Physics in Central and Southern Europe

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SCIENTIFIC ACTIVITIES IN BRITAIN, Scandinavia, and Western Europe are familiar to most American scientists, but unfortunately contacts with activities farther to the east are less extensive and far from satisfactory. It is therefore with pleasure that I report on some impressions and experiences of a recent visit in central and southern Europe. The following brief account does not attempt to describe all important activities in the countries mentioned, nor does it list all of the leading workers in any one place. The visits which my wife and I made were unofficial, and the choice of itinerary was dictated by practical and personal considerations. Moreover, the comments which follow pertain more to the conditions under which scientific work is being prosecuted than to the researches themselves.

Poland

Conditions in Poland do not permit the unrestricted entry of foreigners, and there are no facilities for tourists. However, it is claimed that anyone with a legitimate reason for entering the country will receive permission to do so. I had been invited to lecture at the University of Warsaw, and visas were issued with little delay. Travel to Warsaw is not difficult and one has the choice of comfortable international trains with sleeping cars from Sweden (via ferry) or from the west or south; air travel also connects most European capitals.

The Polish physicists were extremely friendly and hospitable, as were, indeed, all of the Polish people whom we met. We lived in Warsaw as guests of Prof. W. Rubinowicz, whom we had met at the September discussions in Copenhagen. Prof. Rubinowicz, in addition to a heavy teaching schedule and supervision of the research of a number of advanced students, is carrying on his own research in theoretical physics and writing two books, a monograph on multipole radiations and a textbook on atomic physics.

Prof. S. Pieńkowski, director of the Institute for Experimental Physics, placed a car and chauffeur at our disposal. He, like the other experimentalists, is severely handicapped in his work by the shortage of equipment, but we were told that the situation is gradually improving. The building which houses the physics institutes is intact, but all equipment and the entire library were carried off or destroyed by the Germans. Even the furniture was removed; not a chair or table was left. (Liquidation of the Warsaw physics institutes was under the supervision of the well-known German physicist, Prof. K. Diebner.) In the process of re-equipping the institutes, preference has wisely been given to equipment for teaching. We were much impressed by the high quality of this equipment, some of which was provided by UNRRA. The Institute for Theoretical Physics was completely destroyed. Its director, Prof. C. Bialobrzeski, now works in the single building that houses the institutes of Pieńkowski and Rubinowicz and, indeed, lives in a small room in the building. (The housing shortage in Warsaw is probably the worst in the world.)

At the conclusion of the war not a single physics book or periodical remained in any of the libraries of Warsaw—or what was left of them. This is a typical case, for all of approximately 150 institute libraries of the University were completely destroyed. The rebuilding of the physics library is proceeding well, but, although many recent books and periodicals have been acquired, replacement of older items is difficult. Funds are extremely limited, and much has been given by other countries, including an American contribution from the Rockefeller Foundation. Scandinavian countries have been particularly generous.

My lecture in the physics institute was attended by about 50 persons—professors, assistants, and students. Many questions were asked afterward, and English was generally spoken, usually well. After the lecture I met Prof. A. Soltan, who has worked at the California Institute of Technology and who is now constructing a high-voltage accelerator for research in nuclear physics.

I was also invited by Prof. W. Kemula, the director, to lecture at the Institute for Physical Chemistry. Prof. Kemula is dean of the Faculties of Sciences this year. Here again the lecture was attended by a large audience which seemed pleased to have close contact with an American scientist. Following the lecture we met several of the other chemistry professors and staff members. One of them, Prof. W. Swietoslawski, who was Minister of Education before the war, spent many years in America, where he is very well known. In a tour through the Institute we were impressed with its size and potential excellence.

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Only one wing was destroyed during the war. Unfortunately, there is very little equipment, for the building was stripped by the Germans and used as a military hospital. (Even the plumbing and electrical wiring were torn out.) Part of the building has been reconverted to laboratories, but it has been difficult so far to obtain research equipment. We were told of searches through ruins to recover pieces of small equipment, such as ringstands, that might be in usable condition.

