

SCIENCE NEWS

*Science Service, Washington, D. C.*THE ROCKS AND HILLS OF DAYTON
TESTIFY FOR EVOLUTION

THE very hills themselves testify for evolution. The little town of Dayton, to be the scene of the now famous trial of J. T. Scopes, for violation of the Tennessee anti-evolution law, could not be better placed geologically as the site for such a test to determine whether natural law, made by God, or legal law, made by man, shall prevail.

The very ground the courthouse is placed upon, the rocks of the landscape with the embalmed life of ages ago will all be irrefutable witnesses for the defense if men will but use their eyes and their brains.

West of the little country town of Dayton is Walden's Ridge—named for an event in a previous struggle that concerned the freedom of the body of man. It is appropriate that this ridge is composed of the youngest and most recent rocks of the region thereabout and that below it, exposed by the wear and wash and the uneasiness of the earth for millenniums, there is layer upon layer of rocks each representing different and progressively older deposits. The ridge itself is composed of sandstone interleaved with layers of coal, the natural source of one of the commercial products of Dayton. This is the record of the rocks that testify to-day that there was a time when trees looked like gigantic ferns and had spores instead of seeds. Look at a piece of coal under the microscope and those spores can be seen and identified to-day.

Close by the coal seams are layers of iron ore made by the accumulative activities of millions of bacteria millions of years ago. And lower down in the hills and earlier in age are strata of limestone, useful to man in utilizing the iron. These many layers of rocks were made by nature in the geological era now called by scientists the Carboniferous on account of its coal. Below them there are Devonian and Silurian rocks and earth upon which the town of Dayton itself rests and out of which spring the strawberries and peaches, the principal products of the region.

In all these rock layers evidence of prehistoric life can be found. There are spores of the trees that made the coal, calcified remains of trilobites, ancestors of the modern cockroach, fossil tree trunks and other animal and vegetable remains of a time that antedated man by millions of years.

Is it any wonder that it was Dr. G. W. Rappleyea, superintendent of the Cumberland Iron and Coal Co., who instigated the anti-evolution test case against the young Dayton high-school science teacher, Scopes? For in his work of finding iron and coal, he has learned the reliability of the record of the rocks.

Scopes, too, knows how to read the story chronicled in limestone, shale, iron and coal. And it makes him more determined that he shall not be prevented from teaching his eager young pupils the most basic, most interesting and most fundamental facts of nature.

Perhaps, if the question of the reality of evolution arises in the evolution trial set for July 10, it would be well for the judge to have the jury take a walk among the hills and see for itself just how, at one stage in the world's history, Nature slowly and purposefully conducted the building of the earth.

THE ORIGIN OF THE VERTEBRATES

THE real missing link in the evolutionary chain according to Professor William Patten, who teaches the freshman course in evolution at Dartmouth, is not the immediate progenitor of man, but a much more remote ancestor, which connected the fishes with the earlier invertebrate forms. Professor Patten has long held that the secret of this problem would be found in the oldest fish-like animals known, the Ostracoderms, who made their appearance in the early Paleozoic, long before the first true fishes came into existence. The last representatives of this class died out in the Carboniferous era and their fossil remains are rare and fragmentary.

But Professor Patten has heard of a new find of these fossils on the northwest corner of Spitzbergen, and he is starting as soon as possible to explore the locality for this new evidence of evolution. From the northern point of Norway he will proceed to Spitzbergen, five hundred miles north, and then charter a motor boat to convey him along the coast of the islands.

Professor Patten's motive in undertaking this voyage of exploration may be given in his own words:

"To the biologist, the real 'missing link' in animal evolution is not between man and apes, but between vertebrates and invertebrates. For the genesis of practically every great system of organs in man can be traced in various ways without serious question to corresponding organs in the fishes. But there the genetic trail ends.

"Thus there is the greatest difference of opinion as to what class of invertebrates gave rise to the fishes and through them to the higher vertebrates. Many biologists now regard this problem as insoluble. I am not of that opinion. I have worked on various aspects of it for nearly forty years and am convinced that I have found essentially the correct solution. The recent finds in Spitzbergen, judging from the as yet brief preliminary accounts, confirm my predictions in a most striking manner.

"This problem has great practical as well as theoretic possibilities. Its solution would more than double our present perspective of the course and manner of animal evolution. Moreover, three of the oldest and most important organs of man from a medical standpoint are the pineal gland, the pituitary organ and the thyroid. They apparently have essentially the same structure and functions in all the back-boned animals from man down to the fishes. If we can prove that the ancestors of the Ostracoderms and fishes were spider-like animals, as I

believe we can, the homologues of these mysterious organs can be readily identified in living invertebrates, such as modern scorpions and the horseshoe crab. It would then be possible for the experimental biologists and medical men to learn something definite about their history and initial functions that should be of great importance in the treatment of the diseases in man due to abnormalities of the ductless glands."

