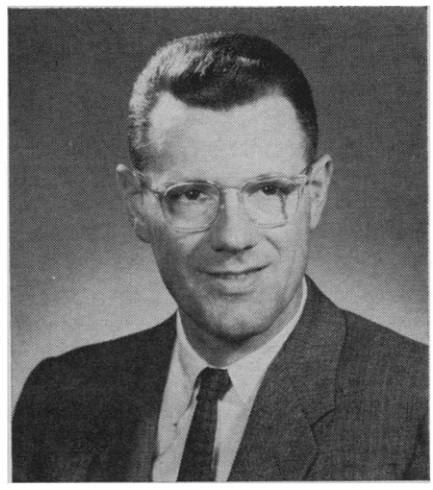
The committee is concerned because graduate education in physics is taking longer than it used to. This is in part because increasing specialization has made a period of postdoctoral study virtually obligatory before a research physicist begins independent work. Because of changing conditions the committee suggests establishment of a strong intermediate program betwen the bachelor and Ph.D. programs, intended for the student not headed for intensive research.

Another recommendation is that stronger incentives be provided for "more students to pursue studies and careers in applied physics." Implied in this is the suggestion that graduate education is biased in favor of research on the farther frontiers of basic research and against applied physics.

It is true that the proportion of federal funds invested in research in applied physics and university involvement in this work are much smaller than the investment and involvement in, for example, elementary particle physics. One reply to this is that a number of the ablest physicists are engaged in research in the field of elementary particle physics and that many of their students, also of high calibre, move into other specialties, and with great effect. More on this interesting point is apparently included in the panel surveys to be published later.



George E. Pake

When allowance is made for the passage of time, the report's recommendations on particle physics are substantially in accord with those of the so-called Ramsey report, the *Report of the GAC-PSAC Panel on High Energy Accelerator Physics* (*Science*, 31 May 1963).

Times, particularly in respect to budget trends, have changed, however, in the past 3 years. The survey committee nevertheless has stuck to its 1969 projections on the grounds that they represent the effort necessary if the United States is to maintain world leadership in physics and meet the quantitative and qualitative needs of a rapidly expanding system of higher education. The committee is disturbed, however, over the consequences of the flattening curve of support of research in physics. It expresses particular concern for young physicists attempting to get a "foothold" in research. The panelists note that only 7 or 8 percent of the proposals from these young investigators were approved last year.

An awareness of another specific effect of the funds squeeze is reflected in a recommendation in the final pages to the federal agencies: "When severe budget curtailments are forced upon the agencies, as is now occurring, the high visibility of large physics enterprises should not influence the agencies to apply a disproportionately large share of the budget squeeze to small and medium-size research groups."

What is clear in this passage and in others is an acknowledgment that, under prevailing conditions, with organized physics facing a time of scarcity although not of famine in funding, circumstances are defining more sharply than ever before hard choices between big physics and little physics.

—JOHN WALSH

Medicare: Awaiting the Avalanche

While Congress is preparing to take up the relatively modest health proposals outlined by President Johnson in his message to Congress last week, agencies in the executive branch are working on implementation of the major legislative innovations passed last year.

Chief among current activities is the tooling up of the Department of Health, Education, and Welfare for the giant medicare program, which goes into effect 1 July. All citizens over 65 are eligible automatically for the hospital insurance offered under medicare. Enrollment for medical insurance, however, is voluntary, and officials in the Social Security Administration have spent the last several months encouraging the elderly to sign up by the 31 March deadline.

A seemingly slow start was causing anxiety in officialdom a few months ago. By early December only 40 percent of the eligible had enrolled. A national survey undertaken to investigate the reasons "somehow got out of hand," according to one official, and began providing data too detailed to be of value. But some of the survey's insights, coupled with common sense, did help clarify the causes of the poor response: people were concerned and confused about possible duplication of their existing insurance policies, and many were worried about the cost. (Medical insurance involves a $3 monthly payment from the enrollee; the government pays another $3 for each individual.)

An intensified sales campaign and the assistance of insurance carriers who have been writing letters to their policyholders and placing ads recommending enrollment in medicare seem to have played a role in drastically increasing the number of enrollees. Unprecedented efforts have also been made by the government to make sure that all of the country's more than 19 million elderly know about the program and understand why experts agree almost unanimously that it is a bargain. The $36 annual premium will cover 80 percent of the charges for physicians and sur-

geons' services. It will also cover up to 100 "home health visits," and a number of other medical and health services, such as x-rays, radiation treatment, and surgical dressings, after a $50 deductible amount has been paid.