From Warsaw we traveled to Cracow, where we were received by Mrs. Jan Blaton, wife of the late Prof. Blaton and herself a physicist. Prof. Blaton was working at the time at the Institute in Copenhagen, and we knew him well there. He was the country's leading younger theoretician, and his death on May 17 of this year in a tragic accident while on a holiday in the Tatra mountains was a severe loss to Polish physics.

The physicists in Cracow had a much less isolated feeling, for only a month earlier they had been hosts to the International Union of Pure and Applied Physics Symposium on Cosmic Rays. I lectured at the physics institute there and met a number of scientists. We had a particularly enjoyable conversation with Prof. Henryk Niewodniczanski, who is well known for his work in spectroscopy. We also met Prof. J. Weyssenhoff, but could not see Prof. K. Zakrzewski, who was very ill at the time. (Prof. Zakrzewski died a few months ago.) The Jagellonian University, as, indeed, the city of Cracow itself, which was the seat of the German "General Government" and enjoyed the advantage of having been chosen to become a "German" city, is almost undamaged. It was extensively mined near the end of the war and escaped destruction only because the end came so fast. Most of the physics equipment, however, was removed by the Germans. Profs. Niewodniczanski and Weyssenhoff told us of several trips they had made to Germany to search for this equipment, with only partial success. The library is intact, although sadly lacking in recent books and periodicals.

I should emphasize the strong impression we had of the vigor and determination with which the rebuilding of the University and the reconstruction of the city of Warsaw are being carried out. The horrible destruction in the city is well known; yet we, like all visitors to whom we have talked, were terribly shaken when we first saw it. The destruction of the University of Warsaw was without parallel in modern times: professors and students were murdered, buildings demolished, libraries burned, and equipment looted. One can have nothing but admiration for the spirit with which the Warsaw scientists have attacked the formidable task of reconstruction.

The Polish scientists feel isolated from American science, and this feeling is only partly diminished by the now fairly regular receipt of the principal American periodicals. It is a result both of their long period of complete isolation and of the paucity of personal contacts after the war, the last because few foreign scientists have traveled to Poland and few Polish scientists have been able to visit abroad because of the staggering shortage of teachers at home. (From 1939 to 1946, although the national population declined by 25%, the number of science students *increased* by 75%.) But as far as we could tell—and there was nothing to indicate that our impression was false—only the friendliest attitude prevailed toward American scientists. There is a tendency today to regard Poland and other central European countries as lying behind the "iron curtain," as has been indicated, for example, by Dr. L. Kowarski in his interesting remarks in the *Bulletin of the Atomic Scientists,* 1948, **4**, 139. Regardless of how true this might be with respect to their politics or economics, it is certainly not true in the case of their science. There is no iron curtain for science to the west of Poland. Polish scientists would all like closer contact with the West. Americans should be much more active in promoting such contact.

Czechoslovakia

We spent several weeks in Prague, just two months before the change of government. The surface of that unforgettably beautiful city is unchanged, but the scars of the German occupation are easily found. Plaques, usually decorated with fresh flowers, on hundreds of street corners commemorate the death of Czechs shot on the spot by Germans. (It is not easy for an American, or anyone who has lived in an unoccupied and undamaged country, to forget these plaques, which one can see from the Baltic to the Mediterranean. They may list a hundred names or merely one or two. They are a new common mark of the streets of Europe.) In almost all university buildings there is a memorial, with wreaths and flowers, to some professor or professors who formerly taught there and who were killed in Prague or died in a concentration camp.