TRANSPLANTATION OF MALE SEX GLANDS

FOR the first time in history of scientific research male sex glands in lower animals have actually been transplanted and made to persist in perfectly normal condition. The announcement was made to-day at the University of Chicago where Professor C. R. Moore has solved a problem that has been troubling biologists since 1796.

Dr. Moore has developed a technic that has enabled him to transfer male sex glands from one laboratory animal, such as a rat or rabbit, to another of the same species but of a different age. This transfer tissue has developed a blood supply from a set of blood vessels that does not normally supply it, has grown for months under new conditions, and on removal for examination has been found to have carried on its normal function.

Dr. Moore explains the work as follows, revealing the difficulties involved in his experiments and those that have preceded him.

"Despite a more or less intensive study of sex gland transplantation for many years past by biologists all over the world," Dr. Moore states, "the conditions underlying the successful incorporation of such tissues removed from one animal to another, or from one place to another in the same animal have not been well understood.

"The work involves the separation of a very delicate piece of tissue from its normal environment and its normal blood supply, and the transfer of it to another animal or another locality in the same animal. Unless the tissue meets conditions sufficiently favorable to enable it to establish a new blood supply it will very soon die and be removed by the protecting mechanisms of the body as any foreign body might be so disposed.

"The female sex gland has been transplanted with considerable success for many years, and in many cases retained its normal condition and function, but the male sex gland of mammals has been found more difficult to work with on account of its very sensitive nature. Until recently it has never been transplanted, even from one place to another in the same mammalian organisms with anything like persistence in its normal conditions.

"With the knowledge gained from many different lines of investigation during the last seven years, facts have been uncovered and so utilized that I am now able to announce the persistence of portions of the male sex gland of mammals in a perfectly normal condition.

"The male gland transplantation in mammals has been studied by many European workers and persistence of some structures of it have been obtained for the past twenty-five years. The tissue persisting, however, has

never been found in a normal condition. Structurally it has been altered very considerably and has never been found to carry on its normal function of producing mature sex cells. It has been considered impossible, up to the present time, to so far carry over from one animal to another the male sex gland of the mammal and to obtain its incorporation so that it could carry on its normal function of producing germ cells."

COLOR SIGNALS IN SWEDISH RAILWAY CROSSINGS

To aid the color blind in distinguishing light signals at railroad crossings, the Swedish State Railways have decided, after an exhaustive investigation, to abolish the green light in favor of bluish-white and to adopt a special shade of red, which tests have shown to be most easily recognized by all automobile drivers. Furthermore, the lights installed at crossings owned by the state, will be additionally differentiated by blinking at different speeds when there is no danger and when a train is approaching, so that even if a person can not tell any color from another, he can not fail to observe the frequency with which the light flickers.

The state railways' eye specialist, Dr. C. G. Bostrom, has conducted the experiments and has found that between five and six per cent. of all males are colorblind and that, since practically every one in Sweden wants to drive a car, it would be unjust to deprive these men of the privilege, as seriously proposed in the Riksdag. At the same time many accidents have been found to be due to the inability of drivers to tell the green lights from the red, so that from July 1 this year the new double precaution will be adopted.

Another device to safeguard railroad crossings has been invented by a Swedish engineer, A. Westfelt, and tests have been made at certain crossings on the state lines. It consists of a bar that swings out seven feet above the ground whenever a train approaches and a row of short chains that strike any car trying to pass under without injuring it. Being placed about eighty feet from the crossing, the bar gives the driver warning in time to stop before reaching the tracks, but at all times it remains high enough in the air to escape being crashed into. It is operated automatically by the approaching trains, and when danger is over it swings back alongside the roadway.

ULTRA-VIOLET RAYS AND RICKETS

THAT such fats as olive oil and lard may be activated by exposure to ultra-violet rays and used as a substitute for cod liver oil in the treatment of rickets is shown by experiments about to be reported by the Department of Agricultural Chemistry of the University of Wisconsin in a forthcoming issue of *The Journal of Biological Chemistry*.

Until recent years, rickets has been a scourge among babies. Only within the past few years has science demonstrated that rickets is due to a deficiency of calcium in the bones and that the oil from the liver of the codfish will prevent and even cure the disease.

In the series of experiments now published olive oil and lard were each exposed to the action of the ultra-violet rays from a powerful mercury vapor quartz lamp for periods of time ranging from 30 minutes to seventeen hours.

