during the last war. The poorest physical state is encountered in some of the southern states. The difference in health in these areas is quite marked; thus for every 10 men examined in Colorado 7 are found acceptable, whereas in one of the southern states only 3 are acceptable. The physical fitness varies greatly with age. The average age of the registrants was 25.7 years. Of those 21 years of age, more than 60 per cent. were fit, whereas those 36 years of age less than 30 per cent. were fit. The Selective Service and Army boards have rejected as unfit for military service approximately 50 per cent. of the registrants examined. About 100,000 are rejected for illiteracy; 430,000 are totally unfit for military service, and 470,000 are classified as 1–B; that is they might be fit for limited military service were they acceptable under Army standards. These figures are not to be interpreted as representing 50 per cent. invalidism of the registrants examined, or as indicative of 50 per cent. illness of the population in general. They simply represent unfitness for military service according to the standard requirements that have been set up by the Army.

These cases of rejections are listed in Table 1.

Because of the relatively poor physical state of 50 per cent. of the registrants examined and the urgent need for manpower for national defense, the President has suggested that as many as possible of those rejected be rehabilitated. It is estimated that around 200,000 have remediable defects. This work of rehabilitation has been assigned to the Selective Service System. Plans have been formulated and the work is already under way. Rehabilitation is to be carried out in the registrant's home community. Funds are to be provided for the medical and dental services necessitated in the rehabilitation program.

TABLE I

Cause	No. of cases	Percentage
Dental defects	188,000	20.9
Defective eyes	123,000	13.7
Cardiovascular diseases	96,000	10.6
Musculo-skeletal defects	61,000	6.8
Venereal diseases	57,000	6.3
Mental and nervous diseases	57,000	6.3
Hernia	56,000	6.2
Defects of ears	41,000	4.6
Defects of feet	36,000	4.0
Defective lungs, including tuberculosis	26,000	2.9
Miscellaneous	159,000	17.7
Totals	**900,000**	**100.0**

OBITUARY

RUDOLF SCHOENHEIMER, 1898–1941

RUDOLF SCHOENHEIMER was born in Berlin, where he received his early education and university training. After receiving the medical degree from the University of Berlin in 1922, he held for a year the position of resident pathologist in the Moabit Hospital of that city. There his interest was attracted by the problem of atherosclerosis and his first published works, dating from that period, relate to the production of this condition in experimental animals by the administration of cholesterol. Recognizing his need for a wider knowledge of biochemistry, he then studied for three years under Karl Thomas of Leipzig, from whose laboratory he published, early in 1926, an ingenious method for the preparation of peptides. During these years of supplementary training, Schoenheimer held a fellowship of the Rockefeller Foundation.

The next move was to the Pathological Institute of the University of Freiburg, where in 1926 he joined, as chemist, the staff of Ludwig Aschoff, who exerted a marked influence on his scientific development. Here, along with his regular duties in the investigation of pathological material, he again took up the biochemical study of the sterols. In 1927 he became the active, and in 1931 the titular, head of his division. During this period his researches related mainly to the metabolism of cholesterol and were continued in this field when, in 1930, he came to this country for a year as Douglas Smith Fellow in the Department of Surgery of the University of Chicago. After his return to Freiburg in 1931 his work, continued with the support of the Josiah Macy Jr. Foundation, was rudely interrupted by political developments within Germany in the spring of 1933. The last study completed in the Freiburg laboratory was reported in the *Journal of Biological Chemistry*; it established the important finding that in the normal mammalian organism cholesterol is continually and extensively synthesized and degraded in the tissues.

The Department of Biochemistry of Columbia University was fortunate in being able to provide facilities for Schoenheimer's subsequent researches. The first report published by him from this laboratory, recording the normal occurrence of cetyl alcohol in intestinal contents, has a peculiar significance in its bearing on his subsequent work on the intermediary metabolism of fatty acids. In collaboration with W. M. Sperry, he developed a valuable method for the precise determination of minute quantities of free and combined cholesterol and applied this technique to a comparative study of serum and plasma.

