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THE MIGRATION OF ANIMAL GROUPS

How animal families became emigrants in past geologic ages, and the effects which their migrations had on their fortunes, were discussed recently by Dr. George Gaylord Simpson, of the American Museum of Natural History, at a meeting of the Washington Academy of Sciences.

Animal families tend to follow one pattern, in their rise, expansion and decline. A family will come into existence in a rather limited ancestral territory. It will increase greatly in abundance, and at the same time expand rapidly to its maximum area. Then come simultaneously a thinning out in numbers and a contraction in the territory occupied, and finally extinction.

When the decline-and-contraction phase sets in, the retreat is not necessarily to the old homeland. Many an animal family has died out thousands of miles away from the place where it started. Sometimes, too, there will be surviving "islands" of a group, widely separated and with the once-existing connections wiped out. Such, for example, are the African and Indian elephants, and the American and European species of bison.

Land bridges, that may connect continents or islands for a time, permitting animal migrations, are not always broad, easy highways over which interchanges of animal populations are rapid and complete. Relatively few land bridges are such easy "corridors."

The more usual kind of land bridge is what Dr. Simpson called a "filter-bridge," which permits travel only under conditions that may be just possible for some of the migrants and quite impossible for others. Such a "filter-bridge" exists between North and South America, at the Isthmus of Panama. South American monkeys are on the Panama land bridge, but they have never crossed it into even the tropical parts of North America. They soon encounter forests of a type not at all hospitable to monkey life, and can go no farther. Similarly, bison from North America have never been able to traverse the Panama land bridge or any of its geological predecessors into South America. They are animals of the open grasslands, and to them a tropical forest is as great a barrier as the open sea itself.

Dr. Simpson pointed out that ability on the part of an animal type to migrate and expand rapidly in new territory does not necessarily mean that it is going to be a success. The great ground sloths and giant armadillos, that rapidly expanded from South into North America in relatively recent geologic times, died out very soon after their period of greatest expansion. Ability to expand and ability to survive have no necessary connection at all.

THE PRODUCTION OF OIL WELLS

A NOVEL method of drilling and pumping oil wells—pumping the oil so that it goes down instead of up through oil-bearing sands—was described by Professor F. B. Plummer, of the University of Texas, and H. K. Livingston, of the University of Chicago, at the recent meeting of the American Institute of Mining and Metallurgical Engineers in New York City. The new method, studied and worked out in the laboratory, will perhaps solve a difficulty confronting oil men everywhere; what to do with a well of the "marginal" variety that is pumping about 90 per cent. water and only 10 per cent. oil. The new results may be regarded as laboratory signposts pointing to a more efficient drilling and pumping of the nation's petroleum resources.

Making experimental counterparts of oil fields and pumps, it was found:

1. That ordinary upward pumping creates a "cone" of water about the well which often shuts out the flow of oil in the oil-bearing sands.

2. That detergent chemicals—in some cases merely soap flakes—can reduce the surface tension forces on the water so that it is not pulled through the sands so easily by capillary attraction.

3. That downward pumping of the well—so that the flow of oil in oil-bearing strata was downward instead of up—tends to prevent the formation of the water cone which previously excluded the oil.

In one test, where the experimental oil and water mixture was passed through limestone, it was found that 5 per cent. oil and 95 per cent. water was coming through. Then a very small dose of soap flakes of a popular variety was added to the oil-water mixture. This changed the ability of the limestone to transmit water so much that quickly the laboratory "well" was pumping 68 per cent. oil and only 32 per cent. water.

Soap flakes would not work for all waters encountered in typical oil well fields, but where it failed other chemicals such as Aerosol OT, Igepon AP/1 and phenol worked successfully.

ADVANCE IN TELEVISION

TELEVISION of the future, giving 30 per cent. more detail than present 441-line television pictures, was demonstrated in a tour of the homes of Philco Radio and Television Corporation engineers.

According to William H. Grimditch, vice-president in charge of Philco's engineering laboratories, the new television advance uses 605-line screens to secure details on the televised images. The new research progress takes much of the fuzziness out of the pictures and is a step on the way to the display of television to large audiences on large-sized screens. "A comparison which may give an idea of this improvement is the difference between the coarse screen reproduction of a picture on ordinary newsprint and the fine screen reproduction of the same picture on slick paper. The coarse screen newspaper reproduction may be likened to the 441-line television picture in use at present, while the fine screen reproduction on slick paper is comparable to what one sees on a television screen with a 605-line picture."

