Research Climate in Italy

Rome. Italian scientists seeking an improved climate for research find themselves more pessimistic than usual in the summer of 1964. They feel that they require strong action by the national government to break up fossilized structures in the universities and to streamline administrative laws hampering the conduct of research.

But the government has just been reconstituted after a crisis, and proposed changes in the administrative laws have been held up. Far from being abolished, these laws have been used to prosecute several leading scientist-administrators, and scientists fear that the consequences will seriously harm research efforts in atomic energy and fundamental biology. It is in just these areas that Italian scientists have sought to break through traditional restrictions.

The Italian government has greatly increased scientific budgets in recent years and is beginning to balance its support for basic physics and atomic energy development with appropriations for other fields. Much of the new money, however, passes through the National Research Council (CNR), a body dominated by university professors who have their own institutes. Many of these professors, the dissidents argue, are out of touch with current research.

The fundamental problem, in the view of the dissident scientists, is a kind of quagmire in the universities. There, all intellectual activity is dominated by the professors, one to an institute, many of whom are less interested in intellectual advance than in maintaining a kind of baronial independence. Many of these institutes, it is argued, are too small to do effective research, despite CNR grants to the institutes, a large program of tacking "study centers" onto such institutes, and grants to researchers scattered over the country who cooperate as a team on a specific problem. It is argued passionately that young men must leave, frequently for America, to get out from under second-rate professors, to seek new equipment, to move to centers where significant work is done.

The arrests and prosecutions of the atomic energy and biological research executives have led to more immediate problems.

The story is tangled and emotional, and Italian scientists themselves, to say nothing of foreign observers, have found it difficult to unravel. But the following sequence of events seems clear enough.

In the summer of 1963, Felice Ippolito, geology professor of the university of Naples and chief administrator of the Italian atomic energy agency (CNEN), was arrested on charges of misappropriating funds and awarding consultation contracts to a firm in which his father had an interest. The prosecution of Ippolito was demanded by Giuseppe Saragat, a leading socialist who has since become foreign minister in Italy's ruling center-left coalition. An element in the resultant prosecution was Ippolito's unsuccessful attempt to take a leading role in the newly nationalized Italian electric power industry. Ippolito's trial began in June 1964 and stretched through July. He has received support from a large number of witnesses. One of the supporting witnesses was Edoardo Amaldi, who heads the national institute of nuclear physics, a consortium of physics departments in Italy that serves as the basic research arm of CNEN, and who played a leading role in founding Europe's space research cooperative.

In the spring of this year, Giordano Giacomello and Domenico Marotta, the present and former directors of the national public health institute (Istituto Superiore di Sanità), were arrested with a number of other administrators on charges of misappropriating funds. The main item in the charges against them was the fact that certain research arms of the institute (including the laboratories of Nobel prize winners E. B. Chain and Daniele Bovet) were established by presidential decree only, not by statute, and only as consulting groups. Hence it was held to be illegal to grant them money and to allow institute members to work on the laboratory projects.

One result of the scandal at the Instituto Superiore di Sanità has been a freezing, since March, of grants from the U.S. Department of Agriculture to a food-preservation research project and from the National Institutes of Health for research conducted by Chain and Bovet's groups. The Italian government maintains that the money was not routed through the national treasury, as required by law.

The Italian government also objects to the fact that parts of the grants were used to pay salaries to people who already received salaries from the government. The American grantors had been assured that they were paying not for Italian government time but for the workers' own time. It is possible that some of the National Institutes of Health money was used for overhead expenses, a use not permitted in NIH overseas grants. The Americans have therefore asked for a look at the books of the Sanità, but the official who knows most about the accounts is among the accused, and he refuses, on advice of counsel, to have anything to do with the books. Despite the complexities, there seems to have been no loss of temper by either the Americans or the Italians. It is clear that further American grants in Italy are up in the air until the current difficulties are resolved.

An element in the prosecution of Marotta was lingering dislike of his firmness—or autocratic behavior, depending on one's point of view—during his 26 years (1935–1961) as director, years during which he built up the Sanità as a national health control institute and then added a large program of basic medical research. There were

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many who criticized Marotta as a director of research and said that he was more interested in constructing the giant complex of buildings along the Viale Regina Elena near the University of Rome, or in assembling a large staff (ultimately 1000), than in hiring top-notch men and creating a free climate in which they could work.

