

may have become clogged with fine particles washed in by the pounding drops. A good cover of plants, which also encourages burrowing worms and other small animal life forms, preserves and improves the soil's porosity. Temperature is important, in that it affects the viscosity of the water, and also changes the dimensions of the crevices. Below freezing point, temperature may either increase infiltration, if the soil is dry, or decrease it, if the soil is saturated and freezes in that condition.

Science News Letter, July 12, 1941

"Invisible River"

AN invisible river, flowing straight uphill, returns to the air a large proportion of all rain and snow that falls. Its name is Evaporation.

At the Hydrology Conference, Dr. C. W. Thornthwaite, of the U. S. Soil Conservation Service, outlined the magnitude of this skyward drainage, and told of progress in its measurement. Of one year's measured precipitation at the U. S. Department of Agriculture experimental farm at Arlington, Va., nearly half was returned to the air by evaporation from the soil surface and transpiration through the leaves of plants.

The practical importance of this way of getting rid of surplus water was suggested by the speaker:

"In central and eastern United States nearly all major flood-producing storms are terminated by invasion of relatively dry air masses of polar continental origin characterized by a thick turbulent layer and low concentrations of water vapor. These air masses provide conditions most favorable to evaporation and are able to absorb enormous quantities of moisture from the rain-drenched land.

"Since floods on large watersheds are most frequently due to general storms which must first restore to the soil reservoir water which had previously been lost by evaporation and transpiration it is evident that land use practices favoring evaporation will accordingly lessen the burden imposed on stream channels by excessive rains, both by retarding immediate run-off and by creating a water-storage capacity in the soil."

Transpiration through plants carries off much more water than direct evaporation from the soil, Dr. Thornthwaite stated. For this reason, it is desirable to encourage maximum coverage with plants of high transpiration rate, in regions subject to floods. On the other

hand, in regions where drought is the main danger, it is best to promote vegetation with low transpiration rates, so as to leave as much moisture in the soil as possible.

Until recently, direct measurement of evaporation from land surfaces was so

difficult that most scientists considered it impossible. Now, Dr. Thornthwaite said, intricate mathematical formulae have been worked out that can give an expression to this mode of water disappearance.

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PSYCHOLOGY

Girls' Experience Shows Hitch-Hiking Reasonably Safe

Runaways Ranging in Age From 6 Years to 105 Years Tell Their Stories to Travelers Aid Society

WHEN CHILDREN run away from home, they do so chiefly because they feel unwanted or unable to measure up to their own or their parents' standards, Dr. Lawson G. Lowrey, of New York City has found.

The major cause of children's running away from home as found by the psychiatrist differs from causes listed by police department reports and the "most intriguing" stories told by the children to Travelers Aid Society workers.

Girls made up 44% of the group studied. According to their experience, "hitch-hiking seems to be reasonably safe," Dr. Lowrey stated. Favorite story told by the girls when asking the Travelers Aid Society for help in finding an inexpensive room runs as follows:

"Their parents had recently died; they have no family of any sort; they have come to New York to embark on a glamorous career in the theatre, movies, or dancing."

"The boys are clumsier with their stories but usually more convincing," Dr. Lowrey said.

The runaways studied ranged in age from 6 years to 105 years. For the most part they were running away from something unpleasant, to a situation "which they hope will be a better one in a variety of ways." Most of the runaways did not have psychiatric abnormalities.

"Nomads present a somewhat different picture," he said. "Many of these are competent workers, who have little difficulty in securing a job, but do have difficulty in holding one. Many of them present paranoid types of personality, such that they are under some compulsion to reorganize any job they have. They commonly give histories of having been on the road for a number of years,

unable to remain long in one place because of their paranoid tendencies.

"One man, 105 years of age, had come on to New York from California to get financial backing for a mine. He had been a prospector for many years, he claimed, but was also interested in promoting a cancer cure and a tuberculosis cure. His small pension was enough for him to live on, but he had wandered away some four or five times during the past six years, always in pursuit of some type of business adventure. There was no evidence of senile deterioration."

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MEDICINE

Hayfever Cause Extracted From Ragweed Pollen

EXTRACTION from ragweed pollen of a colorless, nitrogen-containing chemical believed to be one of the major causes of hayfever was announced by Prof. Harold A. Abramson and Dr. D. H. Moore of the Columbia University School of Medicine and Dr. H. H. Gettner of Mount Sinai Hospital, New York City, at the Wilder D. Bancroft Colloid Symposium held at Cornell University under the auspices of the National Research Council and the American Chemical Society.

The molecular weight of the chemical was found to be "surprisingly low—only 5,000," Prof. Abramson reported.

This small size is significant, it appears, from his explanation that in order to produce hayfever, pollen must not only be blown into the nose and eyes but the molecules causing the symptoms must pass through the mucous membranes into the deeper tissues beneath.

"Our study indicates that the ease

with which allergic individuals will become sensitized to the content of pollen grains may depend to a great extent upon the small size of the allergenic molecules which have now been isolated

and studied quantitatively by electrophoresis, by ultracentrifugation, and by diffusion experiments for the first time," Dr. Abramson declared.

