PUBLIC HEALTH

In Midst of War Scare Danzig Fights Cancer

THE STILL Free City of Danzig, Europe's present powder keg, is pushing the fight against cancer, regardless of what other forces she may shortly have to fight. Under a new health law, every woman over 30 years and every man over 45 years, the dangerous ages for cancer, can have a free medical examination every year in order to detect early signs of cancer.

The new law also provides for an administrative body to fight cancer by educational and other activities. Only doctors may treat cancer under the new law. Treatment by correspondence and other irregular and unethical methods is forbidden. Doctors who diagnose cancer are required to report the cases to the health authorities, and the cost of diagnosis is borne by the new administrative body that is fighting cancer.

Science News Letter, August 26, 1939

CHEMISTRY

War Gas Chemists Have Equation for Death

DEATH by Equation might well be the sub-title of a new chemical textbook, "The War Gases: Chemistry and Analysis," just published (D. Van Nostrand Co. $7.50) and written by Dr. Mario Sartori of the Italian Chemical Warfare Service.

Did you know that chemical warfare experts have an equation for death? It is C x t = W. "W" is the mortality-product, or the lethal index, of a war gas. "C" is the concentration of the substance in air expressed in milligrams per cubic meter and "t" is the time, in minutes, sufficient to cause death.

Another name for the "W" factor is the Haber Product, named after Germany's famous World War chemist who directed the concoction of many of the gases used early in the conflict.

The mortality-product gives the toxic power of the asphyxiating gases and those poisons absorbed through the skin. It cannot be determined on human subjects and the tests are ordinarily made on animals like cats, dogs or rabbits.

The toxic power of war gases is not solely bound up in the mortality-product, or the end result. Highly important is the "lower limit of irritation," the amount of the substance which will show pathological sensitivity. Here actual tests on human beings are employed and the concentration of the gas, for example, is increased until the test subjects cry or sneeze or exhibit other known symptoms.

At the top in its irritating ability is the chemical, diphenyl chloroarsine, whose lower limit of irritation is only a tenth of a milligram of gas in a cubic meter. Chloropicrin and phosgene, better known perhaps, are 20 and 50 times less irritating.

Diphenyl chloroarsine, too, enjoys the unenviable distinction of heading the list on another important count; the limit of insupportability—the maximum concentration a man can breathe for one minute without injury. One milligram per cubic meter is the amount for deadly diphenyl chloroarsine. Chloropicrin, in contrast, requires fifty times the concentration to get the same effect.

No layman's book is Dr. Sartori's new text, for it contains straight chemistry in complete dosage to bring together all the scattered references from the literature on war gases and their properties.

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GENETICS

Halving the Chromosomes Next Step in Plant Study

NEXT step in making new plants to order will be just the reverse of the sensational doubling of the chromosomes technique—diploid plants made by the drug colchicine, which promises better cotton, tobacco, berries, etc.

Now geneticists are searching for a chemical that will halve the number of chromosomes — produce to order what are called haploids, which very occasionally occur naturally.

Chromosomes inside the germ cells are the bearers of heredity. All the inherited qualities of a plant (or an animal or even a human baby) are packed in their minute volumes. The doubled chromosomes allow a more successful and fertile blending of two different heredities, even two plants with different numbers of chromosomes. Just the reverse is the case in the hoped-for haploids. Inbreeding is desired, a sort of parthenogenesis, the chromosomes being halved in number can combine with themselves, under colchicine's influence, magnifying genetically the qualities of the plant. At Cold Spring Harbor, N. Y., on Long Island, Carnegie Institution of Washington's world-known geneticist Dr. Albert F. Blakeslee, who developed the colchicine technique, is trying all sorts of chemicals—200 so far—attempting reliable creation of haploids.

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IN SCIENC

GEOPHYSICS

Sunspots, Northern Lights, Disturb Telegraphy

SUNSPOTS, brilliant displays of northern lights, magnetic storms and interruption to telegraphic communication have coincided to give new evidence that there is some connection between spots on the sun and the magnetic condition of the earth.

The sun had a very unusual procession of sunspot pairs parading across it. A severe magnetic storm, accompanied by a very unusual display of aurora borealis, so brilliant that cars were able to drive without headlights, occurred on Friday night and Saturday morning, Aug. 11-12. Some telegraph lines that use the earth as one side of the circuit were temporarily put out of commission by the unusual electrical state of the earth.

As spots are still on the sun, more magnetic storms, aurora and accompanying effects may be expected.

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AGRICULTURE

Plow That Made Corn Belt Acquired by Smithsonian

THE SMITHSONIAN Institution has acquired an implement that had more to do with the winning of the West than even Daniel Boone's famous long rifle. It is the first steel plow forged by John Deere at Grand Detour, Ill., in 1837. Made of an old sawmill saw because other suitable steel was lacking, it was able to shear through the tough roots of the prairie grasses that balked the relatively feeble Eastern-type plows which the pioneers had brought with them.

The reputation of Blacksmith John Deere's steel plows spread, and presently he and his partner gave up general blacksmithing altogether and became specialists in plow manufacturing. In 1846 they turned out 1,000 sod-breaking plows —a mass-production figure, for those days.

The historic implement will be added to the collection of early American plows already in the Smithsonian Institution, some of which date back as far as 1797.