There was also a political element in the prosecution. Reviving charges made 2 years earlier at about the time of Marotta's retirement, two Communist deputies in Parliament demanded an investigation of the Sanità in the fall of 1963. This was something of a surprise, since the Communist party of Italy usually does all it can to appeal to scientists and other intellectuals. It was felt that perhaps the Communists sought to punish the ruling Christian Democratic party for putting politically committed men in charge of technical agencies. While Marotta had maneuvered shrewdly in the maze of Italian politics, he had been a nonparty man. Giacomello was friendly to the Christian Democrats. Another possibility was that the demands for an investigation at the Sanità were some kind of complex Communist response to the prosecution of Ippolito.

In Defense of Marotta

When Marotta was taken to jail in handcuffs in April (he is 78 and in bad health), there was a shower of protest. Prominent scientists, usually cynical about any major official, called the charges against Marotta "absurd." One said, "Given the archaic character of the administrative laws of the Italian state, all directors of institutes inside and outside the universities are obliged to act this way. This is well known and tolerated by the central authorities." It was pointed out that every act of Marotta's had been cleared by officials of the Court of Accountability.

One scientist anonymously commented to Raymond Millet of the Paris newspaper *Le Figaro*:

> The regulation of accountability of agencies of the state rests today in Italy on legislation which is behind the times. In matters of administration the laws do not permit the development of research except by methods which do not always appear strictly orthodox and which can involve, for example, carrying in one chapter of a budget expenses that were really made for other purposes. Taking account of these facts, one still feels that in the present situation there are large ambiguities in the facts and the law. The accusations do not touch in any way the personal morality or the reputation for rectitude and uprightness of Professor Marotta and his colleagues. . . . The impression results that the measures taken against Professor Marotta are more severe than warranted.

Bovet wrote in anger about the situation, and the *Times* of London (1 May) described his remarks this way:

> Professor Bovet recently wrote that almost all true researchers in state organizations were guilty of more or less big, though formal, crimes against the Administration; and that any subordinate "now has to hand the instrument necessary to make his superior tremble." The finest scientists working in the state laboratory, those on whom the best hopes were pinned, were anxiously trying to leave them—"so fragile in structure that a gust of wind from one part of the press or of parliament can destroy them"—and to find work elsewhere, preferably outside Italy.
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> Coming from him, this judgment is bitter because he is known to place much value on state participation in research. Moreover, this crisis has arrived at a time when the demand for scientists from private industry has slackened as a result of difficulties in the Italian economy. The almost whimsical side of the sorry story is that the state institutions have the money for research; it is just that they will now be afraid to use it and will presumably lose their best brains.

Among other protests, the faculty of sciences of the University of Rome passed a unanimous resolution deploring what had happened and called on Prime Minister Aldo Moro to assure efficient administration of scientific institutes so that their directors would no longer need to choose "between an eventual paralysis of research activities and the risk of falling into a state of blame."

A nationwide group of 72 professors, including Chain, Bovet, and chemist Giulio Natta, another Nobel prize winner, sent Moro a statement praising the "spirit of sacrifice" of researchers like Giacomello and Marotta, complaining of prosecutions which would stifle "all initiative," and urging administrative reform. More than 400 researchers at the Sanità signed a document backing Marotta and sent it to President Antonio Segni.

The situation also roused the minister of research in Moro's own government. Socialist Senator Carlo Arnaudi, professor of microbiology in the University of Milan and discoverer of certain steroid-conversion processes in microorganisms, wrote Moro an open letter calling for administrative reform.

Although the prosecution of Marotta and Giacomello and the others proceeded, Marotta was allowed to go home pending trial in the fall. The minister of health drafted a law to give the Sanità a statutory underpinning and independence.

The confusion worsened, however, when the center-left government of Moro was defeated 26 June on a vote to add a slight amount to the state's aid to Catholic schools. The real issue was months of disagreement and deadlock over the relative importance of social reform or of retrenchment in the face of inflation and recession. At the end of 4 weeks, Socialist leader Pietro Nenni was able to get agreement from his party for immediate action on retrenchment. The reformist editor of the socialist newspaper *Avanti* resigned. Reformists glumly commented that the center-left coalition was pulling the socialists' teeth. Although the basic problems of the coalition remained unresolved, the only alternative to another coalition was a new election for Parliament, which was elected as recently as 1963 for a term ending in 1968. The Communists made gains in 1963 and could look for more this fall.

The crisis had an immediate impact on the Sanità. The minister of health had kept more than 300 employees on the staff on his personal responsibility pending passage of the new law. But he could not keep them beyond 1 July during the crisis, so they were discharged. Among those let go were Bovet's own secretary and a number of employees of the sterilizer room.

