

RADIO

Magnetic Storms May Be Due To Holes in Radio Layers

➤ **MAGNETIC STORMS** which interrupt radio communications and cause magnetic needles to get jumpy may be due to holes in the ionosphere, those conducting layers high above the ground that reflect radio waves back to earth. The holes are punched by streams of atomic fragments from the sun.

This view is expressed by T. L. Eckersley of Marconi's Wireless Telegraph Co. Ltd. (*Nature*, Aug. 8).

The streams from the sun, he believes, are neutral, being composed of equal numbers of positively charged protons and negatively charged electrons. The protons being heavier penetrate the atmosphere more deeply so that two oppositely charged layers are formed, the protons below, the electrons above. But a localized neutral stream may sweep a space clear of charged particles thus leaving a hole in the ionosphere. This is the cause of a magnetic storm, Mr. Eckersley believes.

He finds much evidence for the existence of these holes, but the mathematics of the matter has not been completely worked out because the density of the particles in the stream is not yet known.

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PHARMACY

Sugar Shortage Puts New Ingredients in Syrups

➤ **SYRUP** which your corner druggist often uses to suspend the latest medicines as well as make the "soothing syrup" of grandma's day, now may contain new and strange ingredients due to restrictions on use of sugar.

Irish moss, locust bean gum, tragacanth, hog gum—all are being experimentally used as thickening agents, mixed with the soluble form of saccharin in an effort to find a completely satisfactory syrup in which to suspend medicines taken in this manner. Work being done is reviewed by Dr. C. Lee Huyck of the Research Laboratories, Wm. S. Merrell Co. (*Journal, American Pharmaceutical Association, Practical Edition*, July).

The snowy white crystals of the chemical, saccharin, are around 280 times as sweet as sugar, pharmacists tell us, so a little bit will go a long way.

Some difficulty has been encountered

in making this into a smooth tasty syrup with the materials available, however. Tragacanth, for example, one of the druggists best gummy substances for this purpose, comes from shrubs growing on the mountain slopes of Asia—not a particularly good source right at present. Imports of the locust bean have also been cut off.

Irish moss and sodium alginate look most promising, Dr. Huyck reports. We get these from forms of sea weeds obtainable in this country.

London Hospital reports the use of the chemical methyl cellulose with chloroform and saccharin in water, but this type of substitute often forms a feathery unsightly sediment which makes the medicine undesirable for use.

A variant of a British syrup of marsh mallow is said to be good, using saccharin instead of the usual sugar. This is obviously not made from the puffy white candies, pharmacists smilingly warn, but from the white root of an herb often found growing in our marshes.

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ASTRONOMY

Furnace Used to Learn About Properties of Stars

➤ **TEMPERATURES** of the stars and their composition are now more accurately determined with the help of an electric vacuum furnace, described by Dr. Arthur S. King of the Mount Wilson Observatory in California. A hollow carbon is filled with some substance to be tested and this is vaporized in the furnace. The light of the incandescent vapor is then examined with the spectroscopy which spreads the light into a rainbow band, the spectrum. The spectrum of a substance varies with the temperature. New "lines" appear and old ones fade as the temperature rises.

With the furnace, the precise temperature can be determined at which a spectrum of a certain type appears. If a star shows a similar spectrum, it must contain that substance and have that temperature.

Hitherto, substances were vaporized in the flame, the arc, or the spark. The spark is the hottest, but its temperature is not accurately known, and is not easily controlled. The new furnace eliminates these difficulties, but so far reaches only to the temperatures of the cooler (red) stars, several thousand degrees Fahrenheit.

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IN SCIENCE

AERONAUTICS

New Navy Scout Plane Is Now in Active Service

See Front Cover

➤ **THE SEAGULL**, new scout-observation plane for the U. S. Navy, is shown in the photograph on the front cover of this week's SCIENCE NEWS LETTER taking its rough water test.

The plane, now in active service, is designed to serve as the "eyes of the fleet." It is claimed by its designers to be the fastest battleship and cruiser-based plane operated by the U. S. fleet, but actual performance data have not been announced.

It is equipped for either land-based operations or for catapult operations from battleships or cruisers and has a wide range of operating speeds.

The Curtiss-Wright Corporation, the makers of the Seagull, are pleased that the first of these new planes is assigned to the new cruiser *U. S. S. Cleveland*, because much of the precision machinery used in building the plane was produced in the Cleveland, Ohio, area.

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TOPOGRAPHY

Nazis Would Find Caucasus Mountains Hard to Cross

➤ **THE NAZIS** would have a tough job if they attempted to cross the Caucasus mountains in their drive toward the Caspian oil-fields.

The Caucasus are high, steep, rocky mountains which have easily defended narrow valleys leading to mountain passes. They have ten peaks higher than America's highest, Mt. Whitney. In fact, the highest mountain of Europe is 18,000-foot Mt. Elbrus in the Caucasus.

