SCIENCE NEWS

Science Service, Washington, D. C.

COLOR TELEVISION

THE day when we shall not only see our distant friends as we talk to them over the telephone, but when we shall also see the flesh tints of their faces, the red of their lips and the color of their clothes, was brought nearer with the demonstration of color television at the Bell Telephone Laboratories. Color television has been achieved previously in England, but the Bell demonstration was the first time that it had been done in this country, and much nearer to perfection.

In one part of the laboratory building a girl in a fancy dress sat in front of the transmitter. A group of newspaper men and scientists in the auditorium sat in front of the receiver and saw a faithful reproduction of her dress and features in all their natural hues. An American flag was held in front of the transmitter and the red, white and blue were immediately reproduced in the receiver. Flowers, fruit and other colored objects were also transmitted.

It was on April 7, 1927, that the first satisfactory long-distance television was demonstrated by the Bell engineers, when Mr. Hoover, then Secretary of Commerce, sat in front of a machine in Washington and was seen and heard in New York. This was the result of researches of a group of scientists under the direction of Dr. Herbert E. Ives. Years ago Dr. Ives's father, Frederic E. Ives, of Philadelphia, invented one of the first successful methods of color photography. The new method of color television is essentially a combination of these two achievements of father and son.

In the Ives color photography, three photographs were made of the same scene. One was taken through a red glass filter, and recorded the reds of the scene. Another was taken through a blue filter and recorded all the areas of this color, while a plate exposed behind one of green showed all the greens. These were made into lantern slides. In a triple magic lantern all three were projected on the same screen. Over the slide showing the reds was placed a red glass, over the one showing the greens a green glass and over the third a blue glass. Thus, all three colors of the original scene were combined on the screen, and a natural color reproduction was the result.

For color television, a large disc with a spiral row of tiny holes near the edge revolves rapidly in front of a powerful light. A lens in front of the disc casts an image of the hole on the subject to be transmitted. The result is a series of spots of light crossing the subject. The disc turns so fast that the spots are spread out into lines, and the lines themselves combine so that the subject seems to be uniformly illuminated.

Thus far the method is the same for monochrome and color television. In the former, a group of photoelectric cells picked up varying light as the spot shone on bright and dark areas of the subject. The cell converted the moments of brightness to electric impulses which were sent by wire or wireless.

For color television, three groups of photoelectric cells are used. One set is covered with red filters, the second with green and the third with blue. Suppose the object to be transmitted is a red rose, with green leaves in a blue vase, all against a black background. The spot of light comes to the rose, red light is reflected in all directions. The blue filter stops it, and the blue cell is not affected. So does the green filter. But the red light passes through the red filter and the cell behind it sends out an electrical impulse. It travels through vacuum-tube amplifiers and over wires to the receiver, where it operates a glow lamp that shines in correspondence with the light shining on the cell. In front of the glow lamp is another red glass.

When the spot of light comes to the green leaf, the cell behind the green filter is affected, to the exclusion of the others. A corresponding glow lamp, behind a green glass, operates. And when the spot shines on the vase and reflects blue light, only the blue filtered cell operates and only a third glow lamp, behind a blue glass, shines. All this is made possible because of the development of a new type of photoelectric cell that is equally sensitive to all colors of the spectrum. The older cells were sensitive only to certain particular colors, and so would have been unsatisfactory for color television.

The light from three glow lamps is combined by means of prisms to form an illuminated surface, the same color as the illuminated spot in front of the transmitter. Another scanning disc, a replica of the one at the transmitter and exactly in step with it, revolves in front of this illuminated area. In this way a person at the receiver really sees a series of colored spots, corresponding to the illuminated spots of the subject. However, the discs revolve so fast that the separate spots combine into a continuous picture and successive pictures combine into an accurate reproduction of the original, just as the successive pictures in a motion picture film combine on the screen.

So far, the method of color television has only been used for wire transmission, but it could be done equally well by radio if separate wave-lengths were used for each of the colors.

