adiabatic calorimeter and to a new level of refinement in the study of heat phenomena.

His career may well be summed up as one which established a new standard of excellence for every task he undertook. Some of his concepts proved to be without lasting significance, and some of his contributions have been superseded by improved approaches. Nevertheless, he left a lasting mark on chemistry as a result of his care, his perseverance, his insights, and, particularly, his humaneness.

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NEWS AND COMMENT

Brussels: In Aftermath of Revolt, a Medical School Works at Reform

Brussels. Last spring, when the French student revolt spilled over into Belgium, the medical school of the University of Brussels was tradition-bound and administratively coagulated in the style of most European institutions of higher learning. Its affairs were effectively in the hands of some 40 all-powerful chairholding professors, who ran their fiefs with unassailable authority, were subject to no review, and were removable by nothing short of imprisonment, retirement, or death. Today, following a year of arduous effort at reform, the medical school—which has 1600 students spread over a 7-year undergraduate and professional program—is still a good distance from escaping its antique past. But the old ways are bending, if not cracking, and the prospect for significant change is fairly bright.

Here and elsewhere in European academic affairs, modernization is overdue by as much as half a century, and, even if accomplished, would probably do no more than bring the affected institutions to the conditions that prevailed at Berkeley, Ann Arbor, and Columbia before they went through *their* crises. But every upheaval must be measured from its own base line, and what is going on in many European universities today is indeed significant in terms of the normal pace of change.

At the Brussels medical school, the academic omnipotents—titled *professeurs ordinaires*, and not to be confused with *professeurs extraordinaires*, who are one notch below in rank, but a great way off in status and power—usually reigned from their positions as chiefs of the school's services, or departments. From these positions, each, if he so chose, exercised complete authority over staff appointments, the educational program, and research activities within his jurisdiction. The office was an august one, commanding a kind of deference that has rarely taken hold in American universities. As a Brussels teacher with extensive experience in the United States remarked, "It's really something to be a professor at Harvard or Berkeley, but still they call you by your first name. Here a professor is in a very elevated position."

Those positions, however, came within range of reform last May when the student uprisings in France inspired similar outbreaks in Belgium, and students and junior teaching staff members moved swiftly to exploit the situation in behalf of long-talked-of changes. Well represented in this movement were researchers who had spent some time in American laboratories, and who saw no reason why their own institution should remain bound up a stifling authoritarian system. "We are closely linked to the United States," one of these researchers explained. "We want to emulate the good things that we saw there." To which he added that, upon returning from a visit to a U.S. research center several years ago, he told his chief that he thought several changes in departmental affairs would be desirable. "He answered me, 'That's a very good idea. Go ahead and make them. But wait about 2 years before you start.' "

Revolutionary Aims

Although the student movement was revolutionary in its origins and objectives, its most immediate effect was to clear the way for those persons whose disaffections could most readily be treated by managerial or organizational changes. And that apparently is the way things worked out in the medical school last spring. With the university's central administration building occupied, and threats forthcoming that the medical school might be next, the ruling professors agreed to establish and delegate power to a Conseil Facultaire de Réforme that would include representatives of all ranks within the school—full professors, lower-ranking teachers,

NEWS IN BRIEF

● **PRESIDENT'S SCIENCE ADVISORY COMMITTEE**: President Nixon on 24 April announced the appointment of five new members to his 19-member President's Science Advisory Committee. The new members, who will serve 4-year terms, are John D. Baldeschwieler, professor of chemistry, Stanford University; Richard L. Garwin, director of the IBM Watson Laboratory, Columbia University; Murray Gell-Mann, professor of theoretical physics, California Institute of Technology; Patrick E. Haggerty, president of Texas Instruments, Inc., Dallas; and Gerald F. Tape, president of the Associated Universities, Inc. The President's Advisory Committee advises the President on a broad range of government issues pertaining to science and technology. Lee A. DuBridge is chairman and Charles P. Slichter of the University of Illinois is vice chairman.

● **FERMI TO BE HONORED**: Atomic Energy Commission (AEC) Chairman Glenn T. Seaborg has said that the AEC plans to name the National Accelerator Laboratory at Batavia, Ill., after the late Enrico Fermi, the physicist who is credited with the first sustained nuclear reaction. The new name, "The Enrico Fermi Laboratory," will not be official until construction is completed and the facility is operating. Completion is scheduled for 1972.

