

MEDICINE

Penicillin Plus Albumin May Prove More Effective

➤ MORE EFFECTIVE penicillin treatment may result from a new penicillin substance announced by Dr. Bacon F. Chow and Miss Clara M. McKee, of the Squibb Institute for Medical Research (*Science*, Jan. 19).

The new substance is a combination of penicillin and the albumin of human blood serum. Its promise of increasing the effectiveness of penicillin treatment is seen in the fact that, in mice at least, it is excreted from the body more slowly than the sodium salt of penicillin, the form of the mold chemical used for treating patients. The more slowly penicillin is excreted, the longer it can act on infecting microorganisms and the less is needed for treatment of a given case.

Several other methods of delaying penicillin excretion have been developed. This is the first report, the Squibb researchers believe, of a penicillin compound with a delayed excretion rate. The other methods involved suspending penicillin in oil, giving other chemicals with penicillin, or chilling the region where penicillin was injected.

Whether the penicillin-albumin combination is a true chemical compound is not yet known. The fact of its slower excretion suggests that it is. Unlike a similar combination of albumin and sulfa drugs, which some investigators believe has no germ-checking activity, the penicillin-albumin combination does have anti-germ activity.

Science News Letter, January 27, 1945

ENGINEERING

Tiny Ball Bearings Vital For Successful Bombing

➤ SUCCESS OF AMERICAN precision bombing depends upon the mass-manufacture of some of the smallest ball bearings in the world, reports Major R. J. Pask, of the Air Technical Service Command. These tiny ball bearings are a vital part of the Norden bombsight.

Until 1940, the smallest bearing assembly which American industry had produced had an over-all dimension of three-eighths of an inch in diameter, including inner and outer rings. The smallest ball being made in America at the time was one-sixteenth of an inch in diameter. Germany was supplying balls about one twenty-fifth of an inch in diameter.

In the summer of 1941 the foreign source of supply was cut off. As a result of research, the American ball bearing industry is now producing these tiny bearings in large enough quantities to meet the demands of the Army Air Forces.

The Norden bombsight, at that time, called for 61 ball bearings of 25 different types, upon which the actual operation of the bombsight depended.

Some idea of the sensitivity of the ball bearing assemblies can be gained from a "brush" test to which they are subjected. The bearing is first placed in a steel wheel, weighing exactly three and one-half pounds, then mounted on an axle. Next the hairs of an ordinary camel's-hair brush, like those used by artists, are drawn lightly over the heavy ring. This extremely light touch has to move the ring and bearing back and forth.

About 18,000 different kinds of bearings are being made today to supply war demands. The Army Air Forces alone require approximately 100,000,000 bearings in addition to 35,000,000 steel balls and 25,000,000 roller bearings.

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PHYSICS

Fused Magnesia Used in High-Temperature Lamp

➤ SMALL mercury-vapor lamps designed to operate at very high temperatures—hotter even than fused quartz will stand—are the subject of patent 2,367,595, obtained by John W. Marden of East Orange, N. J. To stand up against such temperatures, highly refractory materials such as fused magnesia or alumina are introduced into the quartz envelopes, either as sleeves or baffles. Rights in the patent are assigned to the Westinghouse Electric & Manufacturing Company.

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AERONAUTICS

Whirling Jets of Air Wipe Plane Windshield

➤ WHIRLING JETS of air under high pressure are substituted for the familiar rubber-edged arm of the automobile windshield wiper in a device for keeping the windshields of aircraft clear of water and ice, on which W. N. Patterson of Detroit has received patent 2,367,426. To make sure of dislodging the ice in winter, small quantities of alcohol or other non-freezing liquid are injected into the air-jets.

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IN SCIENCE

SEISMOLOGY

Japan's New Earthquake Centered Off Honshu

➤ JAPAN'S most recent earthquake was centered under the ocean floor off the coast of the Empire's principal island of Honshu, about 125 miles south of Tokyo. This epicenter determination was made by seismologists of the U. S. Coast and Geodetic Survey, on the basis of telegraphic reports forwarded through Science Service from three observatories.

The shock was not as severe as the big earthquake that shook Japan on Pearl Harbor Day, Dec. 7; it was apparently an aftershock of that disturbance. Point of greatest movement was in the region of latitude 34 degrees north, longitude 139 degrees east. Time of origin was 2:38.6 p.m., EWT, Jan. 12.

Observatories reporting were those of Weston College in Massachusetts, and the U. S. Coast and Geodetic Survey stations at Tucson, Ariz., and Honolulu, T. H.

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ENGINEERING

Coil Spring for Tractor Eases Work of Driver

➤ A SPECIAL coil spring, and a shock absorber, is the basis of a new suspension-type tractor seat which will take all the jolts out of riding the farm tractor over rough plowed land and ease the work of the driver. It may perhaps decrease the high degree of kidney and skeletal disorders among farmers blamed on the all-day-long tractor jarring. The new tractor seat was developed by the Monroe Auto Equipment Company, which developed and has made thousands of seats for war tanks.

The coil spring is placed directly under the driver's seat, and the triple-action hydraulic shock absorber at the rear. The absorber is similar to those commonly used in automobiles. Together the two devices give stability that enables the rider to stay level while the tractor bobs over rough ground.

The construction of the new device is simple and inexpensive, and it can be installed on all makes of tractors. It can also be applied to truck seats.