The disorder in the institute's affairs had its bizarre elements. Now that Giacomello is suspended, biochemist Giovambattista Marini-Bettolo is acting, much against his will, as director. He has insisted that a lawyer be at his elbow, clearing every action. During the investigation of the institute, which Giacomello permitted although legally he did not have to, it was found that there was no legal authority for having laboratory coats laundered at state expense. There was talk for a while of collecting back laundry charges from staff members as illegal salary supplements. Before the arrests, a computer had been purchased for the Sanità's physics department under Mario Ageno, but no money had been appropriated for the monthly maintenance charge of about $700 called for in the purchase contract. Ageno had to pay the money on his own responsibility for 5 months until a committee could be assembled to approve the expenditure. At last re-

port the committee had approved future appropriations but was still considering the matter of Ageno's previous expenditures.

Impact on Science Administrators

The prosecutions in the atomic energy and health research establishments have created something like panic among science administrators in Italy. The leaders of the National Research Council, which makes grants to all branches of science and the humanities, fear that they, too, will be prosecuted.

This fear has led President Giovanni Polvani, a retired professor of experimental physics at the University of Milan, and his colleagues to crack down on the most unusual laboratory supported by the CNR, the International Laboratory of Genetics and Biophysics, in Naples.

In 1962, with the strong backing of Polvani and of the minister of industry and commerce, Giuseppe Medici, the laboratory was established in temporary buildings on CNR land beside a stadium in the Campi Flegrei section west of Naples. The southern location was chosen in part because of the Italian government's stress on developing the south, and not particularly because of the proximity of the marine biological station of Naples.

Chosen to head the institute was Adriano Buzzati-Traverso, a professor of genetics at the University of Pavia, near Milan. Buzzati, who was head of the genetics division of the Scripps Institution of Oceanography for 5 years in the 1950's, is a leader in the newly formed European Molecular Biology Organization. Buzzati has made a second career of writing popularly—and at times caustically—about science, in Italian newspapers.

To guarantee independence, a democratic form of organization within the laboratory, and attractive salary scales, the laboratory was given a special organization. It was set up by a complex contract among the CNR, the atomic energy agency, and the nuclear energy development organization of the Common Market countries (Euratom). The three entities guaranteed a total of $3 million over 5 years. The contract named Buzzati as director. The contract provided for independent research groups and for wide membership in the "scientific directorate" of the laboratory. This "scientific directorate" could name the director and two vice directors. An Italian administrative committee had certain authority, and so did a joint Italian-Euratom committee. A scientific advisory board, three-quarters foreign, was set up.

Within generous limits, the directorate and director had authority to buy equipment and chemicals and to hire researchers, secretaries, and technicians. The laboratory was permitted to use the swift purchasing methods of CNEN. Hence, laboratory chemicals could be purchased in bulk and paid for at once to take advantage of discounts.

The laboratory established six groups in Naples: biophysics of bacterial viruses (under Franco Graziosi, a vice director); genetics of bacterial viruses (Enrico Calef); biochemistry of the nervous system (Antonio Giuditta); oncogenic viruses (G. Di Mayorca); biochemical genetics (Corrado Baglioni); and biochemistry of nucleic acids (Edourdo Scarano, a vice director). In Pavia two other units were joined to the laboratory: animal genetics (L. L. Cavalli-Sforza) and mammalian cells in vitro (L. De Carli).

Buzzati began putting the laboratory on the map by getting noted scientists for his advisory board: Alexander Hollaender of Oak Ridge National Laboratory; Renato Dulbecco of the Salk Institute; Joshua Lederberg of Stanford; S. E. Luria of M.I.T.; Roger Revelle of the Center for Population Studies at Harvard; Hans Friedrich-Freksa of the Max Planck Institute for Virus Research in Tuebingen; C. H. Waddington of Edinburgh; Sidney Brenner of the Laboratory of Molecular Biology at Cambridge; and François Jacob of the Institut Pasteur. Then he invited a number of scientists to come to Naples to give seminars. In the fall of 1963 Edouard Kellenberger of the University of Geneva led a course in experiments with bacteriophage, which will be repeated in September under the direction of S. P. Champe of Purdue. C. H. Waddington gave a course on embryology and epigenetics last April. Researchers like Jean Brachet were invited for stays of 6 months.

But when all of Ippolito's actions at CNEN came into question late in 1963, Polvani and the CNR grasped the reins. Rapid purchases came to an end. Authorization was refused for a number of secretaries and technicians hired in January. Construction on an animal house was stopped. Movement of the library to new rooms was delayed. For lack of a staircase, the laboratory's mess hall could not be used. The laboratory's temporary buildings, now crammed with new equipment (including at least three Spinco L-50 preparative centrifuges and one Spinco-Beckman analytic centrifuge), appeared inadequate.

