

MEDICINE

Discover How and Where Body Makes Its Germ-Fighters

Antigens Marked With Dye Protein Came To Rest in Blood Vessels in Liver, Spleen and Bone Marrow

DISCOVERY of where and how the body makes its disease-fighting antibodies was announced by Dr. Florence R. Sabin, of Denver, at the meeting of the Southern Medical Association in Memphis.

Resistance to disease depends on the possession of these antibodies in the blood which are active against the specific disease germ or its poisons. These antibodies are best induced by repeated small injections of antigen, which may be either disease germs or their poisons.

"Marked antigens," made with the use of dye-protein synthesized by Dr. Michael Heidelberger, of Columbia University, were used in Dr. Sabin's studies to locate the site of antibody formation.

When she injected these dye proteins

or marked antigens into an animal's body, she was able to discover particles of them in the cells that line the blood vessels in the liver, spleen and bone marrow and in certain other parts of the body. These cells are the scavenger cells of the body. They are part of the reticulo-endothelial system which had already been suspected of being the body's antibody factory.

Finding the marked antigen particles in these cells clinched the matter of where the antibodies are formed. A few days after the marked antigen particles were located, and at the time antibodies were appearing in the blood, the scavenger cells no longer showed any dye-protein and exhibited a considerable pinching off of their surface films. This

suggests, Dr. Sabin reported, that after engulfing the antigen from the disease germ, the scavenger cells synthesize a chemical called globulin, part of which is modified into antibody globulin. Then through a sacrifice of part of their protoplasm, these globulins are given to the blood. This part of the research seems to explain how the antibodies are formed.

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Rare Skin Disease

THE long-unsettled question of whether Kaposi's disease, rare skin malady, was due to cancer or a germ has apparently been settled by studies reported by Drs. Roger M. Choisser and Elizabeth M. Ramsey, of George Washington University School of Medicine.

The disease, characterized by acute swellings and peculiar eruption, is a malignant tumor, Dr. Ramsey stated. The conclusion was reached from the facts that: it was impossible to find a causative germ or virus; the disease could not be produced in animals by injecting material from human patients; and the microscopic appearance of the tissues and the invasive nature of the disease were like that of cancer.

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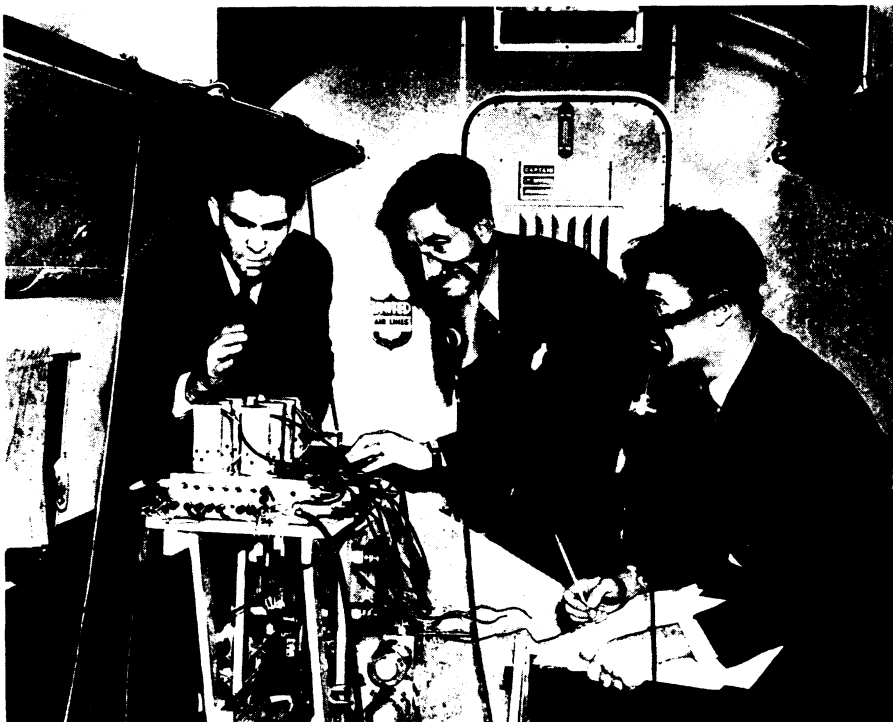
Desensitizing for Ivy

A METHOD of desensitizing persons susceptible to ivy poisoning so they will escape attacks if they should come in contact with the plant was announced by Dr. Bedford Shelmire, of Dallas, Texas.