ISOTOPES OF OXYGEN

OXYGEN, the gas which constitutes a fifth of the air we breathe and which is essential to our life, is really triplets. It is not twins, as was recently suggested, or single, as it was thought for many years.

This has been discovered by two University of California experimenters, Professor W. F. Giauque and H. L. Johnstone. They have found that oxygen in the air consists not only of the element with atomic weight of 16, but that there are small numbers of heavier atoms. Some weigh 17 and others weigh 18. These make up forms of oxygen which are like ordinary oxygen in all respects except atomic weight, and are called isotopes of oxygen. Many other elements, notably lead, have been found to have isotopes, chemically similar, but of different atomic weight.

The investigators have discovered this fact from a study of the way light is absorbed as it passes through a thick layer of air, as with sunlight in the late afternoon. The oxygen absorbs certain wave-lengths of light, and from these, Professor Giauque and Mr. Johnstone have calculated the weight of the atoms that produce the effect. Recently they found that some of the oxygen molecules were made of an atom of weight 16 combined with one of weight 18. Since they announced this, they have discovered the presence of the third isotope, so that there is still a third kind of oxygen molecule, consisting of an atom of weight 16 combined with one of weight 17. However, the atoms of weight 16 must be in the vast majority, and the typical molecule must consist of a pair of atoms of weight 16, as the atomic weight of ordinary oxygen has been determined to be 16 with great precision. Any great amount of the other isotopes would make the average atomic weight of oxygen appreciably greater than this figure.

UNCHARTED ISLES IN THE PACIFIC

Even though modern map-makers have charted almost every scrap of land on the earth, whether large or small, there may still be some uncharted islands in the vast stretches of the Pacific. Successors to Defoe wishing to write of an unknown island upon which their hero is shipwrecked, might still do so without fear of contradiction if they placed it in the Pacific Ocean, slightly south of the equator and about a hundred miles south of the Caroline Islands. This region is to the north of New Guinea; it is out of the way of steamer tracks and has never been adequately charted.

But, on the whole, Robinson Crusoe would have a difficult time to-day trying to find an unknown, desert island to get wrecked upon. In his time, a little more than two hundred years ago, the Pacific Ocean was dotted with thousands of unknown, uncharted islands, both verdure-clad and barren.

The profusion of these oceanic oases, especially in the equatorial region, and the fact that they were not placed on any sailing charts, made it an easy matter to pick out a nice, lonely island as remote from the world of men as a corner lot on Mars. Alexander Selkirk, the original Robinson Crusoe, lived on the island of Juan Fernandez, three hundred and sixty miles west of Valparaiso, for three years without seeing another human being.

The story of the discovery and charting of the Pacific's islands is a fascinating tale, replete with romance and studded with the names of many doughty adventurers. Islands have been discovered, lost, and in some cases rediscovered. The Solomon Islands, for instance, were lost for two centuries and then found again. Most interesting, however, are those phantom isles, sighted once or twice by mariners of sailing ships and then never seen again. A great deal of this island hide-and-seek was due to uncertain methods of determining latitude and longitude at sea. The rest was due to the sighting of floating patches of marine life which, at a distance, looked like islands, to submarine earthquake and volcanic action which might push a mass above the surface of the water temporarily, and to the ever-active imaginations of deep-water sailors.

Fifty years ago, more than a thousand tiny phantom isles were reported to freckle the Pacific's seventy million square miles. The United States Hydrographic Office, at that time, published a "List of Reported Dangers in the Pacific Ocean." The list, in three volumes, contained over three thousand reported shoals, reefs and islands, most of them with the notation "Existence Doubtful" or "Position Doubtful." To-day, the majority of these reported dangers, especially the islands, have definitely "disappeared." So have sea serpents and the other chimeras which once did the adrenalin act to adventurous sailors' hearts.

