SCIENCE NEWS

Science Service, Washington, D. C.

CHEMICAL TREATMENT TO INCREASE THE TRANSPARENCY OF GLASS

AT the Optical Society of America, Frank L. Jones and Howard J. Homer reported on their researches at the Mellon Institute, Pittsburgh, on the chemical treatment of glass surfaces, making them more transparent, which may have many important applications. Photographic lenses may be made faster in their operation, for example, or telescopes used at night by ships will gather more light and show a clearer view.

Previously, methods have been used for increasing the amount of light passing through lenses, thus decreasing the amount that they reflect, by applying thin films of another material. The method studied by Mr. Jones and Mr. Homer, however, treats the surface of the glass to form a film, by dissolving away the oxides from a thin layer. Such removal is possible without damage to the surface polish if the solvent does not dissolve silica. One of the best solvents found was a weak acid solution, such as one per cent. nitric acid, though solutions of salt, alkaline phosphates, melted salts and even water were found to show the effect.

Apparently it will hardly be safe for amateur photographers to attempt treating their own lenses without expert advice, for it was found that glass surfaces not freshly prepared reacted in an uneven fashion. After the surface film is once formed "it can be processed in various ways that will render the surface unreactive, so that a second treatment will not appreciably change the thickness of the film."

OLD PHONOGRAPH RECORDS

IN a preview, in a tiny, crowded room at the Library of Congress, recently, engineers demonstrated that they can at last rejuvenate wax cylinder phonograph records of 40 years ago.

Not merely have they found a way to play safely thousands of frail cylinders on which scientists and musical archivists hopefully recorded folk music and primitive songs—and then stored the records away silent, afraid to play them even once. But the engineers have succeeded in making the music sound as it really was sung forty years ago, not the way the old tin-horn phonograph hoarsely croaked it out.

Among keenly interested participants in the demonstration was Percy Grainger, the composer and pianist. Nearly 300 cylinder records of folk music from all over the world, which Mr. Grainger himself recorded, about 1905 to 1908, will be transcribed to initiate the task of the Library of Congress of making old and silent records hearable. Mr. Grainger has kept his records unplayed.

The new machine, which will enable the American public to hear thousands of old American folk songs, Indian songs, and voices of personalities long deceased, is an invention from the Philco Company's laboratories. Produced in about two months' intensive research by Elmer O. Thompson, laboratory engineer, the machine transcribes the old cylinders without danger of scratching away valuable words or music, as ordinary needles would do in a few playings.

The machine represents use for the now familiar electric eye, or photo-electric cell. The photo-electric pick-up is placed on a standard dictaphone machine, replacing original equipment. The standard spindle is changed for one that will fit the commercial type of old Edison wax cylinder. The photo-electric pick-up is in turn connected to a Philco Home Recorder. Sound from the wax cylinder can thus be transcribed from the cylinder onto a flat disk type record, from which any number of additional impressions can be made.

Instead of the usual phonograph needle, which would gouge and destroy the sound groove of a frail cylinder, the device has a sapphire stylus which needs only to float gently in the grooves. As it does this, it sways a tiny mirror from six to seven thousandths of an inch thick. This mirror reflects light rays, directed on it by a tiny bulb, onto a photo-electric cell. The cell translates the light rays into energy which sets up the sound vibrations.

The new device reveals vividly that the weak feature of old-fashioned, scratchy, gurgling phonograph music was due, not to the recording itself, but to the reproducing machine. The horn was too small to reproduce the lower frequencies, and the mechanized part would not reproduce the upper frequencies. Listening to an old cylinder record of "Rocked in the Cradle of the Deep," as played on an old tin-horn phonograph, the quartet seemed to have trouble diving for low notes and voices faded in critical moments. The same record now transcribed to a flat disk and played with modern reproducing equipment shows that the quartet was not floundering, or suffering from a bad cold. The music is heard, as people of the early twentieth century had no chance to hear it—though it was there all the time on the cylinder.

One of his most valued sets of recordings, Mr. Grainger points out, is a set of the same complete songs sung by the same man on three different occasions. Available for close analysis at last, this rare musical record will show the kind of variations that occur in folk music, and features which are kept faithfully unchanged.

The Library of Congress hopes that Americans who have old cylinder records, of no use to them, may add them to the musical archives for study there.—EMILY C. DAVIS.

NEW ELECTRIC LAMP USING TELLURIUM AND OTHER RECENT PATENTS

TELLURIUM, an element related to sulfur, discovered about a century and a half ago, and, though not rare, has so far found very few applications, is used in a new electric lamp. To its inventors, John W. Marden, East Orange, N. J., Norman C. Beese, Verona, N. J., and George Meister, Newark, N. J., the U. S. Patent Office has just granted U. S. Patent 2,215,648, one of 564 granted last

week. Rights have been assigned to the Westinghouse Electric and Manufacturing Company. The inventors are connected with the Westinghouse Lamp Works, at Bloomfield, N. J.