In 1934 Schoenheimer made a new contact which proved to exert a fundamental influence on the nature of his work. In order to exploit the availability of deuterium, discovered by Urey in 1932, for the development of biological research, the Rockefeller Foundation established a fund to enable chemists trained in deuterium techniques to apply their special knowledge to biochemical and allied problems. Under these

auspices David Rittenberg came from Urey's group to the laboratory in which Schoenheimer had been working for a year. From their association there developed the idea of employing a stable isotope as a label in organic compounds, destined for experiments in intermediary metabolism, which should be biochemically indistinguishable from their natural analogues. Justification for this scheme was found in the established fact that the hydrogen in organic matter displays the same isotope abundance as that in common water. Exploratory experiments soon showed that the feeding of 4,5-deuteriocoprostanone led to the presence of deuteriocoprosterol in the feces and that the ingestion of fat containing combined deuteriostearic acid was, surprisingly, followed by the rapid deposition of a large proportion of it in the body fats.

A similar effect was then observed to occur in animals the body fluids of which were enriched with heavy water; deuterio fatty acids appeared in the depot fats and reached a maximum in a strikingly short time. Conversely, with ordinary water in the body fluids, the isotopic label in the depot fats disappeared equally rapidly. This rapid interchange between components of the diet and of the tissues proved on further investigation to involve not only direct replacement of chemically identical fatty acids but rapid transformations, notably desaturation, saturation, degradation, elongation and reduction to alcohols. The only natural fatty acids which appeared not to be synthesized by the rat were the highly unsaturated acids known to be essential for health.

As soon as the stable isotope of nitrogen, N^{15}, became available, Schoenheimer and his colleagues applied it to an analogous study of protein metabolism. Amino acids synthesized from isotopic ammonia and added in small quantities to the diet of adult rats in nitrogen equilibrium were found to be rapidly and extensively incorporated in the tissue proteins. Like the fatty acids, they also gave evidence of chemical transformations; after the ingestion of isotopic amino acids or ammonia, heavy nitrogen was found in all amino acids isolated from the proteins, except lysine. Advantage was also taken of the possibility of labeling compounds with both isotopes, the ratio of which in the products isolated from tissue proteins indicated the extent to which the carbon chain of an amino acid had followed a different metabolic pathway from that of the nitrogen atom.

As a result of Schoenheimer's investigations, of which but a few examples have here been outlined, there has emerged a concept of metabolic "regeneration," wherein the central idea is the continual release and uptake of chemical substances by tissues to and from a circulating metabolic "pool." Coincident with these cyclic processes there occur among the components of the pool multitudinous chemical reactions, of which only relatively few are concerned with elimination of waste products. These general interpretations were summarized by Schoenheimer in his Harvey Lecture of 1937 and his Dunham Lectures of 1941.

Schoenheimer died by suicide, at the height of his productive career, on September 11, 1941. Few men had more reason for desiring to live; his work gave him intense satisfaction, and its increasing importance was widely recognized. He was surrounded by devoted friends; all who knew him held him in admiration and affection. He leaves his mother, a brother; his widow, Salome Glücksohn Schoenheimer, is an accomplished embryologist.

One of Schoenheimer's most striking characteristics was his ability to correlate pertinent facts from highly diversified branches of knowledge and bring them to bear upon problems under immediate consideration. He not only sought the advice of experts in fields other than his own, but freely discussed his scientific plans with his colleagues as well as his direct collaborators. He led his research group with tact, understanding and constant stimulation.

HANS T. CLARKE

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DEATHS AND MEMORIALS

DR. THOMAS HERBERT NORTON, research chemist, from 1883 to 1900 professor of chemistry at the University of Cincinnati, died on December 2 at the age of ninety years.

DR. CLYDE SHEPARD ATCHISON, since 1912 professor and head of the department of mathematics at Washington and Jefferson College, died on November 21, at the age of fifty-nine years.

DR. FREDERICK HUTTON GETMAN, director of the Hillside Laboratory at Stamford, Conn., from 1909 to 1915 associate professor of chemistry at Bryn Mawr College, died on December 2 at the age of sixty-four years.

A MEMORIAL service for the late Walter Granger under the auspices of the American Museum of Natural History and the Explorers Club of New York was held on November 25.

ACCORDING to an Associated Press dispatch the Government of Newfoundland has issued a five-cent postage stamp in honor of the late Sir Wilfred Grenfell, medical missionary, commemorating the fiftieth anniversary of the founding of the Grenfell Mission.