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E FIELDS

ASTRONOMY

Giant Telescope Disk One Of Strangest Monuments

See Front Cover

ADD to the list of strangest monuments in the world one to glass and astronomy. The largest piece of glass in the world, the original and "spare" disk for the 200-inch telescope mirror, has been erected as a public exhibit in the public square of Corning, N. Y., not far from where it was poured in 1934 at the Corning Glass Works. It will become a tourist sight, it and its dome-shaped building advertised on postcards sent back home by thousands. Weight: 20 tons. Size: Nearly 17 feet in diameter, 27 inches thick. Color: Translucent, opalescent bluish white. The reason it is a monument instead of mirroring the universe for Hale Observatory, Mt. Palomar, Calif., is that slight defects caused by cores of the mold coming loose marred its perfection. Another disk was poured and actually used for the mirror.

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PHILOSOPHY

Explorer Doubts Greeks Invented "Liberty"

DID some wise human invent Liberty —or was it a pre-insect invention?

A shrewd guess that it was the latter is advanced by Arctic explorer Vilhjalmur Stefansson, who finds himself drawn into argument over "Who invented Liberty, anyway?" (*See SNL,* July 8)

Challenging Dr. Walter Woodburn Hyde, University of Pennsylvania's Professor of Greek, who recently declared that Liberty was the greatest invention of the Greeks, Dr. Stefansson wants to know, "What about the Eskimos?"

"Dr. Hyde may be right that the Greeks were first to theorize about Liberty," concedes Dr. Stefansson. "But Stone Age Eskimos of Coronation Gulf took it so for granted as recently as 1910 that they never theorized about it. To borrow an American phrase of 1776, they took the right to freedom as self-evident."

Dr. Hyde has traced the record of Liberty back to the historic council of Greek chiefs meeting outside the walls of Troy. Ideas of personal freedom were then already formed in the minds of these thinkers, he concludes, and he speculates that the germ of the Liberty idea came perhaps from Greek ancestors migrating from the Danube.

But Dr. Stefansson argues that that isn't going nearly far enough back. He reasons that prehistoric man thousands of years before the siege of Troy enjoyed Liberty, even if he was not very articulate about it.

In fact, Dr. Stefansson doubts that man invented Liberty at all. Perhaps Liberty was merely here on earth—taken for granted by the dim-witted anthropoids, and by the little animals before them, and by the reptiles and the earliest insects before them.

"Perhaps," says the Arctic explorer, "Liberty was never invented. Perhaps the real invention was the abridgment of Liberty."

And even credit for thinking of that may not go to human thinkers. Dr. Stefansson says maybe human beings re-discovered curtailing of Liberty—an idea that insects or pre-insects invented.

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METEOROLOGY

"Weather by the Week" In Washington, D. C.

THE NATION'S capital gets its weather by the week, so that if it rains on Sunday it is likely to rain on several following Sundays.

The cycle is not exactly a week, but six days and 18 hours, explains Dr. Charles G. Abbot, secretary of the Smithsonian Institution, who with Miss Nancy M. McCandlish has just published the results of statistical studies on persistently rainy weekends, covering a period of 15 years.

The cycle is just one-fourth the time it takes a group of sunspots to make one complete rotation around the sun, so that apparently the phenomenon is connected in some way with sunspots, says Dr. Abbot.

Because the period is one-fourth of a day less than a week, the rainy Sunday "curse" can be expected to be lifted in about a month, by a one-day forward shift.

This actually happened during June and July of the present year. When the study was completed, in May, Dr. Abbot ventured the prophecy that June would have rainy Sundays and Tuesdays, and July rainy Saturdays and Mondays. The record shows maximum rainfall on Tuesdays in June and on Saturdays during July.

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PSYCHOLOGY

Meaning More Important Than Sound in Conditioning

A BOY'S mouth may be taught by experience or by a psychologist to water if he sees the word "cent" because he can buy candy with such a coin or because he is given candy when he sees the word. This is the good old conditioned reflex a la Pavlov.

Will it water, with no candy in sight, when he sees "scent" (homophone to "cent"—word with same sound but different meaning) or when he sees "penny" (synonym not sounding the same)?

That problem has been tested by Prof. G. H. S. Razran, Columbia University psychologist. Three subjects conditioned to words "style," "urn," "freeze," and "surf" flashed on a screen while they chewed gum, sucked lollipops, or ate tea sandwiches. Their mouths watered upon sight of the words alone with no food fed them. Then later flashed on the screen: "stile," "fashion"; "earn," "vase;" "frieze," "chill;" "serf," "wave." First word same in sound—second word same in meaning. Which received more transfer conditioning, for which was salivation greatest?

To the journal *Science* (July 28) Prof. Razran reports: By far the greater portion of the transfer conditioning went to synonyms (semantic conditioning) than to homophones. Verbal conditioning is primarily semantic, going with word meaning than with mere visual-auditory word form.

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CHEMISTRY

Colloidal Fuel from Coal Sought as Oil Substitute

A SUCCESSFUL and cheap method for manufacturing colloidal fuel from coal is being sought through an industrial research fellowship at Kansas State College.

Although colloidal fuel is not now being used industrially anywhere in the United States, investigations to date have offered promise of finding a technique which would be cheap enough to make it an important possibility for railroad fuel and for use in power plants where either fuel oil or pulverized coal is now burned.

Dean R. A. Seaton of Kansas State College's Division of Engineering, explained that a satisfactory colloidal fuel would help to utilize effectively the petroleum supplies of the United States.

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