● **NSF SPENDING CEILING**: The National Science Foundation announced on 5 May that it will impose expenditure ceilings on some 150 institutions during fiscal year 1970. The institutions that will be affected are those whose expenditures from NSF funds are expected to exceed $500,000 during the year. Specific ceilings will be transmitted to these institutions by mid-June. In some respects, the new plan for spending limitations seems milder than the one that was put into effect during the current fiscal year. For one thing, the new plan affects only about 150 institutions, whereas the old plan imposed ceilings on some 500 institutions whose annual NSF expenditures exceeded $50,000 apiece. For another thing, knowledgeable officials don't expect that the percentage reduction required under the new plan will be quite as high as that required under the old. The new plan specifically exempts various summer programs, traineeships, and individual fellowships and travel awards from the expenditure ceilings. But there may be worse news ahead. The new ceilings are merely intended to keep spending within the limits specified for NSF in the Johnson and Nixon budgets. If Congress imposes a further mandatory spending reduction, as seems likely, NSF may have to revise its plans and tighten up even more.

● **SHOCKLEY PROPOSAL TABLED**: The National Academy of Sciences (NAS) in an almost unanimous decision voted to table a proposal to urge an expanded study of heredity aspects of national human quality. The proposal was made at the annual NAS meeting in Washington by Nobelist William Shockley, a professor of physics at Stanford University. Shockley, who has previously presented the proposal at two other NAS annual meetings, refers to a recent paper by Arthur R. Jensen of the University of California in the winter issue of the Harvard Educational Review, in which Jensen suggests intelligence may be determined largely by heredity and may not be altered significantly by improving environment. In clarifying the Academy's position, NAS President Frederick Seitz said, "There is a strong feeling within the Academy that social inequities make it impossible to do reasonable scientific research in this area. . . . In addition, the conduct of such research at the present would tend to heighten current social tensions to a very destructive degree."

● **SCIENTISTS' SALARIES**: A National Science Foundation (NSF) report shows that the median annual salary of U.S. scientists in 1968 was about $13,200, about 10 percent higher than in 1966. The NSF report, based on the responses of nearly 300,000 scientists to NSF's National Register, also shows that self-employed scientists earned the highest median salary, $18,000, while scientists employed by industry or by nonprofit organizations were at the $14,700 level, and university scientists paid on an academic year basis, had a median salary of $11,000. The report indicates that 10 percent of all scientists earned more than $21,500, and 10 percent earned less than $8,500.

researchers, students, technicians, and nurses. At the same time, it was agreed that, pending completion of the group's work, voting rights on academic affairs would be extended to the 120 or so teaching staff members below the top-ranking professorial level.

Concessions to Reform

It is generally felt that the spread of the franchise has not produced any significant effects, but, while fundamental reforms were being worked out by the Conseil, the move served to symbolize the fact that the *professeurs ordinaires* no longer were in their traditionally unchallengeable position. And, as a further concession to reform, the university agreed to proceed with plans for an outpatient clinic, which was a long-sought-for objective of young faculty members who regarded such a facility as an essential part of designs for a community health program—still another new departure for the medical school. "There is not the slightest doubt," says one of the planners of the clinic, "that, without the events of last May, we would have got absolutely nowhere in our attempts to get started on this project."

Nevertheless, if deep-down changes are to come about, they will have to come out of the work of the Conseil, for that body was charged with the basic task of redistributing the day-to-day control that traditionally had been held almost exclusively by the top-ranking professors. Whether such changes are actually going to take place is now the critical question, for the Conseil, after months of deliberations and widespread consultations with medical school authorities in Belgium and abroad, has at last agreed upon a new design for running the school—and, predictably, some of the senior staff is balking.

The proposals, which were completed in mid-March, look tame from an American perspective. But there is no doubt that they cut right through to the center of the problem—the stranglehold that a relatively few people have been able to exercise over the school's basic affairs, with the result that curriculum reform, coordination of teaching programs, and the introduction of new equipment and techniques are matters of individual preference rather than an attempt to run the school as a whole. Thus, in stating that there should be no necessary connection between functions and titles,

the Conseil struck at the practice by which chairholders, regardless of their competence or the demands on their time, automatically are the chiefs of all activities within their domain. In fact, many of them delegate responsibility to their subordinates, but, under such circumstances, credit, blame, and authority can be difficult to work out; also there are many instances in which a professor chooses to behave as though he knows best when it comes to teaching students, running a research program, and conducting a medical service. Within his jurisdiction, all three are his to command if he so chooses, and there are those who do. Another of the recommendations of the Conseil states that the occupant of a position should be competent to perform the work that is required—a stipulation that conveys some idea of the reformers' assessment of the present state of affairs. Striking again at the dominance of the professors, the Conseil recommends that no individual shall be at the head of more than two major activities. To govern the school, it proposes that a legislative body of 67 be elected, of whom 25 would be from the upper

M.I.T. Reviews Its Military Research Policies

Massachusetts Institute of Technology (M.I.T.), which currently receives more Defense funds for research activities than any other university, is reviewing the relationship of two special laboratories that conduct classified research activities to the institution as a whole. In the meantime, M.I.T. has declared a moratorium on all new classified research programs at the two laboratories. Work in progress will continue.

