

BIOLOGY—PHYSICS

Extract Antigens From Germs With Intense Sound Waves

New Method Designed to Prevent Injury to Delicate Substances Which Produce Antibodies in Our Tissues

SQUEEZING and shaking substances valuable in medicine out of cultures of disease germs by means of intense sound waves is the biological feat that has been accomplished by two University of Pennsylvania scientists, Dr. Leslie A. Chambers and Dr. Earl W. Flosdorf.

The substances they obtain belong to the class known as antigens. They are poisons secreted within the germs' bodies. Injected into the human body in suitably small quantities, they may be used in provoking the formation, by our own tissues, of opposing substances known as antibodies, which defeat the germs if they attack later on. Or the antigens may be injected into the bodies of animals, from which blood is later withdrawn for making immune serums for medical use.

Present methods of obtaining antigens involve heating, addition of chemicals, or other treatments that injure or destroy certain of the more sensitively composed antigens. This is what the new method of Drs. Chambers and Flosdorf is designed to avoid. Its treatment of the germs is strictly physical or mechanical, and it can be conducted at a low temperature.

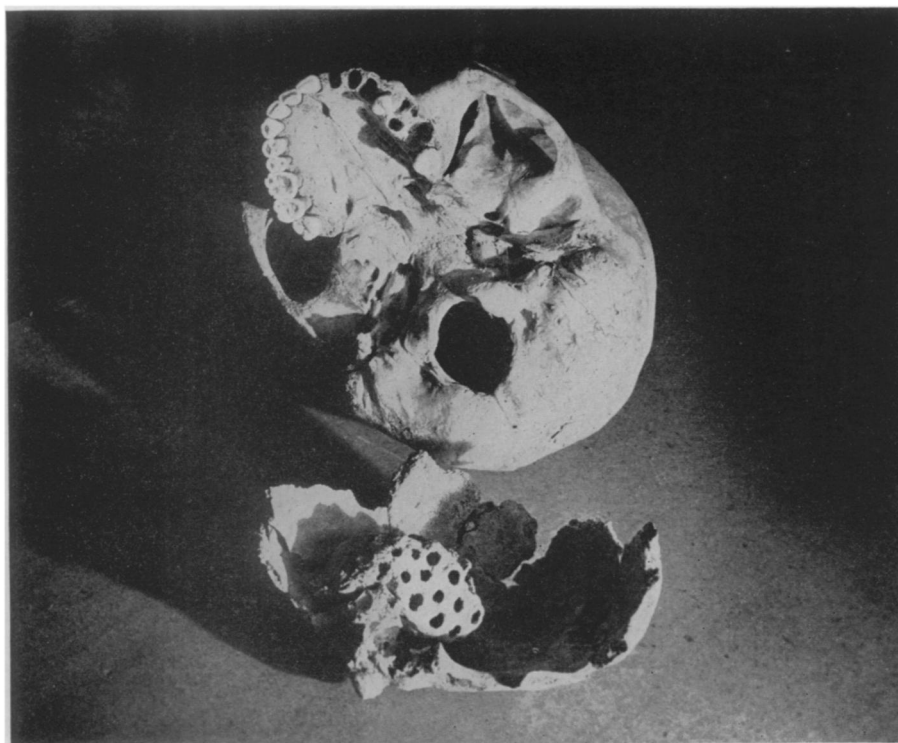
The foundation of their apparatus is a magnetized metal tube, usually made of nickel, which is caused to vibrate extremely rapidly by flowing an alternating electrical current around it in coils. The sound waves thus set up may be either exceedingly shrill, or even so high-pitched as to be in the ultrasonic range, beyond reach of the human ear. In either case, they are made highly intense.

Over the upper end of the metal tube a glass tube is fitted, with a leak-tight rubber joint. Into the chamber thus formed a culture fluid containing billions of germs is poured. Then the current is turned on and the vibrations started. After the treatment has been continued long enough to get out most of the antigens (and incidentally, to shatter most of the germs), the process is stopped, and the liquid is first centrifuged and then passed through a fine porcelain filter, to remove all debris and any of the germs that may have survived the treatment.

The antigens are in the clear, germ-free liquid that has passed through the filters. Some types of these antigens are so sensitive and unstable that they will spoil if kept for only a couple of hours at temperatures a little above freezing. However, if the liquid is frozen at once and the water evaporated out of the ice, the solid, dried residue, now consisting of concentrated antigens, can be kept for a year or more, the experimenters state.

Drs. Chambers and Flosdorf have obtained U. S. patent (No. 2,230,997) on their apparatus and process, on which they have assigned their rights to the University of Pennsylvania.

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WASP APARTMENT

One of the 300-year-old wasp nests discovered inside skulls of Virginia Indians. The skull above shows the sort of entrance hole used by these wasps in their strange apartments.

ANTHROPOLOGY

Wasp Nests 300 Years Old Found In Indian Skulls

WASP nests built in vacant skulls where brains of Powhatan's Indian tribesmen had been, are the latest revelation of Indian life 300 years ago in the Virginia region of Pocahontas, Powhatan, and Capt. John Smith. Discovery of the wasp nests, which shed light on customs of this historic tribe, was announced by Dr. T. Dale Stewart, Smithsonian Institution anthropologist, to the Anthropological Society of Washington.

So well preserved are several of the 300-year-old nests in the Indian skulls that entomologists here have identified the species of mud dauber wasp that built the homes, and even spied out fragments of larvae inside, Dr. Stewart stated.