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CE FIELDS

ASTRONOMY

Pilots Learn Astronomy By Recognition Trainer

See Front Cover

► PILOTS ARE LEARNING astronomy through a new star recognition trainer, as shown in the official U. S. Navy photograph on the front cover of this SCIENCE NEWS LETTER. The stars are projected on the canopy through holes pierced at proper places in the globe shown in the foreground, as the globe rotates. This makes it possible for the instructor to demonstrate the relationship of the heavenly bodies to one another and explain their apparent motion as seen from the earth.

This is one of the many devices developed at the Navy Bureau of Aeronautics, Special Devices Division, under the direction of Capt. Luis de Florez, which aid in the realistic training of Navy flyers.

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MEDICINE

New Anti-G Flying Suit Weighs Only Two Pounds

► AMERICA'S NEWEST anti-G suit, which prevents fighter pilots from having a dimming or blacking out of vision during aerial maneuvers against the enemy, weighs only two pounds, Capt. George L. Maison, of the Aero Medical Laboratory, Wright Field, reports. Capt. Maison, who before the war was professor of physiology at Wayne University, and Lt. Col. F. G. Hall, of the physiology department at Duke University, are credited with the development of the anti-G suit, which both the Army and the Navy and some of our Allies now use as standard equipment. (See *SNL*, Jan. 13)

Weight has been an important factor in the development of the suit, Capt. Maison declares. The early anti-gravity pressure suits had valves weighing as much as 14 pounds. The British developed a very heavy suit which was filled with water instead of compressed air. This suit, developed early in the war, looked like a pair of duck-hunter's pants, and was very uncomfortable to wear.

The AAF G-suit is being used in the

European and Italian theaters, Capt. Maison stated. Pilots in AAF fighters, which are among the fastest aircraft in the air today, are provided with the suits. These planes can fly faster than 420 miles an hour and have an operational ceiling of 40,000 feet.

The new suit is a modification of one designed by the U. S. Navy, adopted after extensive tests on the human centrifuge at Wright Field. This human centrifuge was developed to measure the blackout tolerance of pilots and suits before, during, and after simulated power dives, building up pressures equivalent to from five to seven times the force of gravity, Capt. Maison commented.

The great success of the suit lies in the way it combats the effects of such forces on the body by applying pressure to the pilot's lower legs, thighs, and abdomen during aerial maneuvers, thus preventing blood from pooling in the lower extremities and permitting the heart to maintain circulation to the brain. Without the G-suit, forces which may amount to three to nine times that of gravity prevent the heart from pumping sufficient blood to the brain. This results in a blacking out of vision. The pilot usually remains conscious during a blackout, but unconsciousness may follow if the excessive force is prolonged for a few seconds, Capt. Maison explained.

Pressure in the anti-G suit is supplied by air bladders. The bladders are inflated by compressed air from the airplane's vacuum instrument pump. It takes only two seconds to inflate or deflate the bladders when the force rises above or falls below twice that due to gravity. All the pilot has to do is zip on the suit and plug it into the air line before taking off.

The over-all effect of the G-suit, like the oxygen mask, the pressure cabin, and the electrically heated suit, has been to enable the pilot to match his tolerance limit with that of his airplane, Capt. Maison pointed out.

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GENERAL SCIENCE

New Secretary Elected for Smithsonian Institution

► THE BOARD of Regents of the Smithsonian Institution, at their meeting on Jan. 12, elected Dr. Alexander Wetmore to be Secretary of the Institution, succeeding Dr. Charles G. Abbot, who retired last June. Dr. Wetmore, well known for his researches in ornithology, has held the post of Assistant Secretary since 1925.

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CHEMISTRY

Shape of Large Molecules In Plastics Determined

► THE SIZE and shape of large molecules in plastics can now be determined rapidly and visually by the use of two instruments recently developed and tested in the laboratories of the Polytechnic Institute of Brooklyn. They will be valuable to manufacturers using various types of synthetic rubbers, plastics and fibers by extruding, molding, casting and spinning processes in which the size, shape and weight of the molecules play an important part.

Better rubber tires and shoes, plastic combs, buttons and other articles, and fibers like rayon and nylon, result when the size and shape of the molecules in the materials used are known. Viscosity is now used as a rough criterion for these fundamental properties; with the new instruments scientific measurements will replace this none too satisfactory method.

The two new instruments, based on simple visual observations through a microscope, employ the scattering of light to learn about the size, shape and weight of the large molecules in synthetic rubbers and plastics. The principle of the scattering of light was discovered in 1910 by Dr. Albert Einstein, and its application to computing molecular weight and shape of giant molecules was discovered in 1943 by Dr. Peter Debye of Cornell University. Dr. Paul M. Doty, of the Polytechnic Institute staff, is largely responsible for the development of the instruments.

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MEDICINE

AMA Cancels Meeting Scheduled for June

► THE AMERICAN Medical Association has cancelled its annual meeting, scheduled for Philadelphia, June 18-22. This action was taken by its board of trustees in order "to cooperate to the fullest possible extent with the request of the Office of Defense Transportation and in the interest of the nation's war effort" (*Journal, American Medical Association*, Jan. 20).

This is the fourth time in the Association's 95-year history, and the second time in this war, that an annual meeting has not been held. The other two cancellations, in 1861 and 1862, were also war-caused.

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