SCIENCE NEWS

Science Service, Washington, D. C.

OXYGEN ON MARS AS AN INDICATION OF LIFE

THE presence of oxygen gas in the atmosphere of Mars is the best evidence to date of life on that planet, according to the opinion of Dr. Henry Norris Russell, of Princeton University, who spoke recently at the University of California at Los Angeles.

The concentration of oxygen about Mars is only about fifteen per cent. of that over the earth. This was recently shown by measuring the wave-length of certain radiation passing through the moving atmosphere of the planet. So dilute an atmosphere would not support life in animals of the earthly type. There is no very good reason, however, why an entirely different animal evolution should not produce creatures whose venous blood or other bodily fluid could absorb oxygen at low air pressure. Nevertheless, as a matter of simple logic oxygen still does not prove the presence of animal life.

In the vegetable realm oxygen tells a more convincing story. Dr. Russell points out from the chemical viewpoint that free oxygen gas is utterly out of place in the advanced stages of a dead world. In particular, the ferrous iron minerals, present in vast quantities in the various planets, by the laws of the chemist should long ago have absorbed all oxygen gas in sight. In such chemical action the minerals are normally converted into the ferric iron of common red soils. It is only the reverse chemistry of a growing plant which could possibly restore a supply of the active gas.

Extensive gray-green bands on the planet Mars—sometimes called "canals"—are thought by Dr. Russell to consist of vegetation. The extreme distance of the planet, however, renders evidence of animal life so far impossible of detection.

The very existence of a planet such as the earth with so favorable a combination of physical and chemical conditions is regarded by the astronomer as an extremely rare accident. Accordingly there are likely very few inhabited worlds in proportion to the total number of heavenly bodies in existence. Nearly all are either too hot, too cold, too small to hold an atmosphere by force of gravitation, too dry, or have the wrong kind of atmosphere. Moreover, it is equally unlikely that any great number of inhabited worlds would happen to develop during the period of time in which we live.

BELGIAN ELEPHANT FARMS

PLOWING by elephant in the Belgian Congo has proved fourteen times less costly than plowing by tractor. Since maintenance of the great beasts, including food, two attendants each, medication and depreciation, works out to about twenty-five cents a day and a trained elephant brings about $2,400, at the present value of the franc, the government elephant farms at Bas-Uele and Haut-Uele in the Kongo district are expected to be soon on a self-supporting basis.

On account of the havoc brought upon horses and cattle by the tsetse fly, the government began experimenting with the training of wild elephants as far back as 1902. Indian mahouts and domesticated Burmese elephants were imported but both soon succumbed to the climate. The ferocious African elephant is not easily transformed into a gentle domestic servant, though there is some evidence that the famous elephants in Hannibal's legions were from his native continent.

Before the Burmese mahouts departed, however, they taught the African natives some of the age-old Burmese elephant songs and a few apt pupils picked up the art of elephant management. Certain fierce tribes found elephant hunting a pleasant substitute for killing their neighbors so that the experiment went on after the war with redoubled interest. The black mahouts were soon singing the Burmese elephant songs to Niam-Niam tunes, but the big pachyderms seemed to understand.

Only baby elephants, from approximately two to ten years old, are singled out from the wild herds for capture. They are trained under the tutelage of skilled elephant men and older elephants known as "moniteurs," wise in the ways of breaking in the younger ones of their kind. Some idea of the rate of elephant growth can be gathered from the case of one elephant that has grown from four feet two inches when he was captured in 1902 to eight feet three inches at the present time.

It is estimated that one elephant will plow two and a half acres in two days and is an otherwise valuable asset in pulling stumps, piling timber and such arduous tasks, necessary in bringing a new country under cultivation.

DISEASE OF THE GROUSE

THE grouse disease that has made the partridge literally a rare bird in sections of the northeast, where his drumming was once as familiar as the robin's call, is proving a difficult problem for science to unravel.

Under the direction of Dr. A. A. Allen, of Cornell University, research has been carried on for three years with the object of locating the cause and possible cure of the scourge. Progress has been hampered by the fact that ruffed grouse are delicate and high-strung birds to handle in the laboratory. Some of the difficulties can be appreciated from the fairly typical results obtained by one game preserve officer, who succeeded in raising only 50 birds from 394 eggs laid in captivity.

Attempts made to identify the germ of the malady responsible for the large losses throughout the northern states and Canada have not yet succeeded, though a vast amount of useful information has been collected concerning the parasites that infect the birds and certain fungus diseases that affect the lungs. It has been found that one parasite produces changes in the blood that bring about the deposit of waste products in the feathers, causing patches of them to turn black.

