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EDITED BY WATSON DAVIS

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EDWIN E. SLOSSON, Director
WATSON DAVIS, Managing Editor

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A REAL TALKING MACHINE

By Dr. Edwin E. Slosson

The Great War was most fertile of inventions. One of these war babies, now growing toward maturity, is a talking machine. Not merely a machine that records and reproduces speech like the phonograph, but a machine that will actually utter the sounds of language at the will of the operator. This may conceivably be developed into an instrument by which a deaf and dumb man might speak if he could learn to manipulate it properly. Various investigators here and abroad are working on this problem of artificial speech. One of the most successful is Sir Richard Paget, Bart., who during the war, was called by the British Admiralty to aid in the effort to listen in on the German submarines. In searching for means delicate enough to detect the approach of the most pussyfooted of U-boats by the sound of their machinery conveyed through the water, he devised methods of sorting out complex sounds that he has since developed into an instrument for analyzing and imitating human speech. The cheirophone, or hand-speaker, as he has named it, consists essentially of an artificial larynx, attached to a tube through which a current of air is blown, while the hands of the operator form two variable resonance chambers, serving the same purpose as the mouth cavities before and behind the tongue. He also constructs various models of plasticine with two, three, or four such chambers, each setting the air into vibrations of a particular pitch, or wave-length, depending on the size of the cavity and its orifice.

He can also get amazing lifelike tones with still more simple devices. I heard him last summer at a popular lecture when the British Association for the Advancement of Science met at Toronto, and he got not only vowels and consonants but whole words and even sentences by merely pinching a rubber tube and suddenly releasing it. A common foot-blower furnished the wind and the tube was closed by a spring clip or by pressing it with the thumb against the sharp edge of a ruler. The tubing used was of a quarter or half inch diameter and was pinched or bent at one or more points between two and six inches from the open end. Wetting the inside of the tube makes the constriction sharper and consequently changes the consonant. This is something that anyone could try, and he could get the same results provided he had the unlimited patience and the extremely sensitive ear and delicate touch of Sir Richard.

There have long been dolls that could say "mamma" and "papa" when properly pinched, but the apparatus of Sir Richard Paget can distinctly pronounce "mother" and "father" which shows that the machine is growing up. It will talk French as

easily as English, and presumably an apparatus could be constructed to talk Russian, though that, I suppose, would be pretty complicated. He imitates the Yankee nasal twang and proves that it does not come through the nose. His apparatus gives utterance to the telephone call, "'ullo, London! Are you there?" with characteristic cockney accent, and pronounces " Oh, Leila, how I love you!" in hear-rending tones.

Sir Richard Paget shows that whistling and humming involve entirely distinct organs of speech. So he is able to whistle and hum different tunes at the same time. His daughter has acquired the same art and the two rendered a quartette for us.

He has come to the conclusion from his experiments that consonants and vowels are not so absolutely unlike as we have been taught, but that all the consonant soundsare as essentially musical as are the vowels, and that both depend upon variations of resonance in the vocal cavity. In whispering the vocal cords are not used, but in ordinary speech the current of air from the lungs is broken into puffs by the vocal cords of the larynx. This greatly increases the audibility because the voiced sound acts like the carrier wave in radio and so intensifies the distinctions between the various vowel and consonant sounds. In the sentence, "The sink is made of zinc", the former noun is not so easily understood as the latter, bacause the z is voiced but the s is not. It is almost impossible to get over s on the telephone as those of us know whose names begin with that letter. Sir Richard advises that in constructing an international language such unvoiced consonants as s and f should be omitted, and the voiced forms, z and v, used instead, since these carry better by telephone and radio. "There is", he says, "only one language in which all the sounds are voiced, and that is the dialect of my native country - 'Zummerzet'. In that dialect all sounds have carrying power of the same order. besides all having the added beauty of musical inflection and melody. The 'Zummerzet' dialect should, without doubt, become the standard English for all telephone and broadcasting purposes."

AFRICA MAY BE CRADLE OF RACE, DISCOVERER OF NEW SKULL DECLARES

From a study of the face and brain cast of the chilish specimen of the man-ape, Australopithecus africanus, found at Taungs, Bechuanaland, Prof. Raymond A. Dart, of Witwatersrand University, Johannesburg, South Africa, its discoverer, has come to the conclusion that this new creature, believed to be intermediary between ape and man, was far further advanced than any living anthropoid ape.

