

PHYSICS

What Makes Paper Curl? Remedial Measures Studied

► **WHAT** makes printing paper curl? Frederick T. Carson and Vernon Worthington, scientists at the National Bureau of Standards, have found that tendency to curl depends on such things as shrinkage during manufacture, weight and how porous the paper is to air. But moisture is of greatest importance.

If moisture content of the paper could be kept the same as the surrounding air, the scientists explain, most annoyances of paper curl could be avoided. As humidity changes from day to day, one part of the sheet expands or contracts more than another part—and up it curls.

Some printing plants find it worth while to air-condition their plants, thus maintaining an equilibrium between the paper and surrounding air.

To help choose remedial measures for those who must fret with curling paper, a test has been developed for maximum curl which involves floating bits of paper on water.

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METALLURGY

Tiny Mirror Reveals Data on War Metals

► **BOUNCING** a beam of light off a tiny metal mirror, scientists now observe metals changing into alloys and learn in a few minutes the rate at which metals diffuse through one another.

Developed by Dr. Howard S. Coleman and Prof. Henry L. Yeagley, physicists at Pennsylvania State College, the new method replaces tedious processes which took months and years. It helps speed the study of war metals, just as other phases of the war program have been accelerated.

New information will be obtained about improving alloys, the metal mixtures so important in the war.

Studies may reveal more about the resistance of metals to heat and suggest ways of improving this quality.

This same process might be used to prevent metal corrosion, the scientists suggest. Fundamental things that occur in aging metals are being revealed.

The scientists use thin metal films only about a fourth the thickness of ordinary typewriter paper. First the metals are vaporized, then deposited atop one another as films on a glass slide, thus forming a mirror.

They are then removed from the

vaporization chamber, heated to the desired temperature and the diffusion rate observed.

The diffusion of these thin films usually occurs in a few minutes, compared to the many months often required by old methods which used larger quantities of metal. This also involved prolonged heating at a temperature of several hundred degrees while only slight heat is required by the new method. Sometimes even the heat of the hand is enough to start diffusion of thin films.

To follow the speed of diffusion, the amount of light reflected from the mirror film is measured. A normal metal surface has a certain reflecting power. But as one metal spreads through another the amount of reflected light is changed. This change is measured by a recording instrument called a galvanometer.

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MEDICINE

War Medicine Aided by Grants from Commonwealth

► **A THIRD** of the medical research gifts from the Commonwealth Fund during the past year went into studies related to the war, the Fund's annual report just issued reveals.

"Six of these," the report states, "should contribute to the knowledge of shock, four to the control of infectious diseases, one or more to aviation medicine.

"This is a technician's war and the techniques of medicine are essential to the winning of it," the report comments.

"The Fund is selecting for current support chiefly projects in research which promise direct usefulness to war medicine, offer significant contributions to the physiological underpinnings of medicine, or rest on long-continued consecutive observation that cannot be interrupted without letting partly won facts slip back out of reach."

Since the war began the Fund has set aside \$845,000 for war relief, war service and related purposes.

Total appropriations from the Fund last year were \$1,777,396. This has been divided between war gifts and gifts to support constructive efforts for health and scientific advance.

Assets at the end of the year were over \$50,000,000. The Fund was established by Mrs. Stephen V. Harkness in 1918 and its endowment was later increased by gifts from its president, the late Edward S. Harkness.

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IN SCIEN

AGRICULTURE

Soviets Raise Black Cotton; Eliminates Dyeing

► **BLACK** cotton is a new variety recently originated by Russian plant geneticists, a bulletin from the Soviet embassy states. One advantage which this cotton has, together with other varieties with colored lints ranging from reddish to green, is the eliminating of the dyeing process. It is believed that the natural black will be a faster color than the black of dyed cottons.

American cottons with green and brown lints have been known for some time but are not grown on a large scale because their yield is considerably lower than the white-linted varieties. Our colored cottons are used principally in certain regional handicrafts industries.

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PLANT PHYSIOLOGY

Seed Treatment Chemical Fails To Increase Yield

► **HOPES** of greatly increasing vegetable and field crop yields through chemical treatments of seeds are somewhat damped by a report (*Botanical Gazette*, Dec.) on negative results of a large number of experiments by Dr. William S. Stewart and Charles L. Hamner of the U. S. Department of Agriculture.

These two researchers tried a number of growth-regulating substances, including several commercial preparations intended for seed treatment, on the seeds of a considerable assortment of plants, ranging from field crops like corn, wheat and soybeans to garden vegetables such as radishes, carrots and squashes. They grew them under a wide variety of soil and climatic conditions in three places—the Department's great experiment station at Beltsville, Md., at the University of Chicago, and at Lake Geneva, Wis.

In all cases, they report, they were unable to detect any significant increase in yield as a result of the chemical treatment of seed.