Actual light comes from a glass tube shaped like an inverted J, contained in a larger bulb. The tube contains tellurium vapor. With a tube four inches long and a little more than a half inch in diameter, satisfactory operation was secured with two to three amperes of electrical current at 150 to 200 volts. A curious characteristic of the tellurium light is that it resembles that of a glowing solid more than of a glowing gas. The latter usually, when broken into a spectrum, shows a series of bright lines, but that from tellurium vapor shows more of a continuous spectrum. When operated at the correct voltage, its light is very close to daylight, so perhaps the lamp will have applicataions where artificial daylight is needed.

Other Westinghouse investigators recognized this week by the Patent Office were Dr. Edward U. Condon, assistant director of the Research Laboratory, in East Pittsburgh, Gereld L. Tawney and Willard A. Derr. This is a machine to play the game of "Nim," which, they say, "is to a certain extent similar to checkers." By a complicated system of electrical wiring the machine itself really plays against one or more players, the moves being shown by lamps on a screen above the apparatus. Rights for this patent, 2,215,544, are also assigned to the Westinghouse Company.

Daily changes in temperature from the cool of the night to the warmth of the day are used to furnish power in an invention by Michael Salvador Quinte, of Burbank, Calif. This was given patent 2,215,652. The air in an enclosed chamber expands as its temperature rises, which in turn changes the height of a level of liquid, and with it a float connected to a spring motor. As the changes in height occur, the motor is wound up, so that it can be used as a source of power. To make sure the device will work, even if temperature changes are not adequate, the patent provides for an electric heating element which can be used to warm the air.

A railroad freight car which can be removed from the tracks and made to serve as a trailer on the roads, pulled by a truck or tractor, is the invention of George T. Ronk, of Cedar Rapids, Iowa, which received patent 2,215,886.

Those who can not sleep in a Pullman car because of the click of the wheels as they pass from one rail to another, may benefit as a result of the invention of Thomas B. Maher, of Lynchburg, Va., granted patent 2,215,475. This is a joint which is made silent by connecting the rails to eliminate the click.—JAMES STOKLEY.

NEW WAY TO PICK PEOPLE NEAR NERVOUS COLLAPSE

A WAY to pick out the person who is approaching nervous breakdown and prevent that catastrophe may be found as the result of new research in the laboratory of psychology of Brown University.

Building on what has recently been discovered about the causes of nervous breakdown, and the comparisons in both rats and humans between "neurotic" and "normal" individuals, Dr. Frank W. Finger has gone back of the mental crisis. In experiments with rats, he has watched and measured the abnormalities of behavior that are preliminary to nervous disorder. He found out how a rat behaves when he has not collapsed, but is on the way toward nervous breakdown.

The rats in Dr. Finger's experiment are faced with a difficult problem of choice between two similar gray cards. If he jumps against one, it swings open to food. The other will not swing, and he gets a bump on the nose and falls. After each punished jump, Dr. Finger found, the rat will hesitate longer in making his choice, and will jump with greater force. This tendency increases when the difficulty increases and following each punishment. For a whole day following each trial, the rat is sluggish.

By measuring the time of hesitation and the force of the animal's jump, he was able to obtain, probably for the first time, a quantitative evaluation of what happens on the road to nervous breakdown.

If a similar measure can be found for changes in behavior of men and women faced with increasingly perplexing or unsolvable problems of life and continually punished by life's hard blows, it may be possible to help those who are approaching the breaking point.

HORSE SLEEPING SICKNESS

HOPE that specific remedies to treat sleeping sickness, infantile paralysis, and other virus diseases of the central nervous system can be developed appears in the new rabbit serum for treating the western strain of horse sleeping sickness announced by Dr. Joseph Zichis and Dr. Howard J. Shaughnessy, of the Illinois Department of Public Health, in the *Journal* of the American Medical Association. Men as well as horses are attacked by the form of sleeping sickness known technically as equine encephalomyelitis. Vaccines to protect horses from the disease have been used successfully, and at least one such vaccine suitable for protecting man has been developed.

A successful serum for treating the disease would be more practical than the vaccine, according to public health authorities, because so little is known about the spread of the disease that it is hard to determine where and whom it will strike and who should be vaccinated. Vaccination of the entire population, of course, would be impractical, especially as human cases have not been very numerous.

The serum developed by the investigators of the Illinois Health Department from the blood of hyperimmune rabbits has given good results in treatment of mice and guinea pigs. Practically all the animals treated in the early stages and about two thirds of those treated in the later stages of the sickness recovered. No human trials are reported, though further studies of the serum are said to be in progress.

Serums for the treatment of other virus-caused diseases have been developed and used before this. In the case of diseases like the horse sleeping sickness, encephalitis and infantile paralysis, however, no success with serum treatment has been achieved. It was thought that this was because in these diseases the virus strikes nerve cells and the serum could not be got into contact with the virus in these cells. Examination of the brains of the treated animals that recovered showed that the virus had been

spreading in and damaging the brain, but that its progress was checked by the serum. This gives hope that serums can be developed to check the damaging progress of other viruses that invade the brain and nervous system, though, of course, it may be some time before such serums are ready for use if they ever are.