Prof. Dart also declares that it seems probable that in view of this and other new and important discoveries connecting the early history of man with Africa, it is likely that the Darwinian claim that Africa is the cradle of mankind will be substantiated.

"This group of beings, having acquired the faculty of stereoscopic vision, has profited beyond living anthropoids by setting aside a relatively much larger area of the cerebral cortex to serve as a storehouse of information concerning their objective environment as its details were simultaneously revealed to the senses of vision and touch, and also of hearing," Prof. Dart says, referring to man-apes, of which the six-year old child, Australopithecus, is a sample. "They possessed to a degree unappreciated by living anthropoids the use of their hands and ears and the consequent faculty of associating with the color, form, and general appearance of

objects, their weight, texture, resilience, and flexibility, as well as the significance of sounds emitted by them. In other words, their eyes saw, their ears heard, and their hands handled objects with greater meaning and to fuller purpose than the corresponding organs in recent apes. They had laid down the foundations of that discriminative knowledge of the appearance, feeling, and sound of things that was a necessary milestone in the acquisition of articulate speech.

"There is an ultra-simian quality of the brain depicted in this immature endocranial cast which harmonizes with the ultra-simian features revealed by the entire cranial topography and corroborates the various infernences drawn therefrom. The two thousand miles of territory which separate this creature from its nearest living anthropoid cousins is indirect testimony to its increased intelligence and mastery of its environment. It is manifest that we are in the presence here of a prehuman stock, neither chimpanzee nor gorilla, which possesses a series of differential characters not encountered hitherto in any anthropoid stock. This complex of characters exhibited is such that it cannot be interpreted as belonging to a form ancestral to any living anthrpoid.

"Unlike Pithecanthropus, it does not represent an ape-like man, a caricatur of precocious hominid failure, but a creature well advanced beyond modern anthropoid in just those characters, facial and cerebral, which are to be anticipated in anextinct link between man and his simian ancestor. At the same time, it is equally evident that a creature with anthropoid brain capacity, and lacking the distinctive, localized temporal expansions which appear to be concomitant with and necessary to articulate man, is no true man. It is therefore logically regarded as a man-like ape

"It will appear to many a remarkable fact that an ultra-simian and pre-huma stock should be discovered, in the first place, at this exteme southern point in Africa, and secondly, in Bechuanaland, for one does not asscciate with the present climatic conditions obtaining on the eastern fringe of the Kalahari desert an environment favorable to higher primate life. It is generally believed by geologists that the climate has fluctuated within exceedingly narrow limits in this country since Cretaneous times. We must therefore conclude that it was only the enchanced cerebral powers possessed by this group which made their existence possible in this untoward environment.

"In anticipating the discovery of the true links between the apes and man in tropical countries, there has been a tendency to overlook the fact that, in the luxuriant forests of the tropical belts, Nature was supplying with profligate and lavish hand an easy and sluggish solution, by adaptive specialization, of the problem of existence in creatures so well equipped mentally as living anthropoids are. For the production of man a different apprenticeship was needed to sharpen the wits and quicken the higher manifestations of intellect - a more open veldt country where competition was keener between swiftness and stealth, and where adroitness of thinking and movement played a preponderating role in the presercation of the species. Darwin has said, 'no country in the world abounds in a greater degree with dangeroud beasts than Southern Africa,' and, in my opinion, Southern Africa, by providing a vast open country with occasional wooded belts and a relative scarcity of water, together with a fierce and bitter mammalian competition, furnished a laboratory such as was essential to this penultimate phase of human evolution.

"In Southern Africa, where climatic conditons appear to have fluctuated little since Cretaceous times, and where ample dolomitic formations have provided innumerable refuges during life, and burial-places after death, for our troglodytic forefathers, we may confidently anticipate many complementary discoveries concerning thisperiod in our evolution".