The method consists in giving a "shock dose" of poison ivy oleoresin in gelatin capsules. For three to 12 days after swallowing these capsules, the patients had flare-ups of itching and eruption. These were in no way like the skin irritation that follows contact with the plant. They were like the irritation that sometimes follows medicine to which a person is sensitive.

One week after the skin symptoms disappeared, five of the 19 patients who got the shock dose were given the same or double the dose of poison ivy in capsules. Not one of these had a single flare-up of the skin irritation. All 19 had previously had ivy poisoning and all had shown they were susceptible when a bit of the poison ivy oleoresin was applied to their skin. After the second big dose, the skin tests showed marked decrease in skin sensitivity to poison ivy. How long this period of desensitization will last has not yet been determined.

The possibility of desensitizing pa-



FOR SCIENCE

At an altitude of 28,900 feet, scientists must work in oxygen masks. Wilfred Davies, United Air Lines research engineer (left), Dr. Gerhardt Herzog, Zurich physicist and Winston Bostick (right), of the University of Chicago, are photographing cosmic rays.

tients to poison ivy is also shown, Dr. Shelmire pointed out, by the fact that while about half the young adults in the vicinity of Dallas, where the poison ivy shrub and vine are abundant, are sensitive to the plant, very few aged persons are sensitive to it as shown by the skin tests. Apparently the older persons lose their sensitivity to poison ivy if they avoid the plant for long periods.

Desensitization to other plants which may cause skin trouble in sensitive persons was accomplished by small, gradually increasing doses of the plant oleoresins. The material is given in corn oil, and put into capsules before swallowing to avoid irritation of lips and mouth.

Desensitization in the case of hay fever patients is usually done by injections of pollen extract. The injection method was not practical for those patients who got skin troubles from handling plants, flowers and weeds, so Dr. Shelmire worked out the oral method.

Common vegetables and fruits, such as spinach, tomatoes, radishes, mustard, turnips, corn, Irish potatoes, water cress, carrots, oranges, lemons, grapes and figs, Dr. Shelmire reported, may cause the skin irritation, called contact dermatitis, when these fruits and vegetables are handled. Housewives, cooks, gardeners, and florists are most likely to be affected.

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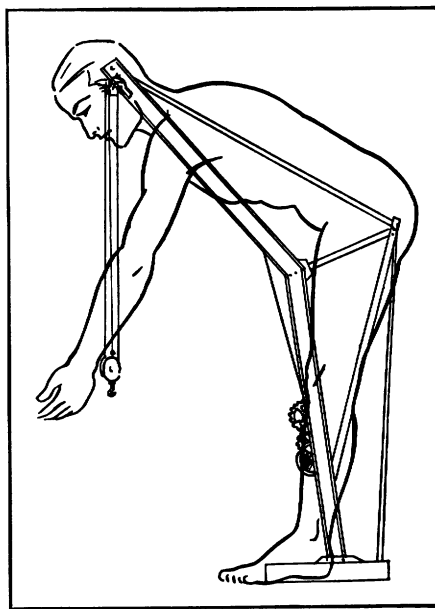
Patients "On the Wagon"

ABLOW on the head is not to be recommended as treatment for alcoholism, but it proves effective, Dr. James Greenwood, Jr., of Houston, Texas, discovered in checking after-effects of head injury in 118 patients.

Alcohol so greatly increases the headaches, convulsions and other after-effects that one-half of the patients who used alcohol before their injury voluntarily discontinued drinking.

More important was the finding that if a patient does not recover completely within two years after the injury, his chances of getting entirely well are "exceedingly small." In the group of severe head injuries, 71% of those who lived recovered completely.

