in detail. Decisions on which group should handle a particular question will be made by a "joint board" made up of equal numbers of members from the two academies.

It is evident that the work of a group like the highway research board, in the NRC, is in the engineering domain, and that recommendations from this board should be approved by competent authorities in the Academy of Engineering. Other matters will not be so clear-cut. Some will require opinions from both academies or, perhaps, joint efforts. It is certainly conceivable that scientists and engineers may differ, and that separate reports may be submitted.

Hope of insuring close cooperation seems to have been the major factor leading to the present tandem arrangement for the two academies rather than independent status for each. Speaking of the decision against setting up a separately chartered engineering academy, Kinzel said, "The main reason, and I might say the sole reason, was that we wanted to do everything possible to avoid creating a barrier between science and engineering, and to do everything possible to eliminate such barriers."

Basic criteria for election of members to NAE, according to the articles, are, (i) "important contributions to engineering theory and practice, including significant contributions to the literature of engineering," and (ii) "demonstration of unusual accomplishments in the pioneering of new and developing fields of technology."

In one way, selection of members for the engineering academy may prove to be inherently more difficult than selection of members for NAS. In the sciences a prime criterion of distinction is publications. In some fields of engineering—electrical engineering, for example—publications provide a reasonably good guide, but in other fields, an engineer must be judged by his visible achievements, such as a bridge.

The committee obviously hopes to insure that members will be highly qualified, distinguished individuals, and to insulate the academy against the corporation logrolling which is apparently influential in some professional engineering societies. Also, managerial talent alone, it seems, will not qualify an engineer for membership in the NAE.

The 25 men on the organizing committee have been made charter members of the new academy, and plans are afoot to expand membership in the academy to about 100, through careful selection over the next several months. Membership then will be increased at a slower rate, to about 300. The National Academy of Sciences now has about 675 members.

Until NAE finds its feet, NAS will continue to pay for studies on engineering now in progress and to house NAE without charge in the Academy building on Constitution Avenue. A new $1-million wing, which has been built with the aid of a National Science Foundation grant and contributions from industry, will provide the space. This togetherness, financial and physical, will, it is hoped, promote a cooperative spirit between the two academies.—JOHN WALSH

Career Awards: No More New Ones Will Be Made under NIH Program

No more new awards will be made under a Public Health Service Program which provides up to $25,000 a year in salary for more than 230 senior investigators in health-related research.

The decision to stop making new awards came at the end of a 6-month moratorium during which PHS–National Institutes of Health officials carefully reviewed the 3-year-old research career program (*Science*, 18 Sept., p. 1283).

Those who now hold career awards will continue to receive support. The most recent count showed 234 investigators at 98 institutions included in the program. Holders of career awards who move to new institutions will lose their grants.

Not affected by the cutoff on career awards are the so-called development awards in the same research career program. These development awards are designed to support younger researchers in the earlier stages of their careers. Development awards have a 10-year maximum, but the career awards are renewable indefinitely so long as the recipient fulfills the terms of the award, which emphasize full-time research.

The cutoff on career awards is attributable partly to a squeeze in fellowship funds caused by a decline in the rate of increase of the federal budget for health research. NIH policy makers have also been seeking ways to strengthen research institutions and have apparently decided that continuously increasing the number of career grants to individuals was not the best way to do it.—J.W.

U.S. Medicine: LBJ Commission on Heart Disease, Cancer and Stroke Offers Sweeping Recommendations

The President's Commission on Heart Disease, Cancer and Stroke, a 28-member panel charged last March with orders to "do something" about the heavy burden of these diseases, issued a report early this month which may dwarf the row over Medicare and be the starting point for this country's most serious debate on the direction of U.S. medicine since Harry Truman proposed a national health plan.

Given the doggedness of organized medicine in opposing so relatively peripheral a federal activity as medical insurance, a group that urges the government to throw itself wholeheartedly into developing centers for the actual care of patients with stroke, cancer, and heart disease will surely be accused of suffering from a fourth disorder, dementia in high places. But the commission, headed by the noted Texas surgeon Michael DeBakey, was established on the radical premise (to quote from Johnson's 1964 Health Message to Congress) that although "the flow of new discoveries, new drugs, and new techniques is impressive and hopeful . . . the American people are not receiving the full benefits of what medical research has already accomplished." (*Science*, 20 Mar.) The commission accepted and amplified this premise. "Every day," its report* states, "men and women are dying who need not die . . . not for lack of scientific knowledge, but for lack of the right care at the right time. Every available fact," the report emphasizes, "points to the same conclusion—that the toll of heart disease, cancer and stroke can be sharply reduced now, in this nation, in this time . . . without further scientific advance."

