

ASTRONOMY

Kopff's Comet Re-Found After Seven Year Absence

TO join brilliant Hassel's comet still in the northwest sky, Kopff's periodic comet has returned to the vicinity of the earth and sun after an absence of seven years. It was rediscovered by Prof. G. Van Biesbroeck of Yerkes Observatory early Saturday morning, April 22. Far too faint (thirteenth magnitude) to be seen by the unaided eye, it will be observed by large telescopes only. It is located in the constellation of Aquarius, the water-carrier, in the southeastern heavens just before sunrise.

Kopff's comet was first discovered in 1906, by a German whose name it bears.

Science News Letter, May 6, 1939

PHYSICS

Atmosphere Is World's Cheapest Raw Material

WHAT is the cheapest and most important raw material on earth? Coal? Wrong. Wood? Wrong Again. Water? That's cheap enough, but there is something more useful and less expensive.

Air, the stuff we breathe. That is the world's cheapest raw material. It is all around us, wafted from city to country, from nation to nation, without freight costs and import duties. Essential to life, both animal and vegetable, it is also needed wherever fire burns.

Yet a mere 200 years ago it was believed that things that burned gave up a substance, phlogiston, whereas almost every kindergartener knows now that oxygen from air is added in combustion. Not until the closing decade of last century was the last 1% of the air's composition explored, but today, the rare gases, neon and argon, are used in large quantity to fill electric lamps.

Nitrogen, 81% of the air's volume, is one of the most essential elements. No longer are agriculture and war dependent upon Chile nitrate deposits for nitrogen because Haber process plants, producing some 4,000,000 tons of fixed nitrogen a year, supply our needs. Large as this amount is, it is only the nitrogen above a fifth of a square mile of earth's surface.

Oxygen, too, is extravagantly abundant. There is an enormous consumption of oxygen by the breathing of human beings, animals, etc. and the daily burning of wood, coal and petroleum. Fortunately vegetation can convert the

resulting carbon dioxide back into oxygen and thus restore the atmospheric balance. For every breathing human being, exhaling at the rate of 3 pounds of carbon dioxide per man per day, about three 200 foot trees are needed to break down the exhalations and return oxygen to the atmosphere.

In this lies a future danger. Dr. Russell Grimwade of Melbourne, Australia, reminds us that replacement of trees by buildings or even grain fields carries with it the danger of upsetting Nature's balanced air. He suggests that we may need to establish vegetation control to protect our atmosphere.

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MEDICINE

Sound Waves Are Tried As Cancer Treatment

A NEW approach to the problem of treating cancer by the use of ultrasonic sound waves was reported to the American Chemical Society.

The procedure was revealed "as a preliminary investigation of the last few months" by Dr. John C. Krantz, Jr., and Frances F. Beck of the University of Maryland.

Ultrasonic sound waves vibrating 300,000 times a second have been used to study changes in the metabolism of cancer cells in rats. The scientists hope to find some differential effect of the sound waves on cancer tissue and normal tissue. As their goal, the scientists are seeking to destroy cancer cells without harming normal surrounding tissue.

The tests conducted by Dr. Krantz were carried out with rats which had been inoculated with abdominal cancer. The tumorous growth from the rats was suspended in an oil bath which contained two vibrating quartz plates. The intense oscillations of the supersonic waves make the cancer cells vibrate.

The test of the effect of the sound waves on the cancer cells was to determine how the tumor could use glucose (sugar) which was injected into the tumor. So new is the research that no positive beneficial effect has so far been noted, Dr. Krantz said. However, the studies are being continued because of their fundamental and important objectives.

In its way, the new method offers the possibility of using a new physical method of treating cancer which may, if it proves successful, some day rank with X-rays and gamma rays in cancer therapy.

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IN SCIENCE

ASTRONOMY

89-Year Sunspot Cycle Reported by Smithsonian

A NEW rhythm in sunspot activity, recurring at intervals of 89.36 years, has been discovered by H. Helm Clayton, meteorologist of Canton, Mass., and is reported through the Smithsonian Institution. Mr. Clayton worked out the new cycle, which is divided into eight "seasons," by mathematical analysis of sunspot records since 1793, when reliable records first begun to be taken.

In the place of the old approximate cycle of 11 years, Mr. Clayton found a period consisting of exactly 11.17 years, and other periods of 5.56, 8.12, 8.94, 9.93, 11.14, 14.89 and 19.86 years respectively. All these are nearly submultiples of the fundamental period of 89.36 years, which now becomes the major sunspot period, and the one upon which predictions must be based.

Mr. Clayton checked his theoretical period by going back and "predicting" sunspots from 1880. The observed number and the calculated number came very close to identity.

According to the new method of prediction, sunspots will reach their next minimum in 1945 and the next maximum in 1949.

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MEDICINE

Rabies Vaccine May Come From Eggs in Future

VACCINE for the treatment of rabies may in future be prepared from eggs instead of rabbits. This is suggested by results of culture experiments reported by Dr. James R. Dawson, Jr., of Vanderbilt University School of Medicine. (*Science*).