Nearly all eligible citizens have been contacted directly by the government at least once, and many of them more than once. The Office of Economic Opportunity developed a new program, "Operation Medicare Alert," employing some of the elderly poor to visit housing projects and other concentrations of elderly in 463 areas to explain the insurance and encourage people to sign. Rural branches of the Department of Agriculture have been used for reaching the elderly in outlying areas. Even the Post Office Department has gotten into the act: rural carriers have been reminding people along their routes of medicare deadlines and now, with the effort in its final days, the department is making available a new "short form" application which, while incomplete, at least serves to keep the possibility of registration open. Churches, scouts, civic groups, clubs—every conceivable source of manpower has been tapped for the campaign. Posters, radio announcements, public service announcements have all been appearing. Recently there has also been considerable publicity from the top: Johnson, who earlier attempted to stir interest by presenting Harry Truman with medicare insurance card No. 1, last week proclaimed March "National Medicare Enrollment Month" and asked state governors to do the same.

Holdouts

These efforts seem to be getting results. As of 8 March, 15 million, or 79 percent, of the 19.1 million eligible citizens had signed up, 1 million had definitely decided against enrolling, and 3.1 million had not been heard from. The last group constitutes a major problem. Little is known with certainty, but is is assumed that these individuals represent the part of the population hardest to reach—the very old, the very isolated, the very poor, the bedridden sick, the illiterate. The obstacles to communication with these groups are enormous. Nonetheless, applications are continuing to come in at a heavy rate, leading officials to conclude that the natural tendency to do things at the last minute may account for a substantial portion of the delays. There is optimism that at least 90 percent of the elderly will have enrolled by the 31 March deadline. There will be another enrollment period from October to December, 1967, but coverage for the late enrollees will not begin until July 1968, and their premiums may be higher, to take account of the higher cost of insuring individuals who fail to begin paying premiums at the earliest opportunity.*

With the enrollment campaign near the cut-off point and the administrative machinery for medicare largely worked out, HEW officials are girding for the actual operation of the program. Already newspapers and magazines are filled with scare headlines predicting a mammoth crush on hospital facilities when medicare benefits become available next summer. It is not hard to see the source of these prognostications. Many major hospitals have reported a falling off of usual admissions of the elderly in the last few months, and doctors have reported a similar dropping off of office visits. The implication is clear that people are "saving up" their disorders to be treated after insurance payments become available. Other factors besides medical hoarding may also contribute to the expected surge of post-medicare hospitalization. One is the fact that, under the hospital insurance program, individuals will be eligible for care in nursing homes and for home health visits only after they are released from a hospital stay of at least 3 days. It is feared that doctors will be under pressure to order the 3-day hospitalization to give their patients access to the other services. Another is the fact that, by all indices, there is simply an overwhelming volume of unmet medical need. When medicare goes into effect people will inevitably begin seeking the bodily repairs they have been unable to afford for so long.

What form the expected crisis will take is something no official feels able to predict at this point. "The one thing you can say with reasonable certainty," said one HEW official last week, "is that places already experiencing a shortage of facilities—some major teaching hospitals, some rural areas, and some disorganized urban cores—will feel it the worst." But how it will be handled—whether doctors and hospitals will panic and lay down tight rules for admissions, whether patients will become enraged at difficulties in getting doctors' services when and where they want them—is an open question. The Social Security Administration will immediately begin conducting a study of hospital admissions, diagnoses, and other factors, and other agencies and researchers will be looking at the social, medical, and personal impact of the insurance program, but it is clear that there will be a lag in gathering data. And, in any case, data and action are not the same.

What Can the Government Do?

The government's position is not a simple one. Officials know that if—or when—a crisis in medical services develops, they will be blamed for it, and they are doing whatever they can. But the fact is that neither the mandate nor the statutory authority for drastic reforms of the American medical system exist. "How could we have created new health facilities in anticipation of medicare before we had medicare?" asks one HEW official. The situation reflects not a failure of government efforts in the present but the absence of government efforts in the past. It also reflects the planless and fragmented character of American medicine as a whole. "The capability for providing the needed care just isn't there," another official commented, "and it can't be created overnight."

If a shortage in facilities makes medical care a heated public issue—and not all HEW officials would be sorry to see such a development—government proposals will be forthcoming. In the meantime, however, the officials are banking on a number of factors to keep the situation to at least somewhat manageable proportions. One such factor may be widespread enrollment in the medical insurance discussed above. At present, health insurance in the United States is skewed heavily toward hospitalization, and it is difficult to purchase policies covering outpatient services. Medicare's voluntary plan, however, provides precisely that coverage, and the availability of insurance-paid outpatient treatment may lead patients who formerly had to be hospitalized in order to get their benefits to choose less radical forms of service.

Another factor that may affect the hospitalization picture is the development of home health services, which medicare promises to a degree quite beyond the capacity of the present system to provide. Under a special $9-million appropriation passed last October, the

* The Government is asking individuals who have not yet enrolled for medical insurance, or who know of others who have not yet enrolled, to contact the nearest office of the Social Security Administration as quickly as possible.

