BIOCHEMISTRY

Bones Make Red of Blood

Hemoglobin is manufactured by bone marrow much faster than has hitherto been supposed, as proved by tracer work with radioactive iron.

➤ TRACER experiments with radioactive iron show that the bone marrow manufactures the red blood pigment, hemoglobin, much more rapidly than had been supposed and that the liver acts as a storehouse for iron.

These new findings have been reported by two University of California researchers, Dr. D. Harold Copp, instructor in physiology, and Dr. David M. Greenberg, professor of biochemistry, who used a superior radioactive isotope of iron for the first time in tracer work.

They found that within three hours some of the radioactive iron appeared in the red blood cells, an amazingly rapid absorption, and that within 24 hours one-third to one-half of all the absorbed radioactive iron has been transferred to these cells.

When there is no deficiency, iron is stored in the liver, and is transferred to the bone marrow for use in the production of hemoglobin when iron is removed from the diet. Thus the stored iron postpones the appearance of deficiency symptoms such as anemia.

Drs. Copp and Greenberg found that there is no liver storage when hemoglobin manufacture is stimulated by iron deficiency, by the action of small amounts of copper or cobalt, or following severe blood loss. The metal, in these cases, is being used rapidly by the bone marrow.

While the experiments were performed with rats the findings are significant for man as well, since the metabolism of this animal is much like that of the human species.

The experiments were performed with iron 55, a radium-like member of the iron family produced by bombardment of manganese in the cyclotron. This isotope of iron was identified and separated at the University of California, the work being done by Prof. Glenn T. Seaborg, co-discoverer of plutonium, and by Dr. Martin Kamen, now at Washington University, St. Louis.

Iron 55 can be produced in a very pure form though in minute quantities too small for human research. Because of its purity it is superior for biological research to iron 59, the isotope previously used for "tracer" work. Iron 59 is diluted by a large percentage of non-radioactive iron which makes it necessary to give doses up to 1000 times those used in work with iron 55.

In their experiments the researchers fed anemic and normal rats 15 microgram doses—hardly more than enough to cover a pin point—of iron 55. The animals were then sacrificed at intervals, and the radioactivity in the various organs was counted by a Geiger counter.

The iron from the sacrificed animals was electroplated to make counting easier, and a special Geiger counter, of extreme sensitivity, was devised to catch the very weak radiations of iron 55.

Science News Letter, June 29, 1946

ENGINEERING

Belt Conveyors Reduce Accident Hazards

➤ BELT CONVEYORS in coal mines, to carry the coal from working faces to outlets, reduce accidents, the American Mining Congress was told.

Ray Cobb of the West Kentucky Coal Company described the operation of these endless belts, made of a wide strong fabric running on rollers, which are used instead of underground railways. Over 130 miles of them are in operation in American coal mines, first installation being made less than two decades ago.

One of the advantages is that the belt conveyor delivers a constant flow of coal from all sections of the mine to the coal tipple. The whole conveying system is started simultaneously by pushing a button. The haulage system needs only a minimum of supervision.

Railway equipment is still the most widely used method of underground coal transportation, C. R. Nailler and C. C. Hagenbuch of the Hanna Coal Company emphasized at the same meeting. Improvements have been made in the past decade in track-mounted equipment. Such equipment, they said, properly installed and maintained, will provide adequate, profit-producing haulage between coal face and tipple.

Science News Letter, June 29, 1946

MATHEMATICS

Desk Electric Computer Aids Chemical Research

➤ A NEW DESK-SIZED electric computing machine, designed to speed mathematical equation solutions in physical and chemical research, will cut tedious hours of work to minutes. It has been reported to the American Institute of Physics by Clifford E. Berry, Doyle E. Wilcox, Sibyl M. Rock and H. W. Washburn of the Consolidated Engineering Corporation.

The new calculator, designed during the war, will speed research and development in such diverse fields as the analysis of complex organic petroleum products, aircraft design, and electric circuit analysis.

The computer handles especially what is known to the mathematician as linear simultaneous algebraic equations. In spite of the impressive name, these are nothing but a more lengthy cousin of the elementary high-school variety of algebraic equations.

As many as twelve of these can be given to the computer to solve. This task, which might take an expert calculator five hours of tedious work to complete using conventional types of machines, can be done with much higher accuracy in a matter of forty minutes.

One reason for this speed is that each number needs to be handled only once, and no intermediate results have to be written down, effectively eliminating one of the most common sources of error.

To operate the computer, the given quantities of each equation are set up on knobs located on a revolving drum. Another one of a row of graduated dials, located on the front panel, is then adjusted to give a null indication on a small indicating tube in the center of the front panel. This process is repeated for each equation on a different set of knobs moved into view by means of a handwheel that turns the drum. The solutions are shown on the dials used to obtain the null-indications.

The computer is of the analog type that uses physical quantities to represent the numbers involved. In this new device, these quantities are the ratios of accurately known resistances, a feature that contributes to the high inherent accuracy of the computer.

Science News Letter, June 29, 1946

The 1945 *birth rate* in America was almost twice the death rate.