A new type of small, vertical loop antenna built into

television receivers was also demonstrated. This loop allows real "plug-in" receivers in contrast to the specially built dipole antennas which now must be mounted on roof tops. To make feasible the use of these new loop antennas, however, it would be necessary to transmit television signals with their waves polarized vertically instead of in a horizontal plane as is done at present. The built-in loop antenna is especially recommended to help cut out interference from the ultra-short wave diathermy machines which are now coming into use in physicians' offices and in hospitals. Interference from these medical devices—which act as short-wave transmitters—is one of television's major problems. By easily rotating the new built-in loop many cases of diathermy interference can be minimized. There is nothing much one can do, however, if the diathermy machine happens to lie in the same line as the television transmitter.

The problem of presenting television pictures to a large audience, in a fashion following motion picture practice, is to improve the viewing distance and viewing conditions. With 441-line screens and large-sized pictures one can not get too near or else the picture takes on a fuzziness and "graininess" that is objectionable. Anything that can be done to increase the fineness of the television picture and improve detail permits the audience to be placed nearer to the screen and still see a picture without the coarseness and graininess.—ROBERT D. POTTER.

MANAGEMENT AND RESEARCH IN INDUSTRY

KEY jobs in the upper ranks of industry are awaiting an oncoming generation of young men now receiving their scientific or technical training in American universities. They are needed because industry is increasingly tapping the frontiers of scientific knowledge by research.

If any one message came out of the meeting of the American section of the Society of Chemical Industry on February 16 it was that, right now, industry needs men who can serve as the liaison link between the presidents of industrial companies and the research men those industries employ.

Increasingly, said Dr. E. C. Williams, director of research and vice-president of the Shell Development Company, technically-trained men are finding their way on to the directorate boards of companies. But until the day when every industry follows this practice there must be better links between management and research.

Misunderstanding may arise out of the backgrounds of research and executive leaders, Dr. Williams continued. The executives—handling finance, commercial and organizational affairs—are influenced greatly in their decision by human relationships. The executive technique is accomplished through persuasion, compromise, leadership and personal determinations. The training of research men, in contrast, has no place for personality or persuasion because a scientist deals with coldly material things like the properties of matter and forces of nature which are outside the realm of human things. To bridge the gap between these two poles is the need of every industry. The top executive needs to be aware that he, himself, by his own decisions, can cloud true issues.

A statement or a wish by the president of a corporation, Dr. Williams declared, may acquire such importance that its mere expression may make that belief a fact. Dr. Williams pointed out that "If the president of the U. S. Steel said he thought steel was likely to go up, it very likely would go up. What might not have been a reasonable happening before he spoke actually becomes a fact because he spoke. If any one else had said so there would have been no such effect. Thus the mind can create actuality."

Every company needs, too, some one who can present to the executive the true picture of scientific training which makes research men sometimes argue over precise definitions of established facts, or over technical matters on which differences of opinions are permissible. The executive often thinks these arguments indicate serious rifts between his advisers or a troublesome disposition (dread of all business men), whereas the scientists are really only enjoying themselves because no one's personal prestige is at stake.

Dr. Williams continued: "The research director is a kind of crystal gazer to industry, without the hocus-pocus. The picture in the crystal for a year ahead is rather clear; further into the future it may be blurred, yet formed in its main outlines; even up to five or ten years ahead dim forms can be seen through the fog. These are not unsubstantial dreams; they are definite indications of future movements in industry."—ROBERT D. POTTER.

THE DROUGHT

DROUGHT still grips the greater part of the United States, despite January's big snow that wiped out people's recollection of an abnormally dry and warm December, following a phenomenal lack of rainfall reaching back to August of last year.

Statisticians of the U. S. Weather Bureau have been at work compiling precipitation records. They have found only six states with normal or above-normal rainfall for the last half of 1939; and the record is little improved thus far in 1940.

Of the six states, two (Florida and Alabama) had exactly 100 per cent. normal rainfall from August to December, 1939. During the first month of 1940 their rainfall was nearly up to normal, and they were joined in the "normalcy" column by Georgia, which took a 106 per cent. dousing in January, partly offsetting its 83 per cent. record of the last months of 1939. During the first two weeks of February, rains in the Southeast have continued, until now the fields over a large part of the region are too wet for plowing.

The remaining states in the normal-and-better precipitation list for August–December, 1939, are in the Southwest: Utah, Arizona, Nevada and California. However, for all except California (and for part of that state as well) 100 per cent.-plus precipitations mean less than they do elsewhere, because of the large desert and semi-arid areas included within their boundaries.

Since the first of the year, heavy rains and snows have continued in the Far Southwest, appreaching twice

the normal rate for all except Arizona, where a drop to 60 per cent. was experienced in January. The heavy precipitation area has spread northward to Idaho and eastward to Nebraska and Kansas, where extra water counts importantly in the grazing and winter wheat areas, badly depleted by the autumn drought of last year. The soil moisture deficit in the Plains states is still far from being balanced.