Most frequent symptom complained of among the after-effects was headache, which was not much less frequent five years after the injury than at the end of one year. There was some improvement in dizziness and in the ability to stand exertion, nervousness, fatigue, visual disturbance and irritability. Discomfort due to sunlight and working in hot weather improved markedly, only 5% of the pa-



HUMAN CRANE

A man lifting a heavy object obeys almost the same mechanical laws as may be applied to a crane or derrick. Mathematical formulae can be used to determine interference with function of a back injury.

tients suffering this five years after the injury.

Neurotic symptoms appear over three times as often in compensation cases as in non-compensation cases. Fear of returning to a dangerous occupation probably accounts for some of this.

About 90% of the convulsive seizures which follow head injury begin after two years. More than half of the patients had their convulsions well enough controlled, however, to be steadily employed or to keep up with their school work.

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Engineering Principles

THE MATHEMATICS and physics used by construction engineers can be used by bone and joint surgeons to determine disability following injury, Dr. Earl D. McBride, of Oklahoma University School of Medicine, declared.

The action of the body with its arms and legs is strikingly similar to that of a crane or derrick, Dr. McBride pointed out.

"Almost the exact mathematical and mechanical laws may be applied to a man lifting an object such as a heavy weight off the floor as would be applied to a crane," he said. "If the hips become stiff or if the back is injured and out of alignment, then it is necessary to determine the extent of interference of true

mechanical action by means of mathematical formula similar to that which would be applied to alteration of the structural supports to a crane and its pulleys."

Dr. McBride showed how an engineer's estimate might be made of a bow-leg or knock-knee condition.

"In a man weighing approximately 160 pounds," he said, "the additional stress at the center of an angulation or curve one inch out of line of the plumb center would be about 500% increase. When a leg is broken and healed in a deformed state which causes the man to walk with his knee flexed at 60 degrees, the burden of weight on the knee is double the weight of his body. Such a condition will cause a disabled person of this type to spend much greater energy in his effort to use the limb."

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Hay Fever Relieved

RELIEF of hay fever and asthma symptoms by daily doses of potassium, and the theory that adrenal gland disorder is responsible for such conditions of hypersensitivity, were announced by Dr. Francis P. Parker, of Emory University, Georgia.

More than half of Dr. Parker's group of 35 allergic patients got complete or almost complete relief from their asthma and hay fever. Another 12% were relieved as much as 50% and 12% showed slight improvement. The potassium treatment did not benefit patients whose allergy took the form of skin disturbance or eczema.

No poisonous effects from the large daily doses of either potassium chloride or potassium gluconate were seen in any of the patients. The patients had to continue taking the daily doses of potassium to remain free of symptoms or hold their improvement.

These findings are in line with those of other doctors who have tried potassium for hay fever and asthma, but Dr. Parker went a step farther, searching for the reason why potassium proved effective. His blood tests of normal and allergic patients before and during potassium treatment led to the adrenal gland theory of the cause of hay fever and asthma.

Patients getting most relief of symptoms had the smallest increase of the amount of potassium in their blood. This probably shows that the potassium succeeded in going from the blood into the tissues where, Dr. Parker explained, it probably must go in order to afford the patient any relief.

Hay fever and asthma patients, the studies suggest, owe their sneezing and sniffing and breathlessness to having too little potassium in their tissues. The lack or deficiency of potassium, however, is probably a secondary result of some disorder elsewhere in the body. Disease or dysfunction of the adrenal glands, which are known to be largely responsible for potassium distribution throughout the body, is probably the underlying cause of such allergic conditions as hay fever and asthma.

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Early Cancer Diagnosis

A SIMPLE chemical test for early diagnosis of one kind of cancer in women is now available and should be part of the routine examination of the pelvis, Dr. Charles E. Galloway, of Evanston, Ill., told the meeting.

The test, devised by Dr. Walter Schiller, now chief pathologist at Cook County Hospital, Chicago, is for detecting cancers at the mouth of the womb, which make up about 75% of all cancers of the pelvis in women. It is very simple and is performed by painting the area with a water solution of iodine. If the area is healthy, it turns brown. If cancer is present, however, the painted area turns yellow or white.

