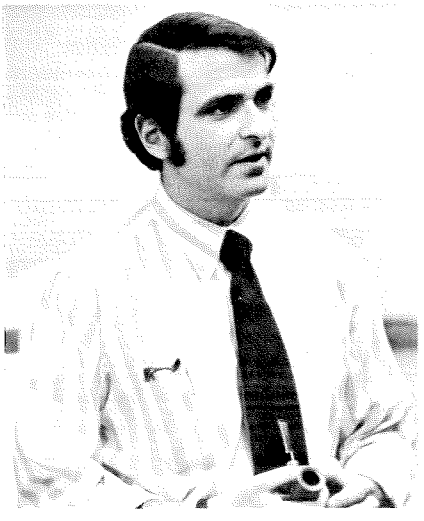
The Italian Connection

by DAVID L. GOODSTEIN

A Caltech physicist finds an unexpected island of tranquility in the tumultuous sea of Italian university life



David Goodstein, professor of physics and applied physics at Caltech, made his first trip to Italy in 1967, when he spent a postdoctoral year at the University of Rome as a National Science Foundation Fellow. That was the year (February 1968) when Italian students at the University carried out the first of the "occupations" that have plagued Italian universities ever since.

On a number of subsequent trips to Italy, as a visiting scientist at the Frascati National Laboratory, Goodstein has had an opportunity to observe the continued erosion of the Italian university system. Last summer, at the Free University of Trent, he saw the first ray of hope for the future. This account of his discovery has been adapted from an article prepared for an Italian journal.

In the tiny village of Povo on the hillside above Trent, a lovely little city in the Italian Dolomites, there is a building—converted from a hotel school—that houses the Institute of Mathematics and Physics for the Free University of Trent. It is a small operation: 10 full professors, perhaps 60 other postgraduate academic personnel, and 500 students. Begun in 1972, its newness is obvious in the clean, bare walls, the still uncluttered and unfinished laboratories. One can sense an air of seriousness and purpose in the classrooms, in the library, and in the laboratories. To the visitor it seems an unexpected island of tranquility in the tumultuous sea of Italian university life. Its existence is so surprising that it prompts speculation on its prospects in the Italian university system.

The Italian system, like Italy itself, staggers under the weight of its traditions, but is also sustained by them. With virtually no visible means of support, Italy's balance sheets perennially spell disaster. Viewed from the outside, it seems a country forever poised at the edge of chaos, but chaos never quite comes. There is something in the Italian genius that cannot be accounted for on the balance sheets.

There are, of course, real problems both for Italy and for her universities. Ten years ago, the Institute of Physics at the University of Rome was similar to the physics department at any good American state university. There were differences, certainly, such as the small number of full professors and the excessive power concentrated in their hands, but learning went on, and young people came up through the system, learned to be physicists, and produced scientific research that was usually competent, sometimes brilliant.

But those years were the now famous 1960s, and life was not to remain tranquil. In February of 1968, to apply pressure on behalf of legislative university reform, the Institute of Physics was "occupied" by a group of students, with sympathetic support from many of the younger postgraduate personnel.

Such "occupations" were not unprecedented at Rome. In fact, like everything else in Italy, they had a history that carried with it traditions, rituals, even courtesies. The student occupiers, meeting under a banner that proclaimed "Down with Bureaucracy," soon organized a bureaucracy every bit as subtle and complicated as the one they had replaced. It was decided that the occupation would stop all teaching activities, but not research. These were, after all, physics students, who knew the value of research. Thus one could enter and leave the building on research business but not on didactic business. Needless to say, decisions were appealed, meetings were called, influence was used. It was all very Italian, the scenario for a funny movie.

During the ensuing ten years of sporadic occupations, disruption of the normal routine has become the normal routine. The students, or nonstudents, who formed the nucleus of the protesters seemed to become, as time went

on, increasingly stubborn and intransigent, and less sensitive to those traditions and courtesies that made the earlier occupations seem almost friendly. Now nearly everyone has grown tired of the situation, and the professors and their assistants seem less afraid of being called (to put it delicately) insufficiently leftist if they stand up to the protesters.