In the Institute for Physics we were again shown the greatest hospitality. Prof. August Žáček, inventor of the magnetron, showed us the laboratories, and Prof. V. Petržílka, who is well known in England, helped explain the research work to us. Prof. Petržílka is engaged in cosmic-ray investigations using the new Ilford photographic emulsions. The plates are exposed in stations in the high Tatra mountains in northern Slovakia. Other fields of investigation in Prague are X-rays, electron microscopy, and ultra-

high-frequency radio. We also had a pleasant conversation with Prof. V. Trkal, director of the Institute for Theoretical Physics.

One of the most difficult problems in Prague, and also in Poland and Italy, is the greatly augmented number of students. This coupled with the wartime depletion in the teaching ranks—for example, in Warsaw fully half the teaching staff of the University was lost—has subjected the staff to a continual strain. One wonders how they have any energy left for research. Prof. Žáček told me that he regularly lectures to more than 1,000 students at a time.

Another problem met again in Prague is the shortage of equipment because of looting by the Germans. Although many things were stolen, the situation now is much better than that in Poland. The scientific libraries and buildings, which impressed us greatly, are intact. There is, however, a shortage of wartime and postwar literature.

In Prague I spoke before the physicists and the physical chemists. Both lectures were attended by interested and friendly audiences whose command of English was impressive. (Before the war, of course, German was the second language in Czechoslovakia. Now, however, its use is discouraged, and one rarely has occasion to employ it.) Prague is famous as the birthplace and center of polarography. Although Prof. Heyrovsky was, unfortunately, absent at the time we were there, Dr., now Prof., Rudolf Brdička gave us much interesting information about the work of the Institute. The contact of the Prague scientists with America seemed excellent.

There are a number of other universities in Czechoslovakia, but in none of them has physics reached an advanced state. The celebrated German university in Prague was permanently closed after the liberation, and its buildings and facilities were taken over for other purposes.

Austria

From Prague we went to Vienna in a Pan American Airways plane. The city, and most of the people, had a melancholy air. The physical destruction in the city, of which we had heard such strong reports, did not make much impression on us after Warsaw, although some sections, particularly in the Russian sector, are very much damaged.

Our visit at the Institut für Radiumforschung was an extremely interesting one. Unfortunately, Prof. Stefan Meyer was not there; he has now virtually retired and spends most of his time in his home in Bad Ischl, in the American zone. Prof. Berta Karlik, acting director of the Institute, told us of the research programs being carried out and showed us some of the new results. One interesting investigation is the study of some nuclear reactions using, again, the new Ilford plates. (These plates are very popular on the continent today because they make possible interesting and original researches within the small budgets available.) We also learned from Prof. Karlik that a new edition of Meyer and Schweidler's *Radioaktivität* is being planned as a cooperative enterprise of a number of scientists. Unfortunately, Prof. von Schweidler died early this year. The library at the Institute is in rather good condition. Its wartime and postwar copies of American periodicals were private gifts from friends in America.

I also had the pleasure of a conversation with Prof. Karl Przibram at the Zweite Physikalische Institut. Prof. Przibram, who spent the war years in England, is again engaged in his studies of luminescence.

It was most interesting to see the new books being published by Springer in Vienna. The program of this branch of the Springer Verlag, now nominally independent of the two German branches, is impressively vigorous, and its publications to date are a remarkable achievement.

I spent a considerable part of our time in Vienna investigating the scientific and technical books published in Germany and Austria during the war. Not a few of these are very rare in America, and many are of major importance (for example, the series of volumes containing Sommerfeld's lectures on theoretical physics). The acquaintance with such books of most American scientists, the majority of whom do not have personal connections abroad, is necessarily based on those volumes republished under license by the Alien Property Custodian and selected according to the discretion, not to say the whim, of the several American firms engaged in such undertakings. It would be good to have some responsible organization in America or Britain compile and publish a complete list of wartime German and Austrian technical books. It is difficult to buy such books in Austria or in western Germany. Interestingly enough, there seem to be more for sale in the second-hand bookshops in Poland. Most of the books there are brought in from Germany.