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CE FIELDS

AGRICULTURE

New York Soybeans Sent To Soviets for Trial

► FOUR bushels of Cayuga soybeans, a variety developed by Cornell University plant breeders, have been shipped to the Soviet Union through the Russian War Relief for trial plantings as a feed and food crop. Cool weather and short growing seasons in Russia resemble conditions of New York state. The Cayuga variety matures in any part of New York up to 1,600 or 1,800 feet elevation.

Soybeans of the Corn Belt will not mature in New York or in the cool areas of Russia.

The Cayuga's yield is from 20 to 25 bushels or more of dry beans to the acre. It may help to solve the food production problems of a Russia despoiled of her great grain-producing area in the Ukraine.

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PUBLIC HEALTH

Prevention Is Greatest Hope For Mental Hygiene

► GREATEST hope for the future in reducing the burden of mental sickness and its costs lies in prevention, Homer Folks, secretary of the State Charities Aid Association and chairman of the Temporary Commission on State Hospital Problems, declared at the 100th anniversary of the opening of the Utica State Hospital in Utica, N. Y.

Many millions of dollars, he stated, could be saved each year in the state of New York alone from the costs of construction and maintenance of state hospitals for mental illness by a vigorous campaign of prevention. New York's present annual budget for mental hygiene institutions is \$40,000,000. Of this, three-quarters is spent for state hospitals alone.

New York made one of its worst financial errors, he believes, when, having wisely taken on the maintenance of the hospitals for the insane, it thought itself unable to carry on an effective system of diagnosis and treatment through clinics.

Establishment, right now, of diagnostic and treatment clinics or "Mental Health Centers" is the "great white hope for the state of New York and every other state in the Union in this mental hygiene field," he declared.

For the future there are three other important things we may hope for in this field, he said. These are: more and more fully trained psychiatrists in our hospitals; new methods of treatment; and a better understanding of the environmental factors in the cause of mental sickness.

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ENGINEERING

Next Ice Cakes That Will Eject Themselves

► THE OLD problem of how to get the ice cubes out of the tray without melting a lot of good ice, on which a number of patents have been taken out, now has been solved in a clever way by making the freezing process itself do the job. The method is disclosed in U. S. patent 2,296,327 issued to Thomas Barish of Jamestown, N. Y.

The tray consists of a number of individual round cups joined together by connecting webs of metal. The cups have corrugated sloping sides much like the tin cups used for baking small cakes. They are composed of two metals one of which contracts more with decreasing temperature than the other. The whole cup is made of the other metal, and strips of the more contractile metal are overlain on the bulges of the corrugations. The consequence is that as the temperature sinks, the corrugations are more or less straightened out, thus increasing the volume of the container and drawing the walls away from the ice. This is exactly opposite to the behavior of the usual ice tray. The metal contracts as the temperature falls and the walls tightly grip the ice.

In addition, the bottoms of the cups bulge downward, and are also composed of the two metals, the more contractile being on the outside. Hence when the temperature drops, the bottom straightens out and may even bulge inwardly, thus lifting the ice cake still further from the outwardly sloping walls. This action if desired can be made so strong, the inventor says, as to make the ice cake actually pop out of the receptacle.

The preferred metals are nickel-steel and copper, so that for this convenience we shall probably have to wait until the emergency is over.

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PUBLIC HEALTH

Meningitis More Frequent Than for Past Five Years

► MANY MORE cases of meningococcus meningitis are being reported by state health officers to the U. S. Public Health Service each week than have been reported at this season any time in the last five years.

The total number, 278, reported for the week ending Jan. 9, is higher than for any week since 1928, which is the earliest year for which the federal health service has comparable weekly figures.

Total number of cases for the week ending Jan. 16, latest on which reports are in, was 275, which is from two to five times as many cases as were reported in the same week during the previous five years. The five-year median figure for this week in January is only 46.

During the year just ended (1942), there were 3,774 cases reported altogether. This is a larger total yearly figure than any year since 1937, when there were 5,390 cases.

At present, and for some time past, the cases have been confined to the extreme eastern part of the country and the Pacific coast.

Influenza cases are also a little high. Total for the week of Jan. 16 was 4,329, representing an increase of several hundred over the previous week and being higher than the 3,894 of the five-year median.

For the same week, Jan. 16, Pennsylvania reported 10 cases of smallpox, Indiana 13, and Ohio 3.

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AERONAUTICS

Flight Testing Advances Win Award for MacClain

► OUTSTANDING work in flight testing of aircraft engines and development of the engine torque indicator has won the Octave Chanute Award for A. Lewis MacClain, aircraft engine test pilot and engineer of the Pratt and Whitney Aircraft Division, United Aircraft Corporation, East Hartford, Conn.

The engine torque indicator, which measures brake horsepower, was the first practical device for accurately measuring the power output of a plane engine during flight.

Presentation of the award was made at the Honors Night Dinner of the Institute of Aeronautical Science in New York on January 26.

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