The tick that transmits tularemia, the rapidly spreading disease of wild rabbits and man, is also suspected of infecting grouse. Dr. R. R. Parker, of the Spotted Fever Laboratory at Hamilton, Montana, has found the tick on grouse but has been handicapped in further research on the problem from lack of funds with which to secure live birds for experiment. One species of grouse has definitely been infected artificially in the laboratory, but whether this dreaded disease is actually prevalent among birds in the field is not yet known.

RICKETS IN BIRDS

FEATHERS may be still another source of the much-discussed antirachitic vitamin D. Hawks and owls raised by Dr. William Rowan, of the University of Alberta, Canada, in captivity and fed only on "livers and lights" from the butcher shop developed rickets and in many cases died before reaching maturity. His experiments are reported in *Nature*. Two young owls, however, that had been fed mice and sparrows almost exclusively, were not affected. This suggested the addition of chicken heads with feathers and an occasional sparrow to the menu of the rest of the survivors. Thereafter rickets ceased to give trouble.

The preen gland of the domestic fowl, Dr. Rowan points out, is known to be a rich source of cholesterol, one of the parent substances of vitamin D, a condition that may apply to feather oil. As further evidence for his suggestion, he cited the case of a merlin under his observation several years ago that fed her offspring on birds that were plucked before they were brought to the eyrie. Only occasionally did she bring home a victim with the feathers still on, from which she fed the young birds mouthfuls of feathers only. Her offspring apparently objected to the "dose" because it had to be thrust well down their throats before it would go down.

"Possibly," said Dr. Rowan, "it is true that there is nothing new under the sun, and we may here be witnessing a crude method of administering the antirachitic vitamin D that has, no doubt, been in practice for countless centuries."

THE DOG'S WORLD

THE average dog owner could write an enthusiastic book about his pet's intelligence and keenness. But scientists have only begun to penetrate into the dog's world, to find out carefully and exactly how much a dog sees and understands.

Experiments so far made indicate that the average dog has far more faulty vision that most dog-lovers suppose, according to a survey of what is known about dog psychology made in *The Quarterly Journal of Biology* by Dr. C. J. Warden and L. H. Warner, psychologists of Columbia University.

Laboratory experiments in Russia and other countries have led most psychologists to believe that the dog has little or no ability to see colors. A puppy that seems to know red from green may be responding to a difference in the brightness of the two colored objects, or some other clue that his human friends overlook. A dog's vision for still objects appears to be decidedly inferior to that of a man, but he is keenly sensitive to moving objects.

A dog's sense of smell appears to be far superior to that of a man. A German shepherd dog, for example, was able in every instance to pick out a small piece of pine wood that had been handled by her keeper, even when the piece of wood was placed with as many as twenty other pieces that he had never touched. Two seconds' contact between the keeper's hand and the object was sufficient to insure the dog's identifying the keeper with the object.

On the other hand, police dogs were tested in Germany by giving them the glove of a person and telling them to pick out the owner from a row of men. The dogs all failed on this test and on a number of other tests intended to prove their usefulness in police work. As a result of the tests the use of dogs in criminal detection was forbidden by the Prussian Government. It is not clear whether the dogs really "understood" what was wanted of them in these tests.

Whether dogs recognize words as a human being does, or whether they respond to sounds, or merely to tones and inflexions of the voice, is not agreed upon by experimenters. In tests with the thoroughbred German shepherd dog, "Fellow," recently made by Dr. Warden and Mr. Warner, the dog responded to 400 words used in various commands given by his master Jacob Herbert, of Detroit. In some cases, Mr. Herbert gave the commands from an adjoining room with the door closed, thus showing that the dog did not depend on watching his master's face or gestures for clues. Taking commands through a closed door was new to "Fellow," and the voice was muffled, but he made a good record though not a perfect one.

One of the chief reasons why scientific men disagree on the dog's capacities is that all sizes and sorts of dogs have been used in experiments, from highly bred bull terriers to an assortment of mongrels. The authors suggest that a representative breed of dog should be settled upon for systematic study.

THE KENTUCKY MOUNTAINEERS

A LITTLE over a century ago, the mountaineers of eastern Kentucky were probably slightly superior to the average American in intelligence. To-day, these disappearing American highlanders rank considerably lower than average.

To find the cause for this striking decline in mentality, Dr. Nathaniel D. M. Hirsch, of Duke University, has visited three counties of the mountain country and has tested almost 2,000 young highlanders.

According to Dr. Hirsch, environment is responsible for only about 25 per cent. of the sub-average mentality; heredity is the cause of 75 per cent. For a hundred years migrations have played a large part in lowering the intelligence level. Long ago, when game and fish became rare in eastern Kentucky, the people who had settled in the mountains were faced by the problem of trying to farm the steep hillsides, or of moving. A migration of the restless and foresighted took place about 1820 to 1840.