The nests confirm scientific belief that the Virginia Indians of the town of Patowomeke held dual funeral rites, first placing the dead high on platforms in a death house, and later holding another ceremony to bury the dry bones. Only in such a sequence, Dr. Stewart reasons, could the wasps have had their chance to build homes inside skulls

which, when now found, were buried deep in covered grave pits.

Adorning Indian children in the ancient Virginia burial ground, Dr. Stewart has discovered copper beads and pendants which point to the important event of white men's coming. Before white man arrived, copper was rare stuff in this part of the East.

Spaniards, adventuring up from St.

Augustine to attempt a Virginia settlement 30 years before the English settled Jamestown, probably brought this copper to the delight of the Virginia Indians, it is deduced. Had the copper trinkets been gifts from Capt. John Smith or his settlers, it is inferred that there would be glass beads somewhere among the Indians' buried treasures, also. But no glass has been found.

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ports, to secure in a relatively small number of interviews the information administrators require in order to direct in a thoroughly democratic manner any programs for which they are responsible.

The "sample" of farmers interviewed must be truly representative—it must have the same proportion of each age group as the population affected by the program being studied; the same geographical representation; the same distribution by income, type of farming, and size of farm; and the same proportion of owners, tenants, and wage hands. And interviewers must avoid "loading" the results by leading questions or other methods.

With these precautions, it is possible to administer government programs in the way that the people want them administered. And it can be done swiftly enough to keep pace with the rapid changes in conditions in an emergency.

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In 1931-1934, the United States averaged production of only \$30,000,000 worth of *machine tools* a year; 1941 production is to exceed \$650,000,000.

PSYCHOLOGY

Public Opinion Poll Seen as Aid to Democratic Process

Scientific Sampling Makes It Practical to Secure Public's Views on How Programs Should Be Administered

THE PUBLIC opinion poll, known to the public as a popular means of predicting elections, is seen as a practical method for making the administration of Government more democratic by Dr. Rensis Likert, psychologist head of the division of program surveys of the U. S. Bureau of Agricultural Economics.

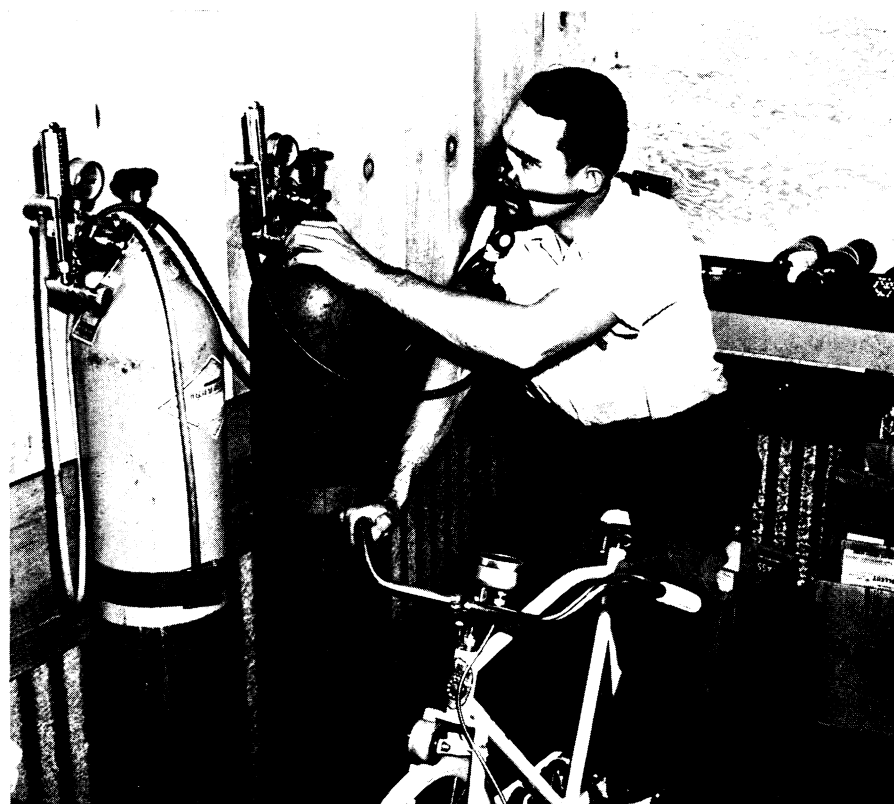
For a democracy to function, individual citizens must take the responsibility for solving their own problems, Dr. Likert says in a report incorporated in the new Yearbook of Agriculture.

Rapidly changing conditions such as are characteristic of the world we live in today naturally rouse violent emotions in the individual. These emotions are likely to hinder solving of vital problems raised by the new conditions. If the individual is enraged, he tries to get rid of his problems by smashing through them. If he is overcome by fear of insecurity, as is more common, he tries to escape and evade his responsibilities.

It is this fear that causes individuals to turn to dictators as a child would turn to his father for protection and relief from responsibility, Dr. Likert explains. But the dictatorship, he points out, while it may give a temporary sense of security, fails to satisfy the basic needs of the individual. The dictatorship must rely on fear to maintain itself. And security cannot be built on fear.

A genuine sense of security is built, Dr. Likert says, on the ability of the individual to develop skill in solving his own problems. A democracy must provide extensive facilities and opportunities for its citizens to develop these habits of living and thinking.

Such an opportunity has been found in the scientific sampling of public opinion now used by the Department of Agriculture for the administration of farm policies. It is now possible, he re-



TANKING UP

Breathing helium and oxygen and pedaling on the bicycle, Milo Burcham drives the nitrogen gas out of his body and "supercharges" himself for rapid ascent.