Precipitation records from the Midwest and Northeast continue to show drought conditions, ranging from about half to three quarters normal for the last six months of 1939 and for 1940 to date. Michigan alone seems to have escaped the curse, with 95 per cent. normal for August–December, 1939, and 122 per cent. in January, 1940.

There is a dry belt, relatively speaking, in the Middle South. Arkansas seems to be the hardest up, with 59 per cent. of normal rainfall for the closing six months of 1939 and only 35 per cent. in January, 1940. Somewhat similar conditions obtain also in Tennessee and Kentucky, except that these states were drier last season and seem to be a little more favored with moisture thus far this year.

THE NEW UNITED STATES POSTAGE STAMPS

UPON new U. S. postage stamps there are appearing this year portraits of 35 intellectual leaders of America, five artists, five authors, five composers, five educators, five poets, five inventors and five scientists.

This recognition upon our stamps of other than military and political leaders will meet, in principle, with general approval. And it will not cost the government money because collectors buy stamps by the thousands that are never used for postage.

Whether the right five in each group have been picked is another question. Most lack of agreement with the Post Office Department's selection is likely to be expressed in connection with the selection of scientists: Luther Burbank, Dr. Crawford W. Long, Dr. Walter Reed, John James Audubon and Jane Addams.

Dr. Reed, who demonstrated the transmission of yellow fever by the mosquito, will meet with universal approval in science circles. Audubon, the pioneer American naturalist and gifted portrait painter of birds, will too win approval. Jane Addams, great humanitarian, is hardly considered a scientist in the strict sense. For great welfare workers, why not a special series to do them honor?

The selection of Dr. Long revives the controversy as to who deserves the credit for ether anesthesia, this Georgia village doctor or William T. G. Morton, Boston dentist. Long was chronologically first, but the use of ether for operations spread from the Boston focus. Why not honor both with stamps?

Most controversy will be caused by the face of Burbank upon a stamp. He is rated a great gardener rather than a great botanist.

Scientists by the dozen have equal reason for being honored on our stamps. Joseph Henry, who ranks with Faraday as the father of the electrical industry; Benjamin Rush, early physician of Philadelphia; Josiah Willard Gibbs, founder of thermodynamics; Simon Newcomb, the astronomer; Asa Gray, the botanist; Benjamin Silliman, early Yale chemist; Joseph Leidy, E. D. Cope and Othniel Charles Marsh, great explorers of ancient and living animals; Dr. William H. Welch, great pioneer in medicine.

Two great scientists and a great agriculturalist, already honored with stamps, may be claimed by science: Benjamin Franklin, Thomas Jefferson and George Washington.—WATSON DAVIS.

ITEMS

PROTHROMBIN, a vital element in the mechanism which brings about clotting of blood that is shed, disappears from the blood when it passes through the lungs, Drs. William DeW. Andrus, Jere W. Lord, Jr., and Joseph T. Kauer have discovered in experiments at the New York Hospital and the Cornell University Medical College. Why this occurs has not yet been determined, but the New York investigators in an article printed in SCIENCE suggest, on the basis of earlier research by Drs. W. H. Howell and D. D. Donahue, that the disappearance of prothrombin may be caused by the action of the blood platelets which are apparently formed in the lung and which, by releasing thromboplastin, change prothrombin to thrombin. Thrombin is a ferment which acts on fibrinogen to form fibrin, the essential portion of the blood clot.

BRITISH shipbuilders, working under the new Ministry of Shipping, are planning large-scale construction of ocean-going vessels built of reenforced concrete instead of steel. Reenforced concrete ships, tried successfully during the last war in Scandinavia, France, Italy and on a large scale in the United States, require less steel and skilled labor for their construction than do ordinary vessels. Tried before in Britain only on an extremely limited experimental basis, concrete ship construction demands only a slipway and ordinary building contractor's equipment. Maintenance of the finished ship is also reduced, as cleaning and painting are unnecessary. Though entirely seaworthy, the concrete craft are considerably heavier than steel vessels of the same size and are slower. They are often launched upside down because construction is easier and cheaper, if the keel is uppermost. The hull is righted by flooding compartments on one side.

RADIOACTIVE phosphorus is being used in a study of the chemical activity of the brain. Different parts of the brain not only have different functions in mental activity, they differ also in the way they handle the chemicals that are necessary to all life. Giving animals phosphorus made radioactive by bombardment in the cyclotron, Dr. I. L. Chaikoff, of the University of California, with B. A. Fries and G. W. Changus, traced this detector chemical in the forebrain, cerebellum, medulla and spinal cord. Soon after birth, they found, the chemical activity involving phosphorus in these parts of the brain and nervous system declined at a similar rate. Later, however, the rate of drop was no longer uniform, but was much more precipitous in the spinal column. It is hoped that this study may lead to the discovery of the interrelationships between the chemical and mental functioning of the brain.