MISSIONARIES URGED TO TOLERATE NATIVE CUSTOMS

Speaking of Uganda, the land where man sew and women plow, Dr. Homer Shantz, agricultural explorer of the U. S. Department of Agriculture, recently urged foreign missionaries here to upset the conditions as they find them. It is a great mistake, Dr. Shantz said, to try to alter tribal customs. The men hold that farming is beneath their dignity; their place, they consider, is in the home. Once it was on the war path, but since that is stopped their chief occupations are hunting, cooking, housebuilding, and textile working. The women, splendidly developed by life in the open air, suffer in health if they are induced by misguided whites to take to the frying pan. As for the needle, they care little enough for sewing since they wear no clothes.

UNDERTOW A MYTH, SAYS SCIENTIST

The undertow, that bugbear of bathing beaches, is a myth, Dr. W. M. Davis, emeritus professor of geology at Harvard University, claims. He says the notion of a strong bottom current that sucks down unwary bathers and carries them out into deep water is for the most part simply a fragment of the imagination of inexperienced persons who have undergone a rough tumbling in the surf.

There is a return movement of water after each wave that is washed upon the beach, which may be strong enough to sweep a person unused to surf bathing off his feet; and in the subsequent buffeting he receives from following waves he is apt to get a confused notion of being carried along by a current, though in reality he moves very little. If, however, one keeps his head, says Prof. Davis, dives into the surf as it comes toward him, and then floats face downward with his eyes open, he will see that the movement of the water is only local and temporary, reversing its direction with each succeeding wave and trough. When the surface water rolls toward the shore in a wave the bottom water moves shoreward too, though at a slower rate; the bottom water flows back simply as part of the spent wave, and its influence is felt only in a comparatively narrow zone close to the shore.

A genuine undertow, that is, a strong bottom current setting permanently away from shore, can arise only under peculiar circumstances, Prof. Davis states. A deeply reentrant, or pocket beach, between two headlands will develop a steady undertow when a wind blows in from the sea and piles the water against the beach.

Prof. Davis is still collecting data on undertow, and invites statementson the subject from persons who have had experiences.

RARE ELEMENTS FOUND IN PETROLEUM ASH

The presence of some of the rarer elements in petroleum ash has been demonstrated in experiments now being conducted by chemists in the Department of the Interior. The spectroscope has revealed a strong lithium line, indicating the presence of a valuable element whose presence was not previously suspected. Nickel is also plentiful, as is vanadium; it is even though possible that the ashes of petroleum cokes may be utilized as future sources of vanadium and nickel.

DISEASED PLANTS AND ANIMALS CLASSED AS UNWANTED IMMIGRANTS

The eternal vigilance that is the price of freedom from diseases of plants, animals and men was discussed before the Washington Academy of Science recently by representatives of the three government agencies charged with the task of keeping immigrant diseases from American shores. Dr. J. R. Moller, of the Bureau of Animal Industry, told of the development of quarantine and sanitary safeguards over the importation of animals; Dr. C. L. Marlatt, of the Bureau of Entomology, spoke on plant diseases and insect pests, and Dr. Lawrence Kolb, of the Public Health Service, summarized the situation as regards human immigration.

Two conditions, Dr. Moller said, are making it increasingly possible for an animal disease to make great headway once it gets a foothold. These are the great crowding to which dairy cattle are subjected, and the present-day methods of handling all kinds of animals intended for market, with the long journeys and the congestion at market and shipping points. This makes for a much more dangerous situation than did conditions a couple of generations ago, when there were far fewer animals and no long hauls. As an example of the rapidity of spread, Dr. Moller cited the case of the 1914 outbreak of hoof and mouth disease, when the plague spread over twenty-two states and the District of Columbia in thirty days.

To combat live stock diseases, which are now causing an annual loss of over $200,000,000, stringent regulations are now imposed on all importation. But in spite of all precautions, Dr. Moller stated, diseases sometimes get through, and by most surprising means. The 1914 outbreak of hoof and mouth disease came in as a contamination in medical supplies from the Orient; the 1924 outbreak in Texas, which was not in any way connected with the California epidemic, apparently started from a pasture where aviators smuggling contraband goods across the border from Mexico were accustomedto land and where they threw away the hay used for packing.

A further danger pointed out by Dr. Moller lies in the fact that cattle which are denied entrance to gulf ports have been taken to Vera Cruz and sold there; and their diseases, of course, have an opportunity later to spread across the border.