In the meantime, a provisional university reform law has been passed. Academic salaries and the number of professorships have been increased drastically. In many cases, the personal lives and prospects of academics below the level of professor have brightened considerably. Learning and research, some of it very good, have continued to go on. Not all of the problems have been solved of course. Professors in outlying universities often prefer the more stimulating atmosphere of the principal cities, and consequently seldom visit their putative places of employment. Moreover, the best of the Italian scientists, those with international reputations, have tended increasingly to do their research abroad, although they have also tended not to break entirely their ties in Italy.

Today, however, there is a problem more serious than reform of the academic profession. A university degree in Italy today has become practically useless for the purpose of finding a job. One reason may be the degraded quality of the degree itself; employers sometimes ask applicants whether they received their laureates before or after 1967. My own theory is that the situation, like many of Italy's problems, has something noble in its cause—and is nearly hopeless in its effect.

Italy is now in the course of becoming the first major country in Western Europe to switch from a system of elite higher education to a system of mass higher education. The fraction of young people between 18 and 22 who are university students has long been much higher in Italy than in England, France, or Germany, and it has increased rapidly in the last few years. The same change, to mass higher education, took place earlier in the United States, where now more than 50 percent of those between 18 and 22 are college or university students.

The trouble is that Italy is making this noble change without the immense economic power and industrial base that allowed the United States to absorb all of those graduates, not perfectly, but reasonably well. Italian students who come from a modest family background and go to the university do not do so because they want to become a part of the educated masses. They go to the university to become part of the elite, and Italy cannot yet afford to have an elite that consists of half or a quarter of her population.

There is another difference between Italian and American higher education. Italy's unified national system lacks the resilience and flexibility of America's complex, pluralistic system. There are 200,000 students who want to attend a university in the city of Rome. Rome has one university, built for about 30,000 students. Nevertheless, there are 200,000 students at the University of Rome. It is simple, inexorable, disastrous.

All of which brings us back to the Free University of Trent. It is not (yet) a part of the national system; it is financed and run by the provincial government of Trent. All of the professors, all of the postgraduate personnel, all of the students in the Mathematics and Physics Institute are there full time, every day. The research tends to be applied rather than pure (some of it is financed by Fiat, the giant automobile manufacturer). It is just possible that the students who write theses and graduate in physics will turn out to have marketable skills.

The applied nature of the research arises out of a decision made when the new faculty was instituted to specialize in material sciences. Physics research elsewhere in Italy is relentlessly pure, and in fact, physicists and engineers in Italy practically form separate camps, with some animosity and little communication between them. Sometimes engineering faculties in Italy have their own professors of physics and physics courses so that their students need not be contaminated by contact with pure physicists.

At Trent it was decided, instead, that the new science faculty would be closely associated with a two-year pre-engineering program and its growing faculty. The engineers that emerged would absorb a bit of the scientific spirit, and in return, the scientists would do research rooted in the real world. A typical example of work going on there now is a study of why and how ion bombardment of metallic surfaces leads to improved corrosion resistance.

Very probably the Free University of Trent will soon become part of the national system, since it is now straining at the modest limits to which the province can afford to finance it. But some organizational steps have already been taken to protect the autonomy and independence of the science faculty in the event the university becomes national. Given good will, clever maneuvering, and a lot of luck, it could just possibly survive with its distinct identity intact.

Four hundred years ago, the Council of Trent launched the Counter Reformation, and thereby changed the history of the world. Nothing happening today in Trent will have so great an impact. To be sure, graduates of the new university could be influential in spite of their small number, which is even less than the number of undergraduates at Caltech. But that brave little group of students and their teachers at Trent can hardly serve as a model to solve the massive problems at Rome and Naples. Instead, Trent could prove by example that a new beginning, an independent course, is still possible in Italy today. That would be worth quite a lot. □