Dr. Dawson has succeeded in transmitting the virus of rabies to chicks and also in implanting it in incubating eggs. The embryos developed, and apparently would have hatched if they had not been sacrificed for laboratory purposes. Examination of the central nervous systems of both chicks and unhatched embryos yielded positive evidence of the presence of the disease.

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E FIELDS

ARCHAEOLOGY

Monument of Rome's Victory Over Germans Found

THE long-lost Triumphal Arch of Tiberius, which the Roman Senate set up in 16 A. D. to hail victories over German tribes, has been found in Vatican City, archaeologists believe.

The discovery, made near the ancient Chancellery Building on Vatican territory, consists of five sculptured panels and includes the only known likeness of Emperor Tiberius as an old man. Pope Pius XII has instructed Prof. Nicola Maggi, assistant to the director of the Vatican Museums, to proceed with excavations, as the marble friezes are of outstanding importance for Roman archaeology.

The first carvings found lay 16 feet underground. They came to light during excavation of the tomb of Irtius, personal friend of Julius Caesar. The carvings show political figures of Tiberius' time, and processions of priests and magistrates.

The only clue to existence of the Tiberius arch has been in the writings of the historian Suetonius. He said the Senate decided to erect it to commemorate victories over the German tribes by Tiberius' son Drusus, and the recovery of the Roman insignia, or emblem, lost at the battle of the Teutoberg Forest. Even the location of the arch has been unknown.

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MEDICINE

Current Progress In Control of Arthritis

MANY reports are appearing these days on ways of treating and controlling arthritis or rheumatism as it used to be called. This is a reflection of increased activity on the part of medical scientists who are studying the problem. The number of different measures reported to have given good results may, however, be confusing.

There is no doubt that progress is being made. Doctors no longer take a hopeless attitude about the condition, and all authorities on the subject urge

arthritis sufferers to be optimistic. Cultivating a cheerful attitude, freeing the mind of worry and anxiety, are in fact now considered an important part of the treatment. This part, of course, is pretty much up to the patient.

Rest, both mental and physical, is very important. One authority, Dr. Walter Bauer, of Harvard Medical School, says that rest is probably as important in the treatment of rheumatoid arthritis as in the treatment of tuberculosis. Like tuberculosis patients, arthritis patients may need to be put to bed for complete rest, getting back to more normal life by slow stages.

So far as the various specific remedies or medicines reported to give good results are concerned, it must be remembered that arthritis patients are likely to have periods when they feel much better and others when they feel much worse. It is natural for them to credit the better periods to the last remedy tried and to think at last a "cure" has been found. The wise physician knows how to discount the effect of such periods of improvement and to wait for a much longer time before considering the remedy or treatment really effective.

If patients with arthritic or rheumatic tendencies are treated early, physicians say that the disease in many cases can be controlled. That is, it can be kept from going on to the stage of permanent joint damage, crippling and disability.

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MEDICINE

Cancer Discoveries Under Grants Can Be Patented

CANCER discoveries made with Uncle Sam's aid may be patented, the National Advisory Cancer Council has decided. When a scientist aided by federal cancer funds makes a discovery he will consult with the Surgeon General of the U. S. Public Health Service to determine whether it should be patented, and if so, how. Patenting is a vexing problem in medical circles.

Atom smashing neutron ray experiments at the University of California, directed at treatment and more control of cancer, were given \$23,000 more support. Surveys of cancer treatment and centers by the American College of Surgeons were implemented by \$7,500.

Three new centers for training physicians in cancer work were approved at Duke University, Durham, N.C.; Wayne University, Detroit, Mich.; and the New England Deaconess Hospital, Boston.

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MEDICINE

Scotch University Honors Discoverer of Prontosil

FOR HIS discovery of Prontosil, first of the now widely used group of chemical remedies that includes sulfanilamide and sulfapyridine, the German scientist, Dr. Gerhard Domagk, has been awarded the Cameron Prize for 1939 of Edinburgh University.

Dr. Domagk of the Institute for Experimental Pathology and Bacteriology of the I. G. Farbenindustrie—Germany's ranking chemical combine—found the chemical had amazing curative action on streptococcus infections in mice. This and many other infections in humans have since been successfully treated by Prontosil and its chemical relatives.

The Cameron prize is awarded to a person who, in the opinion of the Senate of the University, has made within the preceding five-year period a major contribution to practical therapeutics.

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MEDICINE

Copper, Electrically Injected Cures Fungus Diseases

COPPER, passed through the skin by electric current, is being successfully used in treating fungus infections of the hands and feet by physicians at Yale University Medical School.

In the past many remedies have been used to treat these painful and abhorrent skin infections without spectacular success.

Of 37 patients treated at Yale by means of electric current, 26 have been discharged as cured. Some of them had severe infections of long duration, one for as long as 25 years. The average number of treatments given was six.

The afflicted person sits with his feet immersed in enamel pans and with the hands in other basins. When the infection is on the feet, the hands are immersed in salt solution and the feet in 0.2 per cent. copper sulfate solution. For infections of the hands the relations are reversed.

The duration of the treatment is 20 minutes. Special apparatus has been devised to obviate the danger of electric shock.

Dr. Howard W. Haggard, Dr. Maurice J. Strauss and Leon A. Greenberg describe the new treatment in a preliminary report in the *Journal of the American Medical Association*. (April 1)

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