Dr. Marlatt took up the tale for plant diseases and insect pests, and told of the struggle for the passage of an adequate plant quarantine act. Over fifty per cent. of our plant diseases and pests, he said, are aliens. Their datesof introduction range all the way from colonial days, when the Hessian fly and the codling moth came to America, up to the past three or four years. By a curious irony of events, he said, some of the worst pests were introduced by people with the best of intentions. The San Jose scale, for example, came in with a shipment of Chinese stock sent by a scientific missionary to a friend in California. The gipsy moth was introduced by a French professor of mathematics whose biological information was not on a par with the rest of his learning, and who had a notion that he could breed a race of hardy hybrid silkworms in Massachusetts. The white pine blister rust came in on imported seedlings, which had been raised in Germany from American seed.

The most recent, and in some ways the most tragic, of pest introductions was the coming of the Oriental fruit worm. This came in with a shipment of ornamental Japanese cherry trees, sent by the city of Tokyo to the city of Washington as a gesture of international good-will. The worm has spreadlall over the Middle South, andit is feared that it will seriously affect the great peach region in Georgia.

As for the diseases not yet here, but awaiting their chance to get in, Dr. Marlatt said their name is legion. He has compiled a list of some three thousand

of plant diseases and insect pests as yet unknown in the United States. And even more than the known diseases, he said, we must dread the unknown; for the latter can come upon us unaware and we do not know how to fight them until we discover them.

Dr. Kolb spoke briefly on the work of the Public Health Service with the immigrant. The principal causes for exclusion or deportation, he stated, are mental defects, epilepsy, chronic alcoholism and loathesome and incurable diseases.

FLIES AS RAT DETECTIVES FIRST USED IN AMERICA

An item in Science News-Letter No. 200 credited as a British innovation the employment of blue bottle flies to locate dead rats in the house. The Ratin Laboratory, Inc., of New York, calls attention to the fact that they heard of this method some years ago from an old rat catcher in New York who said he had used it with success. According to their informant, he starved the fly for some time before setting it on the trail of a dead rat.

PHOTOGRAPHIC FILMS DEVELOPED AFTER FIXING

Topsy-turvy methodsof developing photographic films and plates, by which the process is carried out in daylight instead of a dark-room, and the film is placed in the fixing bath first and then in the developer, has been shown possible as the result of experiments made at the Wagner Free Institute of Science by Dr. Henry Leffman over a number of years. The plate or film is first placed in a dilute solution of sodium thiosulfate, commonly called "hypo" in a dark-room. Although it seems entirely transparent when brought out into daylight, it is placed in a special developer and the image appears. There is planty of light to observed the action.

In photography, the silver bromid is mixed with some substance such as gelatine that can be spread out in a thin layer on a glass or celluloid support. This forms the plate or film, and, when exposed in the camera to the image formed on it by the camera lens, the parts struck by the light are affected, while the others are not. No change is apparent if thefilm is then examined, but this invisible or latent image may be brought out by development, which changes the latent image into one of very minute particules of metallic silver. This process leaves the parts that were not reached by the light as unchanged silver bromid, so it is necessary to remove it by fixing. Sodium thiosulfate dissolves the silver bromid, but not the metallic silver, and the result is the familiar "negative", the dark areas corresponding to the lights of the original scene.

This being the case, it would seem that if the silver bromid were first dissolved away by fixing, the latent image, supposed to be due to a change in the molecule, would go with it, but Dr. Leffman has demostrated that it persists in the gelatin itself. The ordinary developer cannot be used, but by meansof a special one containing mercuric chlorid or bromid, metallic mercury is deposited where the silver would have been if the plate had been treated in the usual manner, and the negative may be printed in the ordinary way.

A difference of 50 degrees between day and night temperatures is common in Tibet.

AVERAGE CRIMINAL MENTALLY DISEASED

More than half of 10,000 criminal delinquents examined by the National Committee for Mental Hygiene have been found to be mentally diseased, feeble minded, or otherwise mentally abnormal. Thisnumber included immates of prisons, reform schools, and those onprobation to the courts.

As a result of this examination Sing Sing will establish a psychiatric clinic to study each prisoner upon entering. The subnormal will be segregated from the normal and kept under state control. Massachusetts has passed a bill requiring the psychiatric examination of all prisoners sentenced for more than thirty days and those arrested more than once.

