SPECIAL CORRESPONDENCE

PHYSICS IN PRE-NAZI GERMANY

GERMAN physics has occupied a prominent position in science during the last century. A big role in all the discoveries in the field of physics during the nineteenth century and the first quarter of the twentieth century was played by German physicists, particularly renowned among whom are Robert Mayer, Gustav Kirchhoff, Rudolph Klausius, Herman Helmholtz, the physicist, physiologist and physician, and Ludwig Boltsman.

Characteristic features of nineteenth century German physics were breadth of conception and the ability to solve major scientific problems.

The solution of these problems followed two trends. Albert Einstein elaborated his theory of relativity, the profundity and significance of which may be compared in the history of physics only with Newton's elaboration of the theory of mechanics. It was subsequently developed by other scientists, among whom we find the German mathematicians Minkovsky and Weil. On the other hand, we have the teaching of the structure of the atom—the smallest particle of matter—which was developed by both experimenters and theoreticians and which led to the elaboration of the famous quantum theory. At first this was the so-called old quantum theory in which the quantum principles were expressed in the simplest form. They proclaimed the necessity of regarding light, at one and the same time, as both a continuous substance and as an accumulation of discrete particles. For the scientists of those times who were not inclined to think dialectically this signified a revolution in their whole system of reasoning.

This theory was elaborated by Max Plank and Albert Einstein. In the following twenty years it was rapidly developed, at first in the work of the Danish physicist, Nilson Bohr, and the German physicist, Arnold Sommerfeld. It was then reconstructed anew and transformed into modern quantum mechanics (in point of fact, this marked the creation of a new science) by such famous physicists as Irvin Schredinger and Werner Heisenberg. This theory has entered the arsenal of modern technology and has led to numerous remarkable discoveries.

MODERN GERMAN PHYSICS

Theoretical physics is declared by the Nazis to be "Jewish physics." This meaningless combination of words is supposed, in the opinion of the crassly ignorant Unteroffiziers, to signify the harmfulness of science, while as far as the scientists of Germany are concerned a "veto"—complete and utter—has been placed on their fruitful work in this field.

There appears the disgraceful book by Philipp Lenard, "Germany and Jewish Physics," in which it is "explained" that German physics is created by "the German popular spirit which is unoverburdened with erudition."

The "principle" of the racial dependence of scientific knowledge, in accordance with which all correct scientific results belong only to Aryans, is taken seriously as the supreme criterion in judging one or another physical theory. This "principle" asserts that even the "conception of the fact that two times two is four takes on different hues in the minds of the German, the Frenchman, Negro and Jew (from an article in *Natur,* December 7, 1940).

With Hitler's advent to power Albert Einstein is described as follows: "The American Jew Michelson and the vile Jew Einstein received the Nobel prize from the Swedes, who have sold their race."

This citation is taken from the German magazine *Grenzland* of 1934, in which in a letter to K. Rosenberg "Doctor" Eric Roskote lists W. Heisenberg's sins before "Aryan physics."

Urban, "councillor of higher schools" came out with a reply to the letter, "explaining" that "Einstein's theory is pure dupery and has no other purpose than to befool Aryans."

The physicist I. Stork, the director of the Reich Institute of Physical Engineering, at the opening of the institute in Heidelberg, presented an equally authoritative characterization of theoretical physics—"Jewish physics" and its "high priest," A. Einstein. Stork proposed that the science chairs and the guidance of science be handed over to "the true German SS's of science" and that all the great physicists be driven out of Germany.

One after another the most prominent physicists left Germany. Some were hounded out of the country because of their race, others are demonstratively refusing chairs and flee before reprisals can be taken against them, as Dr. Frank did on the day that the Nazis seized power. Dr. Frank was professor of physics in the Göttingen University since 1920. At the present time he is working in Chicago (SCIENCE, Vol. 87, 456, 1938).