These statements are more than an implicit rebuke of contemporary medicine for neglecting patients. They are, first, a warning to the profession that the long-lamented schism between academic and clinical medicine has ceased to be a matter of exclusively professional concern and has become a national problem. And they are the starting point for a series of original and comprehensive (and costly) recommendations which, if enacted, would almost certainly produce far-reaching alterations in the character of American medicine.

The core of the commission's report is its proposal for an extensive, national

network for patient care, research, and teaching in the areas of heart disease, cancer, and stroke to be developed over a period of 5 years. At the pinnacle would be 60 regional centers (25 for heart disease, 20 for cancer, and 15 for stroke). These would be modeled to a certain extent on the Clinical Center of the National Institutes of Health, and they would stress fundamental and clinical research, and teaching. Although the centers would handle some patients, their chief function would be to serve as a regional resource for existing medical services. The bulk of the patients would be handled by the second tier of the network, which would be composed of 550 Diagnostic and Treatment Stations, 150 for heart disease, 200 for cancer, 100 for stroke, and 100 for rehabilitation in all three fields. The purpose of the stations, which would be located in existing medical centers or in community hospitals, is twofold: They would bring the latest medical skills and facilities not only to the patients but also to local medical practitioners, who frequently have a hard time keeping up with medical advances.

Supporting these recommendations is a proposal that the government initiate a broad program of support for local health services, from medical schools to community hospitals, to stimulate the formation of coherent medical complexes that would have a mutually reinforcing relationship with the developing national network. The commission also recommended generous institutional development grants to medical schools, to ensure that the chain of complexes would have no weak links. A major purpose of the grants to medical schools would be to provide them with an alternative to their current dependence on research grants, and to help balance the current emphasis on research with attention to patient care.

The price tag for the regional and treatment network alone would come to roughly $124 million the first year, with annual increases raising the figure to more than $350 million by the fifth year. When grants for the medical complexes and for medical-school development are added in, the total for the first year is roughly $152 million. Over the 5-year period, the program as a whole would cost more than $1.630 billion. The bills—including money for construction and money for equipment and staff—would be paid by the federal government, in most cases on a nonmatching basis. While the commission asserts that the treatment stations could be self-supporting in 10 to 15 years, it does not explain why this should be the case. For the other items, it appears to be the intent of the commission that federal underwriting continue.

In a press release accompanying the report, and to a lesser degree in the report itself, the commission takes pains to stress that what it is proposing is not a federal program. Rather, according to the press release, it is to be "a new alliance of all the elemental health resources of the country, public and private, to bring the benefits of medical science concerning heart disease, cancer and stroke to the benefit of all the people. It is to be locally planned, locally run, and locally controlled in each area involved. The normal methods of payment for care," the statement continues, "are not affected, with payment by the patient, third party, or welfare resources as usual. The Federal government's role is that of stimulation and incentive support to supply the catalysis and to assure that the essential nucleus of resource is available around which each area can develop its own program. . . . The commission program . . . is not socialized medicine," the statement asserts with finality, "but an answer to socialized medicine."

Even if it is not "socialized medicine," however, the proposal is so novel that speculation about the probable directions the system might take becomes an important part of weighing its desirability. How long, for example, could this massive federal program stay focused on the three problems of cancer, heart disease, and stroke? The commission recognized that these three diseases could not be considered in isolation, and in addition to its major recommendations for categorical attacks on the three diseases, it also produced broad proposals for strengthening general medical education and general community health service facilities. (These additional programs bring the total cost of its recommendations for the 5-year period up to nearly $3 billion; the government is at present spending about $218 million a year on these activities.) Also, the presence of excellent facilities for treating three diseases is certain to generate demands for equal attention to other diseases. If one member of a family develops cancer and another, multiple sclerosis, why should one receive better treatment than the other? Is it remotely conceivable that the services of a federally built rehabilitation clinic would be available to a stroke victim but denied to the victim of Parkinson's disease? The fact that patients with one disabling disease often develop other ailments also suggests that the government might find itself pressed to support total patient care. It seems probable that the proliferation that occurred with the disease-oriented research institutes at NIH would also occur in the case of the treatment facilities. Whether medical care could be provided without involving the government in the delicate matter of payment is a real question, but one the commission largely ignored.