After exposure to the rays these fats were fed to a group of experimental rats in which rickets had been produced and the activated olive oil and lard were found to have the same beneficial results that followed the administration of cod liver oil. Not only did the weight of the rats increase, but an analysis of the bones showed an increase in the calcium content.

Some of the activated olive oil that had been stored in a stoppered bottle showed no change in potency after a period of ten months. It was found also that the fats might be activated by the rays from the open carbon arc, the iron arc and by sunlight, but that exposure for prolonged periods such as seventeen hours destroyed the potency of the fats, this effect being produced even on the cod liver oil.

TRAINED MONKEYS

IN Pattani, a southern province of Siam, and in Kelantan, one of the unfederated Malay States, monkeys are trained by the natives to pick coconuts and edible seed pods for their masters, according to D. Bourke, of the Indian Forest Service, who has made an interesting observation of a new commercial use of trained domestic animals.

The romantic notion—derived from literature of the Swiss Family Robinson type—that monkeys naturally climb coconut palms and throw down the nuts out of mischief or from a desire to oblige is pure fiction. The monkeys must be caught young and carefully trained to their jobs by attaching them to a long pole on the top of which is fastened a bunch of fruit. The animals quickly learn to run up to the fruit and throw it down for their own food. Having once mastered the central idea, as it were, they can then be perfected in their profession in the palm trees.

When one considers how very few of the thousands of wild animals man has domesticated and trained to really useful jobs—not more than a dozen, if circus exhibitions and the like are excluded—this use by the Malays and Siamese of the monkey is an appreciable contribution.

Everywhere in Siam and Malaya one sees monkeys kept as pets, but Mr. Bourke was struck by the extraordinary number that he saw in Pattani. Every hut had one or two chained in the doorway, and the natives walked about followed by monkeys attached to long coir ropes. The explanation for this unusual fondness for the animals was the above utilitarian one.

Only the larger monkeys are successful with the coconuts. It requires considerable effort and frequently the use of teeth as well as hands to detach the nuts. But the smaller monkeys can readily manage the pods which grow in small clusters on the ends of the branches of the sataw tree, and which provide the natives with an important food item. The seeds resemble a broad bean, and are eaten as a vegetable, both raw and cooked. It

is said that a well-trained monkey can pick as many pods in a day as a man, thus enabling his fortunate owner to earn a full day's wages with a minimum amount of effort.

ITEMS

SPONGES are the bee hives of the sea. This curious discovery has been reported to the U. S. Bureau of Fisheries by Dr. Charles J. Fish, of the scientific staff of the New York Zoological Society's steamer *Arcturus*, cruising in tropical waters. The "bees" which Dr. Fish found inhabiting the canals of sponges were whole colonies of the tiny snapping shrimp, *Alpheus*. These gregarious shrimps, he discovered, swim freely about but always return to the individual sponge which is their hive-like home. Numerous other forms were also found to use these subway passages as a haven of refuge at the approach of danger. One sponge-hive with its homing shrimps was secured and placed in an aquarium aboard ship where the colony continued to flourish. This discovery makes known another of Nature's queer partnerships; for the sponge which the shrimps use as a home is itself a marine animal, although it spends its adult life fixed to the rocks in one place, like a plant and the canals which shelter the shrimps are the many mouths through which the sponge gets its food.

DEVELOPMENT of accuracy is more important than speed in learning to do certain mechanical operations, according to Dr. Garry Cleveland Myers, of Cleveland, Ohio, who will report a new series of experiments in a forthcoming issue of *The Journal of Personnel Research*. Typewriting was done by two squads of seven girls each, practising three minutes a day for thirty-six days. One group was instructed to work for speed and were reminded by their instructor at each trial to speed up all they could. The other group was cautioned at each trial to take great care that no errors were made. At the end of the period the accuracy group had not gained much over the speed group; but later, after four months without practice, when each group copied, for speed, unfamiliar material for ten minutes, the speeders wrote an average of 383 words, while the accuracy squad wrote an average of 451 words. The average of the accuracy workers was 1.2 words wrong per hundred; that of the speeders was 2.2. A later series of experiments corroborated the finding that if attention was directed solely to speed, accuracy tended to diminish. On the other hand, if attention was directed solely to accuracy, speed tended to increase.

PETROLEUM oil may be supplanted as a lubricant in most German industries by oils produced from lignite and coal tar. Dr. Baum, of the Commission on Mining Engineering, Heat and Power Utilization, estimates that 80 per cent. of Germany's requirements can be supplied at less cost by improvements of lubricants which were produced during the war when Germany was cut off from sources of Russian and American lubricating oils. These tar oils are not suitable, however, for the lubrication of steam engine cylinders, air compressor cylinders or turbines.