The renowned physicists Bloch, Boethe, Haitler, London, Paiphes, Plachek, Wigner and Weiskopf, known for their brilliant work on the application of quantum mechanics to various concrete physical problems, have been driven from Germany. Bloch elabo-

rated the principles of the theory of metals and explained a number of their properties. It was he, too, who explained a number of the properties of ferromagnetites. Bloch, Boethe and Haitler explained a number of the effects of the passage of rapid, charged particles through an element. Their work forms the foundation for the comprehension of all the phenomena taking place in the cosmic rays. Boethe and Paiphes are likewise known for their work on the theory of the atomic nucleus and on the physics of crystals. Haitler and London have explained the properties of chemical forces. Their work in this direction plays an important role in the study of the colossal amount of facts pertaining to chemical reactions. Plachek, Wigner and Weiskopf have worked up the theory of dispersion of light and have done important research in atomic nucleus physics.

The Aryan physicists—Heisenberg and Sommerfeld and others—who remained in Germany found themselves hounded. For recognizing modern science and especially for recognizing the "non-Aryan" theory of relativity, they were given the sobriquet of Weisse Juden. Sommerfeld was compelled to give up his chair in the University of München, where for over thirty years he had trained a brilliant group of young physicists.

As a result German physics lost its leading role in world science.

In Fascist Italy, too, the same thing took place. Fermi, the Nobel prize winner, fled from Italy; Bruno Rossi was expelled from the University of Padua by special decree in September, 1939. Rossetti, Segré and others likewise fled from their native land—Italy!

Before the advent of the Nazis the German physical journals (*Zeitschrift für Physik, Annalen der Physik, Physikalische Zeitschift*) had always served as the central organs of world science in this domain. The campaign of the Nazis against German science caused these journals to turn into meager notebooks frequently filled with third-rate work by the few physicists still remaining in Germany. The biggest of these journals, *Zeitschrift für Physik,* for instance, publishes two and one half issues a year instead of the six to seven issues it normally published in the 'twenties. In its time this journal attracted scientific papers from all over the world. In 1930 approximately 700 scientific papers were printed in its seven volumes, of which 280 were by foreign scientists (including about 80 by Soviet scientists). In 1938 only about 150 papers were printed, of which about 50 were by foreign authors. Thus this journal, once the central organ of world physics, has been transformed into a provincial journal. The following facts are very indicative. If we take the American journal *Physical Review,* which to this day serves as one of the most important scientific organs, and calculate the number of times German papers are cited in it we shall find that in 1932 about 35 per cent. of all the references referred to papers published in Germany. In 1939 only 15 per cent. of the references were to German papers, and even of these many pertained to papers written before the Nazis seized power.

The German physical journals are forced to publish such "scientific papers" as Stork's article: "The Structure of the Electron and Super-Conductivity." From the very first lines of this article it is obvious that the author tries to refute the modern theory of quantum mechanics. Although he asserts that the theory must be combined with experimental work he himself makes no attempt to base himself on modern experimental data.

Stork once received a Nobel prize in the past, but being connected with the ceramics industry it is many years since he has been working in the field of physics and he is therefore more than a quarter of a century behind modern physics. And it is Stork and Lenard who are Führers of "German physics."

Nazism has wreaked the same havoc with science in the territories which it has conquered.

An item in *Natur* (3711) points out that the dismissal of rectors and deans from the Czech universities by the German authorities shows that these universities, which have been closed for three years, will never be reopened.

In an article on German Kultur in Czecho-Slovakia *Natur* (No. 3706 of November 9, 1940) writes that the books and valuable appliances were removed from the Czech universities or simply squandered. The splendid equipment of the Institute of Physics in Poland also, as we know, met the same fate.

CORRESPONDENT IN USSR

QUOTATIONS

THE NUTRITION SOCIETY

ELSEWHERE in this issue we publish particulars of the newly formed Nutrition Society. In giving it, as we do, a whole-hearted welcome, we are not to be taken as either assenting to or dissenting from any general proposition about the desirability of forming new scientific societies—even in peacetime. For such projects to be praiseworthy at least two conditions must be satisfied. First, the subject of the new society's activity must be of importance—as the patent lawyers might say, it must have "content"; secondly,