The M.I.T. hold on new classified research applies to the Lincoln Laboratory and the Instrumentation Laboratory, two independent facilities which M.I.T. administers. The laboratories conduct research and development under Defense Department and National Space and Aeronautics Administration contracts, which total more than $115 million annually.

Sources at M.I.T. say that the move to examine its policy on conducting classified and other military research was sparked in part by the March 4th research stoppage (see *Science*, 14 March 1969) and by recent queries by a radical student group, the Science Action Coordinating Committee, concerning M.I.T.'s ties to the Pentagon. The research ban, which could remain in effect until 1 October, does not affect the present research programs at the laboratories. The ban merely gives M.I.T. time to review its policy for the future in regard to classified research contracts and other activities of the laboratories.

The 22-member investigation panel, which consists of trustees, students, faculty, alumni, and laboratory staff members, was selected, for the most part, by M.I.T. president Howard Johnson. It includes Frank Press, head of M.I.T.'s department of earth and planetary sciences; David G. Hoag, associate director of the Instrumentation Laboratory; Eugene Skolnikoff, M.I.T. professor of political science; Victor Weisskopf, head of the physics department; and Noam Chomsky, professor of linguistics. An essential purpose of the committee is to examine the relationship of the laboratories and their current and future research programs to M.I.T.'s on-campus research and education programs in general. Johnson has asked the panel to make a preliminary report to M.I.T. by 31 May and a final report by 1 October. Panel chairman William Pounds says he is optimistic that the final report may be well underway by 31 May.

M.I.T. officials say that about half the research done at the two laboratories is classified. The Instrumentation Laboratory, located in Cambridge on the fringe of the M.I.T. campus, conducts research and development programs in guidance, navigation, and control systems. In the past, the Instrumentation Laboratory helped develop instrumentation for the Polaris missile system; it is now working on a guidance system for MIRV (Multiple independent reentry vehicles) warheads for United States missile systems. M.I.T.'s involvement in the Poseidon project has raised considerable controversy among radical students. The Lincoln Laboratory, with its main facilities in Lexington, Massachusetts, does research and development in such areas as radar and communications systems, solid-state physics, reentry physics, military satellite communications, and data processing. It has been making specific missile-detection studies related to development of the ABM (the antiballistic missile)—also a sore point among radical students.

The Lincoln and Instrumentation laboratories, which university officials insist are "off campus," nevertheless enjoy a close relationship to M.I.T. The laboratories are not regarded as an official part of the academic framework of the university, but both are administered by an M.I.T. vice president, and laboratory staff members are on the university payroll. With a few exceptions, most of the 3600 laboratory employees are not members of the M.I.T. faculty, but laboratory directors Charles S. Draper of the Instrumentation Laboratory and Milton U. Clauser of Lincoln Laboratory are M.I.T. professors. There are, in all, seven M.I.T. faculty members at the Instrumentation Laboratory and three faculty members at Lincoln. M.I.T. graduate students are also involved. Twenty-one graduate students do academic work and serve as research assistants at Lincoln, and 17 conduct research at the Instrumentation Laboratory. Last year, 37 doctoral theses were completed by graduate students at both of the laboratories.

A recent annual report (1967–68) shows that the laboratories are highly dependent on Defense Department funding. Last year Lincoln laboratory had a total annual budget of $65 million, almost all of which came from the Department of Defense. The Instrumentation Laboratory's total annual budget was $50 million, of which $30 million was supplied by the Pentagon and $20 million by NASA. For the university itself, exclusive of the two special laboratories, total funding last year for on-campus research was $55.8 million. About a third of this amount was supplied by the Department of Defense. University officials say that none of this research was classified.

—MARTI MUELLER

ranks of the teaching staff; 9 would be chosen by the junior teachers; 12, by the students, and the remainder, by the various other groups that are employed by, or associated with, the medical school. These 67, in turn, would elect a governing body of 7. Membership in this group, however, would be limited to the teaching and research staff, a provision which led one reform-minded, middle-ranking researcher to comment, "The colonels were strong enough to take it away from the generals, but the privates didn't get very much."