The Urals, on the other hand, often spoken of as a safe natural barrier to Nazi penetration, would be classed as "a bunch of hills" by any Western American. In general they do not rise above 6,000 feet and are similar in character to our own Appalachians.

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E FIELDS

PHARMACY

Australians Can Produce Much Needed Opium

► OPIUM POPPIES can be grown satisfactorily in parts of Australia, the Council for Scientific and Industrial Research reports.

This news comes at a time when imports have been cut off from the Far East and other former sources. United States officials are keeping a watchful eye on our dwindling stockpile of opium from which valuable medicinals are obtained.

Analysis of Australian opium indicates that its morphine content is variable but has commercial possibilities.

Progress has been reported in extracting morphine directly from the dried whole plant. The present method obtains opium from the poppies by cutting the unripe seed capsules and collecting only the milky juice which exudes.

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PSYCHOLOGY

Children Fear Separation More Than They Do Death

► CHILDREN between the ages of 7 and 13 reflect the cynical, disillusioned attitude prevalent after the last war, with no positive idea of what we are fighting for this time, according to a study made in New York on the children's ward by two Bellevue Hospital psychiatrists, Dr. Lauretta Bender and Dr. John Frosch.

The war so far has had no disturbing mental effect on these children, although they reacted with fear and anxiety to the threat of being separated from their parents. This conclusion, confirming British blitz experience, is reported by Dr. Bender and Dr. Frosch (*American Journal of Orthopsychiatry*, October).

Although the children agreed that "war was bad," war has no very personal meaning to the average young child, according to these psychiatrists. Death and killing do not mean the same to them as to adults. In the few cases of anxiety over the war, this seemed

to be due primarily to personal, emotional problems at home. "Glorification of war was conspicuous by its absence and surprisingly few thought of war in terms of bravery, heroism, freedom and patriotism," these observers found. "If anything, there was a glorification of peace."

Toward the end of the study, however, a change could be observed, reflecting a change in public opinion. There was more emphasis on a global war, with the Nazis and the Japanese seen as a common enemy. Most of the children thought of the war as a fight between the "haves" and "have-nots" with practically no mention of freedom versus tyranny.

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RESOURCES

AA-2X Preference Rating On Lumber for Army Models

► FURTHER OFFICIAL recognition of the importance of model airplanes to America's war effort was given by the War Production Board through the issuance of an AA-2X preference rating for lumber which is used for the making of models needed by the First Fighter Command of the U. S. Army Air Forces.

Conservation Order M-208 issued by the War Production Board on August 21, 1942 (probably the first order in which preference ratings were set up simultaneously with the issuance of the order) applies to all softwood lumber of all species, grades and sizes; except shingles and lath, plywood, veneer and used lumber.

Immediately after issuance of this order which seemed likely to reflect adversely upon the production of airplane models for use by the Fighter Command, Science Service sought further clarification of the order. This has just been issued by the WPB.

"Since the planes are to be delivered to or for the account of the Army or Navy of the United States, all purchase orders for softwood lumber covered by Conservation Order M-208 may bear a preference rating of AA-2X for the lumber needed. This would be a Class 2 order. We would like to call your attention to the fact that this rating would not be applicable to Balsa Wood."

Now all lumber dealers can feel assured that they will be able to replace their stocks of softwood lumber which they sell to these model builders.

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INVENTION

Silver-Tipped Tool Heats Rivets for War Industry

► A SILVER-TIPPED tool for heating explosive rivets, and thereby causing them to explode, is the invention of Lawton A. Burrows and Roger W. H. Gentry of Woodbury, N. J., and Davis L. Lewis, Jr. of Swarthmore, Pa., who have received patent 2,295,075. The rights have been assigned to E. I. du Pont de Nemours & Company.

Explosive rivets have been often described. They are much used in airplane and other construction where it is impossible to get at the other side of the structure to back the rivet. The explosion forms the head on the far end.

In heating these rivets, the inventors explain, the heat must be applied only to the rivets, which are often no more than one-quarter inch in diameter, and the heat must be carefully regulated. If the adjacent metal is heated, it will expand and the joint will not be tight.

The heater devised by them resembles an electric soldering iron, but has a small rounded tip which, they say, must be a good conductor of heat, preferably silver. The tool also has a pistol grip and an extensible front support, like an ancient musket, to steady it and guide it accurately to the work. It also has means for regulating the heat.

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METALLURGY

Air Bubbles Save Metal From Low-Grade Ores

► QUANTITIES of precious copper, zinc, lead, nickel, tungsten, chromium and other strategic metals are being rescued from low-grade deposits and mine wastes by air bubbles, which float them to the surface. The low-grade ores are ground in water and small amounts of chemicals are added which selectively attach themselves to the grains of the valuable minerals and float them to the surface.

This process of "froth flotation" has been used for many years, but E. I. du Pont de Nemours & Company announce the development of new chemicals by themselves and others which improve the process and make it more economical. The precious minerals are skimmed off the surface and subsequently smelted and refined, thus adding to the supply for our war implements.

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