

from then on it improved, and before 9 p.m. was coming over as well as one could possibly wish for. The criticism in the "Radio News" and in a daily paper may have been based on the reception at the commencement of the broadcast. The reception of the Whangarei Band concert, relayed by land line through 1YA, was successfully picked up on a 2-valve machine."

Two Appreciations.

I GET the weekly "Radio" paper, and in it I am surprised to see how many grumblers there are in New Zealand. I am a listener in every evening—we have a very good wireless set. I grant I know very little about wireless, but what I do know I owe to you. I appreciate the efforts of everyone who is connected with the radio announcers, uncles, aunts, etc., as well as the wonderfully good music and entertainments you give us. I often ponder how you in 1YA, 2YA, 3YA, and 4YA can produce such variety every night. The children's sessions are wonderful. I take a great interest in listening-in. All I can say is thank you very much indeed. From one who is very grateful to 1YA, 2YA, 3YA, and 4YA. The dinner session is excellent.—GRATEFUL (Dunedin).

"I am well pleased with all your programmes, and if I am not I switch on to another station. Those who grouse at them I ask for what they alone want are utterly selfish, and do not consider others. Carry on, and good luck," adds a correspondent to our office, H.H.B. (Kawhia).

4YA at Cromwell.

PERHAPS the R.B. Co. would be interested in suggestions in regard to their station, 4YA. Contrary to general experience in this district I can always bring him in when he is on the air except on very rare occasions and now and then he comes in in great style, but unfortunately after a good night or so some of the screws apparently get loose and the modulator tubes rattle in their sockets—at least that is what it sounds like. In case they are short of tools to effect repairs I have a fine big axe they can have the loan of any time.—DIOGENES (Cromwell).

Largest Broadcasting Station

THE Czechoslovakian Government has placed orders with the International Standard Electric Corporation of Prague for a broadcasting station which it is expected will be the largest in the world. The new station will have a power of 120 kilowatts in the aerial, as compared with 50 kilowatts which is at present used by the largest broadcasting stations in the United States.

EDUCATION BY WIRELESS

The Mechanism of Evolution

THE following is the summary of the third W.B.A. lecture on the above subject, to be given from 4YA on Tuesday, July 9, 1929, at 7.30 p.m.

3.—The Lamarckian Factor.

EARLY in the nineteenth century, just fifty years prior to the appearance of Darwin's "Origin of Species," the French zoologist, Lamarck, published a work on zoological philosophy which included a clear account of a theory of evolution, which many scientists of to-day still support in a more or less modified form.

Though Lamarck was a brilliantly-gifted man and a great observer, his work was much hampered by his poverty and the blindness which overtook him later in life. Further, the great French anatomist, zoologist, and palaeontologist, Cuvier, who, at this time exerted a very powerful influence over scientific thought and was a man of high social standing, was a firm supporter of a modified theory of creation to account for the origin of species. Consequently the work of Lamarck, which clashed with the views of his brilliant and influential opponent, was neglected during his lifetime and was not appreciated until many years after his death.

Lamarck's theory of evolution involves two main basic principles. In the first place, he believed that the changes which result in the evolution of new forms are brought about by the direct influence of the environment acting upon the nervous system. A change in any of the conditions which constitute the environment will cause a need or want to be felt by the organism; and if this want is felt over a long-continued period, a new organ may gradually be developed, or existing organs may be adapted to suit the new environmental conditions. Environment, then, plays just as important a part in Lamarck's theory as it does in Darwin's principle of natural selection, but there is this great difference between the two theories. Lamarck believes environment actually to cause changes to take place in the structure of the organism. Darwin, on the other hand, states that from the innumerable variations and changes that happen to occur in any species, those which suit the new surrounding conditions are selected and perpetuated, while the comparatively useless variations are eliminated.

The second part of Lamarck's theory states that once any new character is acquired or an existing one modified by the influence of environment, such a character will be transmitted to successive generations by heredity, till ultimately it becomes an established and characteristic feature of the new species. All biologists agree that there is much truth in the first of these two basic principles; but for it to have evolutionary significance, the second principle outlined above must also operate. Here is the point over which much controversy arises. Is it possible that such acquired characters can be transmitted by heredity?