Italy

At the invitation of Prof. Gilberto Bernardini, I spent two months working in Rome. Scientific research in Italy today is beset with difficulty, and the quantity and high quality of much of the output is a tribute to the energy and ingenuity of the workers. The funds made available by the government for salaries, libraries, and equipment are utterly inadequate; one finds this policy of the government, which directly controls the universities, deplorable. The fact that

Italian research in nuclear physics and cosmic rays still manages to stay in the very first ranks is thus all the more remarkable. The now almost historic experiment of Conversi, Pancini, and Piccioni must give great satisfaction to scientists, in America no less than in Europe, who are concerned at the connotation for the future of science of the disproportionate strength of physics in America, caused chiefly by the greatly augmented funds available in America and the trying conditions and relatively small budgets under which most Europeans are now obliged to work. Many of the most talented young men in Italy have emigrated, and a stay in Italy makes this easily understandable. The physics library in Rome is pitifully incomplete. No English periodicals are received, and the only copy of the *Physical Review* is Prof. Amaldi's private one.

The Institute for Physics, located in the 10-year-old Città Universitaria, is a great and impressive building. The floor space available is more extensive than that owned by most American physics departments, and there is some fine equipment, including a million-volt Cockroft and Walton accelerator. Prof. Amaldi, director of the Institute, told me, however, that because of the difficulty in competing with American piles and other costly equipment he is shifting the emphasis of his work from nuclear physics to cosmic rays—a sad development at the birthplace of neutron physics. However, a great deal of cosmic-ray research is in progress. In January the new Cervinia high-altitude laboratory was officially inaugurated on Monte Rosa (11,500 feet), in northern Piedmont.[2] This laboratory is under the direction of Prof. Bernardini, who spends much of his time there. In Rome the entire staff is under a great strain because of the teaching load, for, just as in the rest of Europe, the number of students has risen greatly while the number of instructors has decreased.

The chair of theoretical physics in Rome has been vacant since the departure of Wick. Although the occasional visits of foreigners (Pauli spent some weeks there in 1947, and it is hoped that Heisenberg may come for some months) and the necessarily short visits of Prof. Bruno Ferretti, who has now returned to his post in Milan after two years of work in England, have helped to fill this gap, the experimentalists are nevertheless considerably handicapped.

[2] For a description of this fine new laboratory see *Nature, Lond.*, 1948, **161**, 254, or *Physics Today*, 1948, **1**, No. 2, 14.

The physics departments of other Italian universities have not so fully recovered from the war, and now, more than ever, the most important work stems from Rome.

Conclusion

We did not have time to visit other central European countries and so can offer no firsthand information about them. Nothing is generally known in the west about the physics in Roumania and Yugoslavia, in both of which important work was accomplished before the war. In Hungary there are now several active physicists. We did visit Spain, but there is no physics there of any importance.

The question of Russian physics is, of course, of as great interest in other European nations as it is in America. However, no more is generally known. I know of only one instance of a visit by a Russian physicist to a laboratory in western Europe after the war, and even visits to eastern countries have been few, if any. Nor have I heard of any private correspondence on scientific problems between physicists in Russia and another country. All information on research, everywhere we have been, is based only on the Russian journals and on the highly glamorized and not always understandable Russian news-service releases. Even the journals are not received regularly in most places, although this is generally believed to arise from inefficient distribution.

In conclusion I should like to emphasize how important it is that American scientists more actively cultivate personal contacts with their European colleagues, by correspondence and especially by actual visits. Travel was never easier mechanically than it is today; yet for most European scientists other serious barriers to foreign visits now exist—for instance, the shortage of teachers, which prevents extended trips abroad, and the very real difficulty in obtaining foreign money. The advantages which Americans enjoy in these respects should and must be fully exploited for the mutual benefit of America and Europe. If a world community of scientists is to be achieved—and where may it more readily be than in science, for which there truly exists a world community of interest?—personal friendship and understanding can greatly aid in overcoming the barrier of disparate nonscientific ideas.