In early May the laboratory leaders sent telegrams to the prime minister and other ministers concerned with science asking for a decision on whether the laboratory should be closed. The leaders asked formally for a return of administration to Naples. In early June, Polvani wired Buzzati to say that CNR had reviewed the whole salary picture for the laboratory's new contract year beginning 1 July (in which its budget, with supplements, would be $1 million) and had noticed proposed changes in salaries. As required by law, Polvani said, the whole matter had been sent to the prime minister's staff for review. Doubting that the prime minister's staff would act by 1 July, Buzzati and his two vice directors, Scarano and Graziosi, decided to resign in protest.

They resigned 18 June, and simultaneously issued a press release to all major Italian papers charging Polvani and other CNR leaders with a lack of courage and charging that their actions threatened the existence of the laboratory. Polvani replied angrily with a public charge that Buzzati was just after a raise. But he also gave authorization for the recently hired staff. As Buzzati's supporters in the government prepared to intervene, the Moro cabinet fell. Polvani discovered that, by a quirk in the contract, one of the administrative boards had gone out of office 30 June. With the CNEN in limbo because of the charges against Ippolito, Polvani felt free to accept the resignations and named Cavalli-Sforza (who had stayed clear of much of the quarrel) as temporary director. Pending a review of the matter, Buzzati left to attend a number of international congresses. The laboratory's work continued calmly, even though its ultimate future was in doubt.

The sequence of events is fairly clear. The result of these events is also fairly clear: the future of several of Italy's most vigorous research programs is in jeopardy.

A Brighter Side

It remains to ask if there are any encouraging elements in the situation. Perhaps surprisingly, some public officials see a bright side. They are Senator Arnaudi, the minister for science in the old and new center-left coalitions,

and Franco Maria Malfatti, the parliamentary secretary of the ministry of industry under Medici.

Arnaudi, who is now essentially a minister without portfolio, occupies a small set of offices in Rome in the Palazzo della Minerva near the Pantheon. There, he develops plans for a small coordinating ministry rather than for any large collection of scientific agencies. He knows that the ministry of industry, which is responsible for the atomic energy effort, and the ministry of health, which is responsible for medical research, would resist any takeover by a science ministry.

In an interview he acknowledged that total Italian private and public spending on research and development is a shade under $200 million a year, or 0.6 percent of the country's gross national product. This is less than a quarter of the present percentage in the United States and Britain, and less than half that in France and Germany. He acknowledged that fiscal and tax policies, which limit revenue, make new money for science hard to find. He noted that Italian laboratories usually have only one and a half technicians per researcher, instead of the three per researcher in the United States and the Soviet Union. He spoke of overcrowding in the universities and overdominance by professors. Research efforts like those of CNEN, the Sanità, and the genetics laboratory in Naples had all arisen *ad hoc*, and their legal positions were not clear.

The major needs, said Arnaudi, were to pass laws giving research a sound legal footing and guaranteeing intellectual freedom.

Like Malfatti, he pointed to recent positive developments. He said that the declaration of support for research made by Moro in December 1963 was the first of its kind to be included in the program of a new government. He noted that laws had been drafted to give his ministry some powers and to regularize the position of the Sanità, and that Pasquale Saraceno had recently drafted a plan for Italy to raise its spending for science to 1.1 percent of the gross national product by 1969.

In the short run, Arnaudi said, he was pessimistic because the managerial class of Italy failed to see the social importance of science. He hoped that Italian managers would learn a lesson from their American counterparts. In the long run, Arnaudi added, he was optimistic because he thought the younger researchers were ready to change the present situation drastically.

Malfatti is a Christian Democrat who helped organize a large conference on scientific policy held in Rome in December 1961 [recently summarized in *Minerva,* **2**, No. 2 (1964)]. He regarded this conference as the beginning of serious debate on science policy in Italy.

Such discussion should be regular, not episodic, Malfatti said. He was encouraged by the decision of CNR president Polvani to give an annual report on the state of research in Italy. He hoped that the budget law would be revised to include a special section in each agency's budget for research costs.

Malfatti said he had formed a committee to consider reforms in the experimental stations of the ministry of industry as part of an effort to improve applied research in Italy. Government research contracts with industry and tax cuts on research funds are being considered.

In the universities, Malfatti said, the chief problem is to get around the feudal attitudes described in 1961 by William V. Consolazio [*Science* **133**, 1892 (1961)]. He contrasted the "vigorous competitiveness" of the American academic structure with the "sclerotic" situation in Italy. But he felt that much reform could be made under Italy's present legislation. Like Arnaudi, Malfatti spoke admiringly of the new fundamental biology laboratory in Naples. Both men were optimistic that the difficulties there would be resolved. They agreed that the laboratory was a vital example for the future of Italian research.

—VICTOR K. MCELHENY