

PHYSICS—MEDICINE

High-Speed Centrifuge Tool for Disease Diagnosis

Forces Equal to Eight Million Times Gravity Used To Sort Out Virus Particles According to Weight

FORCES equal to 8,000,000 times gravity that can be created in modern centrifuges have promise of being a new medical tool for the diagnosis of disease, Prof. J. W. Beams of the University of Virginia told the Sigma Xi chapter of the College of Medicine, University of Illinois, in a special Sigma Xi lecture arranged under the auspices of this national honor society for the promotion of research in science.

Keenly noted by the medical faculty and students who heard him was Prof. Beams' statement that ultimately the process of whirling viruses and other medical substances at high speed may become a new means for the accurate diagnosis of disease.

Under the terrific centrifugal forces created in the whirling rotors of modern centrifuges, it has been found that the viruses of tobacco mosaic virus (a plant disease) and the vaccina virus (cowpox used for immunization against smallpox) can readily be separated and purified. He added:

"Interesting differences in the number of sedimenting boundaries, as well as the relative concentration in each, between normal and pathological sera have been found. It is not impossible that the centrifuge may be very useful as a means of determining the correct diagnosis of disease."

Prof. Beams, America's best authority on the construction of ultra high-speed centrifuges, explained that these devices are highly successful in separating out fractions of complex body proteins. These proteins appear to be composed of homogeneous species of molecules which seem to be definite multiples of a fundamental protein mass unit of 17,600.

Prof. Beams cited the Swedish Nobel Prize winning chemist The Svedberg as authority for this concept of 17,600-mass unit as a fundamental building block of protein structure.

The extremely large protein molecules which occur in the bodies of living things represent stable collections of lesser molecules held together in a fragile bond that can easily be changed by many

factors including the pH, or acidity, of the medium in which they exist.

A prize example, Prof. Beams discussed, was the coloring pigment of the blood of the common, edible European snail. This pigment, haemocyanin, has the enormous molecular weight of 6,740,000.

When its acidity is changed slightly, Prof. Beams said, "it dissociates by steps into halves, eighths and sixteenths, each dissociation product being a homogeneous molecular species. When the pH (acidity) is changed back to the original value, the components recombine to form the original compound of molecular weight 6,740,000." The ultra high-speed centrifuge is invaluable in determining accurately these large molecular weights.

Other valuable uses of centrifuges, outside the field of physics which designs and creates them, are in the purification of hormones, viruses and the enzymes, and in the determination of the masses of the artificially radioactive isotopes of the elements which are increasingly being used in chemistry, biology and medicine as "tracer" elements to study complex and hitherto-obscure reactions in plants, animals and chemical compounds.

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ARCHAEOLOGY—METEOROLOGY

Copper Angel Weathervane Is Rare Gothic Art Treasure

AN ANGEL from fifteenth century Paris is pronounced the most beautiful Gothic figure in this country.

Displayed in a spectacular loan exhibition of medieval art of 1,000 to 1,400 A.D. at Boston Museum of Fine Arts, the copper angel points a stern long forefinger, straight from waist level. Art experts say, however, there is nothing personal in the angel's pointing. Belief is that the image twirled and pointed as a weathervane when it stood on the Sainte Chapelle in Paris.

New England has at least two Angel Gabriel weathervanes, according to WPA's Index of American Design, so



WIND VANE

This 15th century Paris angel points, not at erring mortals, but at the wind. Originally on the Sainte Chapelle, the weathervane now graces a loan exhibit of Medieval art in America at Boston's Museum of Fine Arts. The Morgan Library in New York owns the angel, rated finest Gothic image in America.

the idea of an angel in this scientific role is not entirely new to America.

The copper angel has never before left its present home, in the Morgan Library in New York, for public exhibition.

Dr. Georg Swarzenski, of the Boston Museum, who rates the angel the loveliest figure of Gothic art to come to this country, says that in the Middle Ages art and craftsmanship were more intimately connected than in any other age. The most capable artists enjoyed working in metals, wood, leather, or enamel. It was only in the last part of the Middle Ages that movable pictures—so important in modern art—appeared. And then, with rare exceptions, they were made only in Italy.

Pronouncing the exhibition the largest of the period ever arranged in the United States, the Boston Museum states that collectors and museums throughout the country have lent tapestries, sculptures, illuminated manuscripts, paintings, and other objects which once beautified churches and castles. In American collections, medieval art is relatively scarce.

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