The geneticists headed by Weismann insist that if the nucleus of the protoplasmic cell itself contains the determin-

ants of hereditary qualities, then since the protoplasm cannot possibly be influenced by the environment of the organism, any characters acquired under its influence during life will not affect the germplasm and will not therefore be handed on to the next generation. If this argument is correct we must regard Lamarck's theory as disproved.

A good deal of experimental work has been done along the line of producing "acquired" characters in animals such as mice, guinea pigs, salamanders and insects, and subsequently testing whether or not these characters may be inherited. Evidence of this sort is sometimes—perhaps more usually—in favour of Lamarck's theory, and sometimes apparently opposed to it. Much of it is inconclusive, as it is difficult to prove that the characters thus artificially induced are comparable with those acquired under natural conditions.

Probably geologists and palaeontologists are the strongest supporters of Lamarck's principle to-day. The geologist looks back through the countless millions of years that make up geological time and sees the slow pulsation of life as it ebbs and flows on its evolutionary course. Many of the changes which he sees—often the most profound ones—he can only explain on the assumption that they have been brought about by the direct influence of the great changes in climatic, physiographic and other environmental conditions, which he knows to have occurred again and again through the ages. Many geologists would suggest, for example, that the first land vertebrates originated from a group of fishes away back in the remote period which we term the Silurian, under the compelling influence of adverse climatic conditions to which the survivors were forced to adapt themselves.

We know that no one mechanism can account for all the phenomena of evolution. So geologists believe that, while natural selection is the chief agent in evolution, yet Lamarck's principle of the more direct action of environment has also been at work. Such, indeed, was the view of Darwin himself.

Radio Terms

Their Origin Traced

ALMOST everybody knows that the unit of electrical capacity by which the size of condensers is measured is known as a farad, writes R. P. Clarkson in the New York "Sun." I told one of my radio classes that this term is derived from the name Faraday, in honour of the great English electrician. One of the bright students immediately jumped to the conclusion that microfarad, by the same process, came from his full name, Michael Faraday!

The prefixes milli and micro are, of course, not peculiar to the electric art. They mean a thousandth and a millionth respectively, wherever you find them, just as kilo as a prefix always means thousand. A kilowatt is a thousand watts and a kilo-cycle is a thousand cycles. The microfarad is, of course, the millionth part of a farad.

Faraday is not the only brilliant scientist whose name has been made im-

mortal in the language of electricity. We have the volt in memory of Volta, the ohm in memory of a great Bavarian, G. S. Ohm, who, in 1826, established the law which bears his name. The ampere is likewise named in honour of Andre Marie Ampere, a great Frenchman. The unit by which we measure our inductance, the henry, perpetuates our own Joseph Henry, of Albany, N.Y., and later the first head of the Smithsonian Institution of Washington, D.C. In the lesser known units are the oersted, from the name of Hans Christian Oersted, a Dane, at one time professor at Copenhagen, and the first to show a relationship between the electric current and magnetism.

Then there is the coulomb, which measures the quantity of electricity and comes from C. S. Coulomb, who first experimentally verified the fact that the forces of attraction and repulsion between two charges vary inversely as the square of the distance between them, a choice bit of technical information. James Clark Maxwell, the great Scotch mathematician, provided his name in the maxwell or number of magnetic lines of force. Another Englishman, James Prescott Joule, who gave us the laws of conservation of energy and measured the relation between the various forms of energy, has given his name in the joule, which is the electrical unit of work done. And whenever we talk of watts or kilo-watts we are commemorating none other than James Watt, largely remembered for his work on the steam engine.

Derived from the Greek.

MOST of the funny little names, such as electrodes, electrolyte, ion, anion, cathion, anode, cathode, electronic, paramagnetic, and many others came from Michael Faraday with the help of his

(Continued on page 25.)

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