control of tobacco that are operated by the federal government.

Support for the new research program came from a variety of witnesses with widely differing standpoints on tobacco. The witness whose testimony ranged most widely over the possibilities for federal action on tobacco was Senator Maurine B. Neuberger (D–Ore.), Congress's most dedicated educator of the public on the hazards of cigarette smoking and the severest critic of tobacco-industry advertising and promotion practices.

Senator Neuberger accepts the view of the Surgeon General's advisory panel that, for a large fraction of the public, cigarette smoking "appears to satisfy the total needs of the individual for a psychological crutch."

She noted the panel's conclusion that cigarette smoking reflected man's tendency to "utilize pharmacologic aids in search of contentment," and that "in the best interests of the public health, this should be accomplished with substances which carry minimal hazard to the individual and for society as a whole."

As to the propriety of the government's helping to develop safer cigarettes, Mrs. Neuberger told the subcommittee, "the Surgeon General's committee included among its disturbing findings the judgment that cigarette smoking was 'habituating.' Surely the shadow of such 'habituation' bars us from dismissing the habitual smoker as undeserving of government assistance. He is not a willful suicide. And if he cannot be helped to abandon cigarette smoking, then we must do what we can to take the sting out of habituation by making cigarette smoking as safe as possible."

Mrs. Neuberger wants the Public Health Service to take the lead in a massive plan of public education to dissuade young people from forming the smoking habit and to inform adults of the dangers of smoking, and wants it to serve as a prime mover in a major research effort to make smoking safer.

She has called on the Federal Trade Commission, as censor of deceptive and unfair advertising, to take three major steps: (i) require that each cigarette package bear a cautionary "injurious to health" label; (ii) establish standardized testing services for determing tar and nicotine yields of cigarettes and require a statement of average yields by FTC test to appear on each package; and (iii) establish guidelines similar to those imposed in Great Britain by the Independent Television Authority to eliminate advertising which might make smoking attractive to children and adolescents.

Surgeon General Luther L. Terry testified in favor of the research bill but provided a rather sobering lecture on the complexities of making smoking safer. One bloc of witnesses—industry representatives, governors, legislators, and other officials from tobacco-producing states—were heartily in favor of research but tended to stress the economic stake of their constituents in the tobacco industry, an $8-billion-a-year business which yields about $2 billion a year to the federal government in tax revenue and about $1 billion to the states, and provides, as one congressman put it, the "pastime" of 70 million people.

There was not a great deal of questioning, hostile or otherwise, during