That leaves the possibility of learning that an atom bomb explosion has taken place by electroscopes — highly sensitive instruments that can detect the impact of even one electrically charged particle, and would be certain to show the passing of a big cloud of them, such as made up much of the ominous mushroom-shaped clouds that rose over Alamogordo, Hiroshima, Nagasaki and Bikini.

These clouds dissipated, became invisibly thin; yet myriads of charged particles remained relatively close together, as compared with the sparse scattering of such particles that are normally present in the air all the time. The critical question is: Would the cloud still be thick enough, after drifting half-way around the world, to be recognized by these means?

Testimony is conflicting. After "Able" day at Bikini, the most nearly comparable test, so far as distance is concerned, several operators of such instruments, notably in California, Oklahoma and Texas, reported finding traces of the drifting charged cloud in their records. Other observers denied this; and their numbers included some of the world's leading physicists in parts of the world as widely separated as the United States, Peru and Australia.

There is one additional piece of negative evidence. In May, 1946, 40 days after the New Mexico test explosion, the Eastman Kodak Company had some X-ray film fogged by contact with strawboard that had become radioactive, presumably as a result of contamination by the northeastward-drifting cloud of atomic debris; either the straw used as raw material or the water used in processing had been affected. Carefully prepared "atom-traps" of cotton were exposed for 60 days after the first Bikini blast at various points in the United States and over the Pacific area as far out as Manila and Melbourne. Measurement of radioactivity "showed such low values as to be without definite significance as to dissemination of radioactive dust" from Bikini.

Distribution of the places where these tests were made, both electroscopic and photographic, was haphazard rather than scientifically planned. Observers simply checked up on their electroscopes wherever their laboratories happened to be; the cotton "atom-traps" were merely distributed to the principal Eastman branch offices, with instructions for their quite simple operation. If a systematic study had been undertaken of the possibility of recording a long-range drift of the radioactive cloud fragments, there would have been more observatories, preferably on mountaintops, on the Pacific coasts of North and South America, and probably some in the East Indies, the Philippines and Japan, but fewer at inland points.

Moreover, it is probable that for making a special test of the atmosphere, to find out if anybody has been setting off atom bombs secretly, a type of instrument somewhat different from existing electroscopes might be desirable. Certainly arrangements would be made to send lightweight instruments aloft by plane or free balloon, with robot radio sets to signal back to earth what they might find in the upper atmosphere.

If we want to sniff the stratospheric air for radioactive evidence of possible secret Soviet bomb tests, the likeliest places for high-altitude ground observatories, as well as for radio-robot balloon launching stations, would seem to be central and northern Japan, the Aleutians, and mainland Alaska. That is where winds blowing out of Russian Asia first flow over American-controlled land.

Would instruments so used tell of an atom-bomb explosion somewhere in interior Asia? On the basis of the conflicting evidence here reviewed, the answer cannot be better than "maybe." And if the U. S. Department of National Defense has better instruments and more advanced plans, naturally they aren't telling.

Science News Letter, October 25, 1947

CHEMISTRY

New Germ-Fighting Drugs

Scientists are beginning to understand "chemical kinetics," which promise to allow them to design and then to build substances that will block bacterial growth.

➤ NEW disease-fighting chemicals, tailor-made by scientists out of the cloth of more detailed knowledge of the structure of living matter, will result from the researches that Dr. Linus C. Pauling, California Institute of Technology chemist, described in his Silliman lecture at New Haven, Conn. as a part of the centennial of Yale's Sheffield Scientific School.

Whether a drug will successfully combat an invading germ is largely dependent upon whether the drug can be made more attractive to the germ than the living cell being attacked.

Dr. Pauling, digging into the matter of the molecules involved, finds that the antigen (the germ factor) and the antibody (the germ-fighting factor) interact with each other because they fit into each other in structure. A large portion of the surface of one can be brought into juxtaposition with the surface of the other molecule. Such closeness allows the weak forces operating between them to create an effective bond. Thus the drug can counteract the germ.

The exciting thing about this scientific research is that the scientists have the beginnings of knowledge of what is called "chemical kinetics" which promise to allow them to design and then to build chemical substances that will block the activities of bacterial and virus growth. Years may elapse between the fundamental research and the application to actual sick people but the way to success seems to have been found.

The nature of living matter itself is being better understood. Dr. Pauling explained that a substance called a catalytic enzyme allows the living cell to carry out any specific reactions that don't take place when the chemicals are just mixed together.

Bacteria are themselves living organisms and the scientific attack upon them is planned as an attempt to find a chemical molecule that will inhibit the particular enzyme that is necessary to growth of each kind of germ. This means that the chemists will have to build kinds of chemicals that resemble bacterial enzymes so closely that they join with them and put them out of business.

Disease fighting in a fundamental long-time sense has thus become a matter of delving into the molecular structure of substances, a research that at first blush might be considered far removed from curing the ill and fighting death.

Science News Letter, October 25, 1947

An alloy of iron and cerium is the so-called *flint* usually used in cigarette lighters.

In *muskrat farming,* ditches are sometimes dug in marshes to provide deeper water for the animals during winter weather; the ditches have no outlets.