The process of consultation on the proposed reforms is an elaborate one, and currently it is in the stage of referral back to the constituent groups whose representatives sit on the Conseil. So far, approval has been voted by all the groups that have considered the matter, with one exception: the teaching staff. Meeting in closed session on 16 March, it deliberated at length but decided to go no further than simply acknowledging receipt of the recommendations and describing them as a good point of departure for further negotiations; this means, of course, that some of the senior professors are gagging at the prospect of power being dispersed to the lower ranks. In particular, it appears, they do not like the idea of limiting the number of activities that a man may head; nor do they like the idea of having their representation in the legislative body limited to 25. Furthermore, objections were raised to students having any vote at all. And, finally, there were those who opposed the idea that anyone interested in the various medical activities that are now being reviewed by special reform committees should have an opportunity to make his views known to these committees. At the end of their meeting, the teaching staff agreed to meet again in 2 weeks to reconsider the proposals.

At this point it is apparent that the old ways are no longer viable, but they do constitute a defense in depth that remains formidable. Thus, middle-ranking teachers and researchers, though in the vanguard of the reform movement, tend to see less evil in the chair system as they get closer to becoming occupants. In this sense they are not unlike the congressman who said that, when first elected, he was opposed to the seniority system, but that the longer he remained in office, the more merit he saw in it. A visitor is repeatedly told that it is impossible to overestimate the role tradition plays in determining academic affairs. It is also repeatedly pointed out that the proposed changes are far from radical. "They are not at all revolutionary," one researcher remarked. "It is just that they are long overdue. What is revolutionary is that people are at last talking about change."

The students, it was noted by one staff member, have been quiet over the past few months. "Yes," another remarked, "they have been altogether too inactive. We're going to need them again if the reforms do not go through."—D. S. GREENBERG

ABM: Scientists Are Important in Building Senate Opposition

"In opposing the ABM, the scientific community has come into its own as a political force," asserts a leading aide to the Senate Foreign Relations Committee; "this is science's most golden, glorious hour."

Whether or not one agrees with the interpretation that opposition to the anti-ballistic missile (ABM) system marks a "glorious hour," it is apparent that scientists have played a significant part in convincing many congressmen that they should vote against ABM deployment when it comes to a vote in the next few weeks. At present, opposition to ABM seems much more pronounced in the Senate than in the House. Many Senate observers are convinced that the Senate will vote against ABM deployment by a fairly narrow margin, unless the international situation changes greatly or unless President Nixon adopts more persuasive arguments.

A somewhat dramatic demonstration of opposition to ABM deployment among the scientists was held on 30 April when about 100 physicists in Washington for the American Physical Society (APS) meeting staged a 1.7-mile anti-ABM protest march from their hotel to the White House. There they were joined by more than 100 less physically active activists, who had made the journey by bus. The physicists, most of whom were university teachers, marched in front of the White House for a few minutes, while some of the leaders chanted "Stop ABM, stop ABM." For many of the marchers, including organizers Tom Kirk of Harvard and David Nygren of Columbia, the march was their first political action. Several of the participants said that, in their knowledge, it was the first political march ever conducted by a group of scientists. Five members of the group went to meet with Presidential science adviser Lee A. DuBridge to present a petition signed by 1100 physicists urging that plans to deploy the Safeguard ABM system be withdrawn. DuBridge told the group that he would present the petition to Nixon.

The walk to the White House was an outgrowth of the activities of Scientists for Social and Political Action, a 500-member group formed at the February meeting of the APS in New York. During last week's Washington meeting of the APS, delegations from Scientists for Social and Political Action met with senators or senators' aides in 63 senatorial offices to deliver anti-ABM petitions signed by 1100 physicists. The groups also conveyed the results of a poll of 1216 physicists taken on 29 April at the APS meeting. In this poll, 21 percent of the physicists supported Safeguard ABM, 76 percent opposed it, and 3 percent had no opinion. The poll was taken after more than 2000 physicists jammed a hotel ballroom to hear Eugene P. Wigner of Princeton and Donald C. Brennan of the Hudson Institute argue for ABM deployment, and Hans A. Bethe of Cornell and George W. Rathjens of M.I.T. argue against it.

The purpose of the march on the White House was not so much to persuade the government to delay ABM as to demonstrate to the public that many scientists were ABM opponents. The march was carried out in an emi-