Reason for the success in serum treatment of laboratory animals suffering with equine encephalomyelitis was the fact that a big enough dose was used. Contributing to the success also may be the use of rabbit serum instead of horse serum. The rabbit serum is believed to have smaller antibody (disease-fighting) molecules which probably can penetrate to the infected body tissues more rapidly.—JANE STAFFORD.

TREATMENT FOR CHRONIC SLEEPING SICKNESS

HOPE that a specific treatment for chronic sleeping sickness (encephalitis) will eventually be discovered appears in a report to the American Medical Association of studies of the brain of Patricia Maguire, of Oak Park, Ill. The girl, who fought a five-year losing fight against this ailment, attracting nation-wide attention before her death three years ago, may thus some day be included in the group of medical martyrs whose sufferings contributed to better methods of disease-fighting. The origin of pathologic, as opposed to normal, sleep seems also to be clarified by studies of the brain of this victim of such a sleep disorder.

Post-mortem study of her brain, according to Dr. Richard B. Richter and Dr. Eugene F. Traut, of Chicago, show conditions which it is believed could only be caused by a chronic infection, and not as the result of a progressive process of brain tissue change, set off by an original acute infection.

The latter view of chronic encephalitis as a progressive process following acute infection has gained increasing support in recent years. Findings showing that it is more likely an inflammatory process suggest that a means of treating chronic encephalitis or sleeping sickness may eventually be found because inflammatory conditions may lend themselves to treatment. The present method of treating the condition is to treat each symptom as it arises.

The injury responsible for production of abnormal sleep in humans as well as in animals is, reported from the findings on Miss Maguire's brain, damage to the rear part of the hypothalamus region of the brain. Details of these studies appear in the October issue of the *Archives of Neurology and Psychiatry*.

ITEMS

EAGLES are always an attraction in any zoological park's aviary. So rare that it is doubtful if the average zoogoer ever heard of it, is the monkey-eating eagle of Africa. The National Zoological Park in Washington, D. C., is fortunate in the acquisition of a pair of these birds, brought back from Liberia by Dr. and Mrs. William M. Mann. They are believed to be the only pair of monkey-eating eagles now on display in this country.

CORN has apparently won its race with frost, it is indicated in reports from all over the country received at U. S. Weather Bureau headquarters. In the northern part of the Corn Belt, as represented by Minnesota, frost has already come, but the corn was ripe ahead of its arrival. In Illinois three fourths of the crop is now safe, and in Iowa more than four fifths can no longer be harmed by even a heavy frost. This is stated to be 23 per cent. more than average and about ten days earlier than a normal year. In the South, cotton bolls are opening rapidly and picking is making excellent progress, except where interfered with by heavy rains. Although the rains may interfere with farm work in parts of the great central valley they bring welcome relief from the threat of drouth to many localities. Rain is particularly welcome in parts of the winter wheat belt, where lack of soil moisture has been causing some concern.

IN many kinds of scientific work, a very constant source of light is needed, but with an electric lamp, variations in the current supplied to it may cause considerable changes in the light intensity. Harold Stewart, of the University of Rochester, speaking before the American Optical Society, stated that he had used a special regulator. The voltage of the incoming electricity varied by several per cent., but the regulator cut it down to about 1/400 of one per cent. Even then, he said, the output of light varied more than 1/10 of a per cent., due to causes within the lamp itself. By arranging an electric eye to watch the lamp and, in turn, control the electron tubes in the voltage regulator, he was able to secure light of more constant intensity.

LAURENS HAMMOND, inventor of the electric organ and the novachord, has given the music trades a third electrical instrument on which any one may play a melody simulating any sort of instrument while accompanying himself on the piano. The new device, called a "solovox," consists of a three-octave keyboard instrument to be clipped to the underside of the piano keyboard so that its keys are just below the level of the piano keys. Thus the pianist's right hand can play keys on either the piano or the solovox. The solovox keys operate electrically, by setting up minute oscillations in radio tubes that are in a separate box set off to one side through the usual cable connections and loud speakers. The solovox will not play chords, being so connected that it will sound only one note at a time. On the front of the keyboard, however, are a dozen controls with which the tone of the solovox can be altered to simulate the quality of almost any musical instrument, while a knee-operated lever controls volume.

IT has been found that a marsh can be greatly improved as a home for water-loving wildlife species by blasting openings in the thickly matted vegetation, making small ponds where ducks and geese can swim. Experiments in the creation of such small water areas in a bulrush-cattail marsh near Jewell, Iowa, will be reported in the October issue of the *Journal* of Wildlife Management by Thomas G. Scott, of the U. S. Biological Survey, and W. L. Dever, of E. I. du Pont de Nemours and Company.