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PHYSICS—AERONAUTICS

Three Inches of Safety Glass Shields Fliers from Bullets

Blow of Bullet Shatters and Even Powders Glass Around Point of Impact But It Is Unable to Penetrate

BULLET-PROOF safety glass three inches thick, used as protection for fliers in war planes, stops even the heavy bullets of .50 caliber machine guns, hitting it squarely at right angles at a range of only 100 yards, states Horace J. Alter, aeronautical engineer. (*Army Ordnance, March-April*). Bullets of the regular rifle-caliber machine guns are stopped by two inches of the same kind of glass.

The blow of a bullet shatters and even powders the glass around the point of impact, but the missile dissipates its energy in friction and is unable to penetrate, Mr. Alter reports. Since airplane windshields are always streamlined, and hence present a sloping surface to an attacker's fire, less than the thicknesses named will practically always suffice for protection.

Steel plates, used beneath and back of the flier, to protect him against ground fire and from fighting planes that "get on his tail," may have to go up to half-inch thickness as heavier-caliber machine guns are mounted on fighters. Plates of this thickness will turn .50-caliber bullets at all angles greater than 20 degrees departure from right-angle impact.

Necessity for armoring planes will probably force crews and vital equipment into ever more compact arrangement, since every square foot that has to be protected adds pounds of dead weight to the plane's load.

Utilization of other structures for incidental protective function is urged by Mr. Alter. Wheels in the retracted position can be so arranged as to cover part of the fuel tanks, preventing bullets and shell-splinters from puncturing their bottoms. Surfaces of internal bracing members can be sloped to deflect bullets and cause them to tumble, thus robbing them of power to penetrate.

Need for armor protection began to be realized by fliers during the first

World War, as soon as they found themselves under fire. They improvised as well as they could, putting stove-lids under their seat cushions, and fastening pieces of steel shields from disabled field guns on the backs of their seats. After the war, designers of military planes tended to dodge the question of armor because they hated to add weight. But now, under the lash of deadly necessity, they are again working armor protection into their plans.

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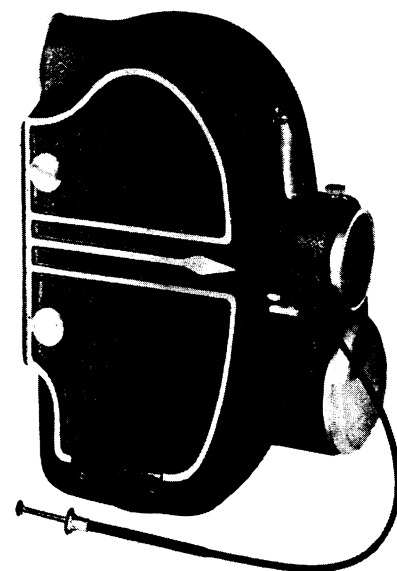
MEDICINE

First-Aid Information Against War Gases

AMERICANS are still fortunately not in immediate danger from war gases but many of them, remembering first-hand experiences with this chemical warfare weapon in World War I, have been wondering why so little has been heard about anti-gas measures in our plans for total defense. As if in answer, there comes the first American edition of the *British Medical Manual of Chemical Warfare*. (Reviewed, *SNL*, this issue.)

The book is intended primarily for medical officers of the Army and Navy and the air branches of these services. It is, therefore, rather too technical for general lay reading, although thorough-going first-aiders may find it worth studying. As is emphasized in the foreword, "speedy recognition of the type of gas which has caused casualties is essential for rapid diagnosis and efficient treatment; these desiderata can only be obtained by timely and thorough knowledge of chemical warfare substances, their characteristics and their effects on the human body."

According to this manual, the old war gases, such as chlorine and phosgene are not likely to be used. Mustard gas, being



FOR PHYSICIANS

With this camera, and its battery of attachments, physicians and surgeons may make color or black-and-white photographs of their cases. A flash bulb is located below the lens, and is operated in synchronism with the exposure. If desired, the bulb may be fired in a separate reflector, several feet away. A tubular attachment may be used to take photographs in the mouth, for example, the light being reflected to the point desired. (Cameron Surgical Specialty Co.)

more versatile and more subject to novelty in its use, may be employed, it is believed. It may be sprayed from aircraft directly on troops, or mustard gas air bombs, along with high explosive or incendiary bombs, may be dropped on buildings, encampments and industrial centers.

One of the gravest dangers of liquid mustard gas is that of damage to the eyes. The immediate discomfort may be slight and brief, but within an hour or so the eye will be inflamed and the lids swollen and painful. Ulceration of the cornea and loss of vision may result if proper treatment is not given. Special eye shields or suitable gas masks will protect the eyes. If these are not worn, immediate preventive treatment should be used even if only a very small drop of mustard gas liquid gets into an eye. Recommended preventive treatment is thorough immediate washing of the eyeball and the insides of the lids with plain water from a water bottle. An eye cup, syringe or dropper will help in this process. The washing-out should be thorough and repeated hourly.

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