Two more waves of migration struck the mountain region, one about the time of the Civil War and again in 1880. Now, since 1903, there has been a fourth migration, which has probably not yet reached its height, carrying away chiefly the more energetic, ambitious and intelligent groups.

Dr. Hirsch concludes that very close intermarriage of the depleted stock that has remained in the mountains is another cause for the falling level of intelligence. The outlook, however, is good. The gifted sons and daughters of the mountains, who have moved to more desirable surroundings are contributing their pure blood and sturdy character to American life in a wider field. "The nation is bettered by their spread," says Dr. Hirsch. "The communities to which they move are biologically and morally enriched."

The mountains that they left are being rapidly developed industrially for the hidden resources of oil, gas, soft coal, mica, kaolin. More changes have taken place there in a few years than in a whole century preceding. The unique civilization of isolated pure-blooded highlanders will soon be lost by the intermingling of mountain families with the Italian and Hungarian laborers that are coming in to dig in the mines, run the railroads and work in lumber camps.

ITEMS

BUTTERFLY breeders, who have built up a respectable little business in Germany as well as in the United States, have their work simplified for them by a simple trick described by Julius Stephan, a German naturalist. Many butterflies have the habit of emerging from their cocoons at night, so that breeders have had to sit up with their charges until all hours in order to prevent them from fluttering about their cages and damaging their delicate wings. Herr Stephan avoids this nocturnal labor by artificially hastening nightfall. At two or three in the afternoon he transfers the cocoons to a dark, cool place, and the insects soon begin to display their normal night-reaction. By seven o'clock all that are due to emerge that day will have put in their appearance.

THE latest available figures of the U. S. Public Health Service show that there are 250 more cases of smallpox in the last reported week in March than there were in the corresponding week of last year. In spite of the fact, however, that smallpox is more prevalent this year in the country at large, it has just been reported to the American Medical Association that not a single case of the disease has been contracted in the public schools of St. Louis, Mo., for thirty-three years. Systematic vaccination with subsequent inspection and reinspection of vaccinations on the part of the city division of health and the hygiene department of the public schools are considered the agents that have made possible this remarkable record.

ULTRA-VIOLET light can be used to take photographs to reveal alterations in documents, according to a report of Professor Carlo Bonacini to the *Rivista Fotografica Italiana*. He has found that writing on a paper which had been erased by chemical means, and was entirely invisible to the eye, had altered the fibers of the paper, a fact which was shown by the ultra-violet photographs. Professor Bonacini has also confirmed previous reports that if writing is done in ink of the ordinary kind, and the paper is placed in contact with an ordinary photographic plate or film for a time, the plate loses its sensitivity where it touches the writing. Then, if it is briefly exposed to the light, and developed, the writing appears transparent on a gray background. He has found that this works even if the writing has been bleached by chemicals, so that the method offers another way of detecting altered checks or other documents.

A DIET high in protein or meat increases the activity of laboratory rats but makes them easily frightened. These are some of the results of an attempt to find the effect of food on the temper made by Professor Emil Abderhalden, of the University of Halle, who has been making determinations of the psychological behavior of rats fed on different diets. One series of rats was fed on a diet that was rich in protein and poor in carbohydrates, while a control series of similar rats was fed on a more usual diet, with abundance of carbohydrates. The experiment was continued for a considerable time, and observations were made of rats' dispositions while fed on the prescribed food. It was found that the variation of the diet had a striking effect on the behavior. The rats which received little carbohydrate and a great deal of protein showed distinctly abnormal characteristics. They were much more active and were more resistant to the ill effects of alcohol. Together with these more or less desirable changes was a decidedly undesirable one, namely increased susceptibility to fright.

THE use of charcoal for producer-gas as a propellant for motor vehicles is being seriously considered in Great Britain. The Forests Products Research Laboratory has already conducted preliminary experiments on various methods of preparing charcoal for this purpose. So far it has investigated two French types of portable kilns, and also the more ordinary type of bee-hive kiln. Arrangements have been made with the Fuel Research Station to carry out tests on the charcoal prepared from various species of timber, and to determine its value for producer-gas.

SOLID bubbles of selenium, the element that transmits electricity when light shines on it, though at other times it offers great resistance to an electric current, can be blown with the aid of a glass tube, according to a report in *Nature*, by Charles E. S. Phillips. The selenium is melted and then when the tube is dipped into it, withdrawn and blown through, a rather sausage-shaped bubble can be blown. A curious effect reported is that when two bubbles, even twenty-four hours old, are brought into contact, they come violently together and can not again be separated. The method is said to be a convenient one of getting flakes of selenium for experimental purposes.