Although possible, it is improbable that other islands may be discovered in the vastness of the Pacific's wilderness of waves. The improbability of this lies in the fact that submarine volcanic and earthquake activities have caused wrinkle-like elevations of the ocean's bottom on which the many groups of islands occur and the general direction of these "wrinkles" may be fairly easily traced.

ITEMS

A stereopticon and a photoelectric cell, which converts light to electricity, are the chief parts of a simple apparatus for measuring photographic plates described by Dr. Cedric E. Hesthal and Dr. George R. Harrison, of Stanford University, at the meeting of the American Physical Society and the Pacific Division of the American Association for the Advancement of Science. The device is used in such researches as those of spectroscopy, where it is necessary to measure the intensity of a series of dark lines crossing the plate. The plate is put in the stereopticon in place of the slide, and moved along so that its image on the screen passes across a small slit. Back of the slit is the photoelectric cell, connected with current-measuring apparatus, arranged to plot the current changes as a curve. This curve corresponds to the intensity changes of the lines.

Far removed from any continent, the Hawaiian Islands have developed their own very peculiar populations of plants and animals, with thousands of species unknown elsewhere. At the meeting of the American Association of Economic Entomologists, O. H. Swezey, of Honolulu, told of the development of Hawaiian forest insects. Many of these forest insects have developed large numbers of species per genus. Usually each species has its own particular tree or plant species on which it feeds exclusively; or where more than one species are found on the same plant host, the species are distributed on separate islands. Similarly, the parasitic and predatory insects that prey on them have their particular host preferences; so that a vast number of different kinds of insects can be found on this relatively small group of islands.

NEW WORK — JUST OFF PRESS

HUMAN HELMINTHOLOGY

A MANUAL FOR CLINICIANS, SANITARIANS AND MEDICAL ZOÖLOGISTS

BY ERNEST CARROLL FAUST, PH. D.

Professor of Parasitology in the College of Medicine of Tulane University
New Orleans, Louisiana

Octavo, 616 pages, illustrated with 297 engravings. Cloth, $8.00, net

IN this important new work there is offered for the first time a complete and authoritative discussion of the subject of human helminthology. Although in no phase of medical zoölogy, both in its biological and clinical aspects, has greater progress been made than in helminthology, hitherto most of this progress has been published in inaccessible scientific journals, and it was not, therefore, easily available. The present volume is the result of the author's own need for a teaching and reference text, and it also results from repeated requests and urgings by his colleagues and students that he make available for them, and for all others interested, the subject matter of human helminthology.

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OUTLINE OF CONTENTS

I. THE SCOPE OF HELMINTHOLOGY

1. Phenomenon of Parasitism in Helminth Groups.
2. Inter-relation of Helminth Parasite and Host.
3. Foundations of Helminthology.
4. Nosogeography of Helminthic Infections.
5. Scientific Nomenclature of Helminth Parasites.
6. Literature of Helminthology.

II. THE PLATYHELMINTHS OR FLATWORMS

1. Flatworms as a Group.
2. Trematodes or Flukes.
3. Classification of Trematodes.
4. Trematode Parasites of Blood System.
5. The Human Blood Flukes.
6. Trematode Parasites of the Intestinal Tract, Biliary Passages and Lungs.
7. Cestodes or Tapeworms—Pseudophyllidean Cestodes; Cyclophyllidean Cestodes.

III. THE NEMATHELMINTHES OR ROUNDWORMS

1. Nemathelminthes.
2. Nematodes or True Roundworms.
3. Trichosyringate Nematodes.
4. Myosyringate Nematodes.
5. Gordiacea or "Hairworms."
6. Acanthocephala or Thorny-headed Worms.

IV. HELMINTHOLOGY AND THE DIAGNOSTIC LABORATORY

1. Equipment Required for Diagnosis of Helminthic Infections.
2. Collection, Preparation and Preservation of Helminthological Material.
3. Identification and Differential Diagnosis of Helminth Parasites and Their Eggs.
4. Intermediate and Reservoir Hosts Involved in Human Helminthic Infections.

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