To what extent federal involvement would bring federal control is uncertain. The commission report is exceedingly weak on spelling out the operational implications of its recommendations, but it is apparent from private conversations that members intend that their plan should strengthen local medical activities, not supplant them. Major authority would probably go to the Public Health Service, an agency determinedly localistic in its attitudes and habits. This would presumably negate the possibility that the network would be run as a series of federal hospitals. Instead, it

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* The Commission report, "A National Program to Conquer Heart Disease, Canacer and Stroke," is currently available free from the President's Commission on Heart Disease, Cancer and Stroke, 330 Independence Ave. SW, Washington 25, D.C. In January it will be obtainable from the Government Printing Office.

The members of the commission, in addition to Chairman DeBakey, were: Samuel Bellet, director, division of cardiology, Philadelphia General Hospital; R. Lee Clark, surgeon-in-chief, Anderson Hospital and Tumor Institute, Houston, Texas; Charles Mayo, professor of surgery, Mayo Clinic; E. M. Papper, professor of anesthesiology, Columbia University; Helen Taussig, professor of pediatrics, Johns Hopkins; Howard Rusk, director, Institute of Physical Medicine and Rehabilitation, New York; Edward Dempsey, dean, Washington University School of Medicine (resigned to become a special asisstant to the Secretary of Health, Education, and Welfare); Hugh Hussey, director of scientific activities, American Medical Association (resigned); Philip Handler, chairman, department of biochemistry, Duke University; John Meyers, chief, department of neurology, Wayne State University; Marion Fay, former president, Women's Medical College of Pennsylvania; Irving S. Wright, professor of clinical medicine, Cornell; Jane Wright, department of surgery, New York University; Barry Bingham, editor and publisher, Louisville *Courier-Journal*; John Carter, editor, *McCall's Magazine*; Marion Folsom, former Secretary of Health, Education, and Welfare; General Alfred Gruenther, retiring president, American Red Cross; James F. Oates, president, Equitable Life Assurance Society, New York; General David Sarnoff, chairman, Radio Corporation of America, New York; Mrs. Harry S. Truman; Emerson Foote, president, McCann-Erickson, Inc., New York; Arthur Hanisch, president, Stuart Company, Pasadena, California; J. Willis Hurst, specialist in internal medicine, and chairman of the department of medicine, Emory University, Atlanta, Georgia; Sidney Farber, pathologist, and director of research, Children's Cancer Research Foundation, Boston; Frank L. Horsfall, president and director, Sloan-Kettering Institute for Cancer Research; W. Paul Sanger, Surgical Consultant to the Surgeon General, U.S. Army; Mrs. Florence Mahoney, co-chairman, National Committee Against Mental Illness.

is likely that the PHS would use its authority to make sure that the regional health planning and community development envisaged in the report actually came about, and presumably it would make evidence of sound cooperative plans a condition for its grants. How the PHS can take over this responsibility is one of the questions left dangling in the commission report, for it already has a reputation of being one of the most overtaxed and least creative of Washington agencies. The commission took note of this problem in a rather genteel fashion and made some cursory recommendations for reform, but an extensive overhaul will be needed if the ideas of the commission are not to get mired down in an ineffective and unassertive bureaucracy.

Even if they did not directly affect American medicine by substituting federal for local control, however, the commission's proposals might have an enormous cumulative impact. If all the proposals were enacted into laws, you might have, for example, a young man going through undergraduate and medical school on federal scholarships, getting post-graduate government grants for clinical experiments as well as for academic research, and ending up at a federal heart center or diagnostic station on a government salary. He would be a new kind of doctor, not too likely to share many of the AMA's present views on the sanctity of medical free enterprise. The implications for each individual may not be too significant. But for the structure of medicine as a whole, the change may be as great as that which has accompanied the growing dependence of the research community on the federal government.

Although the commission report represents many months of patient and hard work on the part of commission members and staff, to a large extent it also appears to represent ideas already held by an influential group of men and women that centers, to a surprising degree, on Mary Lasker. Mrs. Lasker, widow of the wealthy advertising executive and now president of the Albert and Mary Lasker Foundation, which supports medical research, has long been adept at using her political influence to promote an increased role for the government in medical affairs. She was chiefly responsible for pushing the idea of a presidential commission on heart disease, cancer, and stroke from its inception in the Kennedy administration to its fruition under Johnson, and although she herself was not a member of the commission, several individuals who were are known to be either her personal friends or longtime associates. Among these are Florence Mahoney, co-chairman with Mrs. Lasker of the National Committee Against Mental Illness; David Sarnoff, head of RCA; Emerson Foote, president of the advertising firm of McCann-Erickson, and a former associate of Albert Lasker; and several of the medical members of the panel, including chairman DeBakey, Sidney Farber, Irving Wright, and Howard Rusk. Thus, it is not surprising that in a published interview which appeared in a medical affairs magazine several weeks before the issuance of the report, Mrs. Lasker is quoted as saying, "A great deal more should be done clinically to make sure that . . . research gets delivered. There should be more clinical research centers, for example, to deal with the problem of strokes. Dr. DeBakey and others have now given us leads indicating that many strokes can be prevented or cured. I think there should be at least 20 stroke centers around the country, including the VA hospitals, where work is now being done." The article reported that Mrs. Lasker "also advocates setting up cardiac centers in all community hospitals to speed research advances to the people who need them."

