An infinitesimal amount of crystalline mosaic virus introduced into a tobacco plant increases greatly. But we may well leave that problem for the present, feeling that its solution will come in good time.

The viruses differ among themselves in size as measured by physical-chemical methods, and in stability—some are so delicate that they do not withstand chemical reagents. But the invention of the vacuum ultracentrifuge is making the investigation of the nature of these labile viruses possible. These centrifuges are capable of amazingly high speeds which yield a pull as great as 300,000 times gravity. Hence excessively minute bodies can now be aggregated so as to be brought under physical biological study. And by means of the x-ray photographic device, even their structure may be defined.[7]

I seem to have wandered far afield in closing this sketch of the medicine of America of the past half-century. In reality I have not strayed at all. These new discoveries are American in origin and they relate directly to medicine. Moreover, they illustrate in a particularly enlightening manner the interdependence of the physical and the medical sciences. I have already said that there is nothing peculiar about medical science, that it is only biology, physics and chemistry applied to a particular end. In these final examples there is nothing but physics and chemistry used to elucidate problems in comparative pathology—that is, the pathology of all living things. And pathology is merely the basic subject of how disease comes about—how it is initiated in the first instance, through what changes in structure function is impaired, and then finally through what retrogressive alterations health is restored. Just as anatomy and physiology together show us the relation of structure and functions in the normal body, pathological anatomy and pathological physiology or experimental medicine together show us the related altered structure and function in the diseased body. As these subjects come to be better understood, the diagnosis and treatment as well as the prevention of disease will become more scientific and successful.

We have followed some of the developments which in the space of half a century have raised American medicine from a low state to a leading position in world medicine. There is nothing accidental in this great change. What we are witnessing is merely the continuation of the movement westward which has marked the diffusion of knowledge since the revival of learning in the fifteenth century.

"We are like dwarfs," said Bernard of Chartres in the twelfth century, "seated on the shoulders of giants. We see more things than the ancients and things more distant; but it is neither due to the sharpness of our sight nor the greatness of our stature; it is simply because they have lent us their own."

[7] Method has always had a determining influence on experimental science. With every important advance in methods, new discoveries have been made or old ones perfected. Modern medicine owes a great debt to the physical sciences for the new and improved methods they have introduced. But it has the merit of having advanced itself by the discovery of methods applicable in the clinic and in the laboratory through which the diagnosis and treatment of disease have been enhanced.

SCIENTIFIC EVENTS

THE POLAR EXPEDITION OF THE U.S.S.R.

THE daily press reports that a Soviet airplane made a successful landing at the North Pole on May 21, and established a permanent weather and scientific station as the first step in the plan for regular air communication between Russia and America by way of the polar region.

The expedition is in charge of Dr. Otto J. Schmidt, professor of mathematics at the University of Moscow, director of the Soviet Arctic Institute and head of the Northern Sea Route Administration. The flight was made from Rudolph Island, about 82 degrees north and 60 east (or about 560 miles from the Pole). A. V. Vodopyanov was pilot of the plane.

The radio message sent to the U.S.S.R. government at Moscow follows:

We send you, through the Dickson Island radio station, greetings from the North Pole.

Aboard the Soviet plane, *USSR N-170*, we crossed the pole at 11:10 Friday morning. In order to obtain the best results we passed a little beyond the pole seeking a landing field.

We first crossed the pole at 1,750 meters and then came down to 250 meters through the clouds, seeking a place to land. At 11:35 A.M. we landed.

We are sorry to report that difficulty with the radio apparatus delayed our reports to you.

We are about twenty kilometers beyond the pole and a little to the west of the Rudolf Island meridian. We are on an ice floe, but it is possible to bring other planes here to establish a polar station.

Our regards to the government and the party.

Four men plan to remain at the station for about a year. They are Ivan Papanin, who will be in charge; Ernest Krenkel, radio operator; Pyotr Shirsov, hydrobiologist, and Eugene Federov, magnetologist. They will use a carefully planned folding house about 12 feet long by 9 feet wide, and 6½ feet high, which has been elaborately insulated. It weighs only 353 pounds and, in case the ice shows signs of breaking, it can be moved to a new site without dismantling.