Public Health Service has been parceling out matching grants to the states to help them develop home nursing services. In addition, the Public Health Service is working with the Office of Economic Opportunity in a major new program of training the poor as health assistants. This project is just getting under way, but it is anticipated that it will reach as many as 10,000 persons within a relatively short time. These individuals would be trained to go into homes and perform the various services that might normally be performed by a member of the family. Medicare also provides full reimbursement to hospitals of the costs of developing new forms of service such as extended-care units or home-visiting programs, and it is hoped that the availability of these funds will encourage institutions to experiment.

It is not likely that any of these programs will be sufficiently developed by 1 July to have a major impact on the immediate situation, but their existence does have long-term implications that may help officials resist what might otherwise be public demand for a one-sweep solution, such as a crash program to add more hospital beds. The administration's pet heart disease, cancer, and stroke program—now known as the PHS Division of Regional Medical Programs—which, after a slow start and some budgetary bad luck, now expects to begin offering regional planning grants by late spring, may play a similar role. Like the development of home health services, the heart, cancer, stroke program will be in no position to affect the availability of beds and the delivery of medical services on 1 July. But, again like the home health services, it does represent the beginning of an effort to rationalize American medicine and provide services that are both medically and economically logical. That, in any event, is the theory with which government officials are now consoling themselves.—ELINOR LANGER

Nuclear Carriers: Studies Convince the Skeptics

Although nuclear-powered submarines have been accorded a secure and important place in the U.S. fleet since the mid-1950's, the Department of Defense is only now committing itself to nuclear propulsion for even the Navy's largest surface combatant—the aircraft carrier. Defense Secretary Robert S. McNamara never has questioned the performance of the Navy's first nuclear surface ships, which are the carrier *Enterprise*, the cruiser *Long Beach*, and the frigates *Bainbridge* and *Truxton*; but until recently he has resisted Navy arguments that the effectiveness of nuclear power justifies its greater cost.

McNamara's approval of a recently disclosed plan to build three new nuclear-powered carriers—with greatly improved reactors—is a revealing example of Pentagon decision-making as well as a step toward the application of a more advanced nuclear technology. The carrier decision points up the advantages, and possibly some of the ambiguities, which can result from relying heavily on systems analysis in determining the military force structure.

The decision involved not merely the question of whether nuclear propulsion should be employed but also a question as to the number of carriers which should be built. The Navy now has 15 carriers regularly assigned an "attack" role—that is, equipped to deliver air strikes against enemy forces. Another nine carriers, usually smaller, older ships which are obsolescent for the attack mission, are assigned to anti-submarine-warfare work.

Carrier task forces, each made up of a carrier, its aircraft, and its escorts (and served by auxiliary vessels such as oilers and ammunition ships), are as basic to the Navy as troop divisions are to the Army. Secretary McNamara, at this time last year, was planning to reduce the number of attack carriers from 15 to 13 by the early 1970's. In his judgment, the reduction would be justified for several reasons: the ships and aircraft being introduced to the fleet were more effective than their predecessors; the carriers had been relieved of their strategic alert mission by Polaris submarines; and land-based aircraft were increasing in numbers, range, and effectiveness.

Although a new carrier, quite possibly nuclear-powered, was to be built under the fiscal 1967 budget, three older carriers later were to be retired from the attack fleet. These decisions were tentative, however, and the Navy—which felt that, if anything, the attack fleet should be larger—was free to try to persuade McNamara to change his mind. But, as it turned out, the decision to reduce the attack fleet was abandoned because of a plan proposed, not by the Navy, but by McNamara's own systems analysts.

The role assigned these analysts never has been narrowly defined. Charles J. Hitch, economist and formerly assistant secretary of defense (comptroller), described that role in *Decision-Making for Defense*, published by the University of California Press last October. "It is my experience that the hardest problems for the systems analyst are not those of analytic techniques," said Hitch. "In fact, the techniques we [used] in the Office of the Secretary of Defense are usually rather simple and old-fashioned. What distinguishes the useful and productive analyst is his ability to formulate (or design) the problem; to choose appropriate objectives; to define the relevant, important environments or situations in which to test the alternatives; to judge the reliability of his cost and other data; and finally, and not least, his ingenuity in inventing new systems or alternatives to evaluate."

Inventiveness was brought to bear on the carrier question. Patrick J. Parker, a 34-year-old economist trained at the University of Chicago, had become interested, while on the staff of the Center for Naval Analysis (CNA) in Washington, in a new concept for carrier operations. Parker saw no reason why a full wing of 70 or more aircraft should be provided for each attack carrier, as is the case at present. Instead of having 15 carriers and 15 air wings,