What now remains to be seen is whether the influence of the "Laskerites" in creating the commission and shaping its conclusions will extend also to persuading the President to seek its implementation. Johnson's intentions on this score are not yet clear, but his desire to hold the budgetary line and his recently announced desire to have a harmonious administration both work against the likelihood that he will initiate a giant health campaign that is not only costly but certain to be controversial. On the other hand, Johnson is thought to be in sympathy with the main lines of reasoning in the report, and it is thought likely that he will submit at least the more modest of its proposals to Congress, saving the others for some hoped-for moment when cutbacks in defense spending will provide more fiscal flexibility for domestic experimentation. Another possibility, thought by some government officials to be equally likely, is that he will draw up a splashy health package, perhaps fusing the commission recommendations with reports from two health task forces currently at work, and—as he did with his poverty program—permit the Congress to do the hatcheting that is routine on major new programs.

What congressional reaction will be is still too early to predict. The good shepherds of medical affairs—Lister Hill (D–Ala.) in the Senate and John Fogarty (D–R.I.) in the House—are almost certain to be favorably inclined, not only because of their enthusiastic support of nearly every advance in federal responsibility for medical problems but because of their long and fruitful associations with many of the members of the commission, as well as with Mrs. Lasker. It is equally certain, however, that cries of "socialism" will arise from other quarters, and the battle is likely to be a severe one. A hint of the controversy that may be forthcoming is to be found in the fact that Hugh Hussey, director of scientific activities for the American Medical Association, resigned from the commission last summer, reportedly on the ground that he foresaw a conflict of the commission's recommendations with AMA policy. The AMA has declined to make any official comment on the report until it becomes embodied in actual legislative proposals.—ELINOR LANGER

Erratum: Theodosius Dobzhansky, one of the winners of the 1964 National Medal of Science (11 Dec., p. 1445), was erroneously listed as professor at the California Institute of Technology. He is a professor at the Rockefeller Institute, in New York City.

Erratum: In the report "Saturation deficit of the mesophyll evaporating surfaces in a desert halophyte" by P. C. Whiteman and D. Koller (4 Dec., p. 1320), the heading to column 3 of Table 1 should read "Photosynthesis (10^{-2} mg CO_2 min^{-1} g^{-1} leaf dry wt.)."

Erratum: In the article "Man's first encounters with metallurgy" by T. A. Wertime (4 Dec., p. 1257) the interpretation of the kinds of shading used in Table 1 was printed in reverse order. The correct order is (i) Bronze. (ii) Smelting and closed mold casting of copper from ores. (iii) Melting and open mold casting of native copper. (iv) Hammering and annealing of native copper. The shading itself is correct. In Table 3, Tell Asmar was erroneously noted as being in Iran; it is located in Iraq.

Erratum: In T. H. Hamilton's reply to Dawdy's comment-report (20 Nov., p. 1075), the second sentence of paragraph 2) should have read: "That 'linear' line should be labeled $\log \gamma = 1.456$ . . ." instead of "$_{\gamma} = 0.1456$ . . . ."

Erratum: In the article "The hydrated electron" by E. J. Hart (2 Oct., p. 19), reaction 11 (column 1, page 20) was omitted. The ratio for the rates of reactions 9 and 10 was printed twice: correctly in place of reaction 11 and incorrectly in its proper place. The correct version follows:

The ratio for the rates of reactions 9 and 10,

$$k_{e^-_{aq}+H_2O_2}/k_{H+H_2O_2} = 500,$$

attests to the high reactivity of e^-_{aq} compared to H atoms in this reaction.

Among other reactions showing this difference in reactivity is the effect of metal ions such as Fe^{3+} and Cu^{++} on the hydrogen yield in irradiated solutions of methanol (*3*). Hydrogen formed by reaction

$$H + CH_3OH \rightarrow H_2 + \dot{C}H_2OH \qquad (11)$$

is decreased by the addition of Fe^{3+} or Cu^{++} because the reaction

$$e^-_{aq} + Fe^{3+} \rightarrow Fe^{++} \qquad (12)$$

interferes with H-atom-producing reaction 4.