The test depends on the fact that cancer cells do not contain glycogen, which is shown by their failure to stain with iodine. Loss of glycogen is one of the first changes to appear in the skin covering the mouth of the womb when cancer occurs at that location.

Other conditions exist which may also show up with this test and these peculiar forewarnings, Dr. Galloway pointed out, may be the forewarnings of the onset of cancer many years later.

Much earlier diagnosis of cancer, with consequent better results from treatment by X-rays, radium or surgery, will result, Dr. Galloway believes, if this test and examination of the area are made once or twice a year. For visual examination of the area, he pointed out, doctors now have an instrument, called the colposcope, which enables them to see the tissues and detect changes in them.

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Plans are being made to restore Atlantic salmon to suitable coastal rivers in New England.

Need for soil conservation in America was recognized by George Washington and other land owners of Colonial days.

ASTRONOMY

New Method of Testing Large Telescope Mirrors

Discovery by Argentine Astrophysicist Permits Astronomers To Test Disks Continually in Grinding

A NEW WAY of testing the accuracy of grinding for giant telescope mirrors, that saves two-thirds of the cost, labor and time necessary for this vital operation, has been developed by Dr. Enrique Gaviola, Argentine astrophysicist of the National Observatory at Cordoba.

The discovery, believed one of the most important in the century in the construction of telescope mirrors, allows a parabolic surface to be ground on a great glass disk directly and tested continually during the grinding.

For years astronomers have been grinding parabolic mirrors in a three-stage, tedious and costly process.

From their original flat disk, as made in a glass works, they grind a spherical concave surface. Next they take another piece of glass and grind it to an optically flat surface. And finally they use the "flat" to test the spherical surface as they slowly grind and figure it into the desired parabola.

"The amount of work, time and money necessary for this three-stage operation," says Dr. Gaviola, "is about three times the amount demanded by the parabolic mirror itself.

"All three surfaces have to be figured, tested and corrected independently and the optical flat has to be ground more accurately than the accuracy expected in the final parabolic mirror."

Dr. Gaviola, in a recent visit to the laboratories of the Mt. Palomar Observatory, where the great 200-inch diameter mirror has been in the process of grinding since 1936, explained the methods to astronomers there.

They praised its ingenuity but explained that they are so far advanced in their grinding, by time-tried methods, that they will continue to construct their mirror along the routine lines. At the most optimistic estimate it may be completed next year.

If the method had been available and proved successful five years ago, the Mt. Palomar mirror might now be in service and the giant telescope could have been constructed at a much lower cost.

Dr. Gaviola was led to the discovery of the new method, which uses a fine wire instead of a knife edge for testing, by sheer necessity.

In 1936 while at La Plata Observatory in Argentina he set to work to correct noticeable errors in the 82-centimeter Cassegrain mirror at the observatory.

"As we had no plane mirror of that size and no possibility of making either a flat or a Hindle spherical of 82-centimeter (over 2.7 feet) diameter it became necessary to find a new, simple method of testing the Cassegrain using only the available equipment. After some experiments a satisfactory method was devised," Dr. Gaviola explains.

As described in a joint report with Ricardo Platzek of La Plata Observatory to the *Journal of the Optical Society of America*, Dr. Gaviola says the new testing method works on the basic idea that to test an optical surface an arrangement is needed that will form an image of some kind. If the image is good, a study of it tells the quality of the optical surface.

If the image is not good, as it naturally will not be in a new mirror just being ground, it is subdivided into a number of good images by decomposing the main optical surface into sufficiently small parts or zones by the use of screens. The image is usually a so-called "artificial star," a bright point of light, or light from a narrow slit.

The common method is to observe the diffraction of light reflected off the telescope mirror as it passes by a sharp knife edge. The disadvantage of a knife edge, says Dr. Gaviola, is that it does not give a symmetrical diffraction pattern. Systematic errors can easily be committed.

To overcome this handicap, the new method uses a fine wire as the diffracting object and the diffraction pattern is symmetrical on each side of it.

The diffraction pattern from the various zones of the telescope mirror (secured by suitable screens with carefully cut holes in them) are observed. From these observations the curve of the mir-