The bulk of the prison population is made up of repeaters.

"In the study of 608 admissions to Sing Sing prison 66.8 per cent. were found to be recidivists or repeaters. In other words, they had previously served sentences in one or more penal institutions. In the survey of the Texas penitentiary where more than 3,000 were examined, 58 per cent. had been arrested previously accoring to their own admission; and in the study of the 34 New York county jails, 66 per cent were repeaters and 27.9 per cent. had been arrested four or more times, according to the National Committee for Mental Hygiene.

"It is with this group of offenders that society must learn to deal if it ever hopes to achieve anything in its struggle with the problem of crime," the Committee warns. "It has in recent years thought somewhat more of reformation and a little less of retribution, and in its attack upon the problem has made extensive use of the instrument of probation. The results have not been altogether satisfactory, and there has ensued a reaction manfesting itself most markedly in cristicisms that charge sentimentality and denounce the leniency of many of the courts and juries in their dealing with prisoners. But the weakness of probation has been in the absence of competent direction and advice in the examination and treatment of offenders and the oversight of the vitally important mental and emotional factors that cannot be ignored in any attempt to understandthe behavior of these offenders and prescribe adequate rehabilitative measures."

NAVY ASTRONOMARS TO OBSERVE ECLIPSE IN SUMATRA

By Isabel M. Lewis,
of U. S. Naval Observatory.

It is gratifying to American astronomers andothers interested in the progress of science to know that the United States Naval Observatory will carry on in the observation of total eclipses of the sun by sending an expedition to Sumatra to observethe total eclipse of January 14, 1926.

Through the unique opportunities that it possesses as a government institution under the control of the Navy Department it is possible for the U. S. Naval Observatory to advance the cause of astronomical science in some ways that are not within the reach of private institutions. This was evidenced in the sending forth of special time signals for the convenience of eclipse observers on the occasion of the last eclipse and in the pioneer work in the observation of the eclipse from the

Navy dirigible, Los Angeles, by a group of scientists from the observatory under the head of Captain Edwin T. Pollock, superintendent of the Naval Observatory.

The interest shown by the present superintendent in promoting eclipse observations speaks well for the success of the clipse expedition that will be sent fort forth from our national observatory before the year is over, the sixth to be equipped by this observatory since the year 1900. It is also in keeping with the traditions of the Navy. Many astronomers of today recall theenthusiastic interest in the cause of astronomical research evidenced by Rear-Admiral Colby M. Chester, superintendent of the Naval Observatory in 1905, who headed an expedition sent out by this observatory to Africa and Spain to observe the eclipse of August 30, 1905, when a special line squadron of three vessels was detailedby the Navy Department for the observation of the eclipse and a special appropriation of $5,000 was granted by Congress.

An interesting report of the results of the observation of this eclipse, by the way, and of the eclipse of June 8, 1918, as well as notes of aviators on the eclipse of September 10, 1923, are contained in the Publications of the U. S. Naval Observatory, Second Series, Vol. X, Part 11-Appendix, which has just recently come from the press. There are some remarkably fine plates in this volume, photographs of corona and prominences, and drawings from negatives, in addition to the scientific discussion of the observations of these eclipses. The frontispiece is a reproduction in color of the painting of the corona of the eclipse of June 8, 1918 by the artist, Howard Russell Butler, who was a member of the Naval Observatory eclipse expedition to Baker, Oregon. There is also a reproduction in color of a painting by the same artist of the approach of the moon's shadow and of details in the structure of the prominences.

An earlier volume of the Publications of the U. S. Naval Observatory, published in 1905, dealt with results of the observations of the eclipse of May 28, 1900 and May 17, 1901, the former in North Carolina and Georgia and the latter in Sumatra. Both volumes are valuable contributions to the published records of eclipse observations. They will be followed by another volume dealing with the results of the observations of the eclipse of January 24, 1925 and Junary 14, 1926.

The eclipse of next January will be a fine one of four minutes duration in the Indian Ocean and over three minutes duration in Sumatra where it will occur in the afternoon. This eclipse will also be visible later in the afternoon and with shorter duration in Borneo and the island of Mindanao in the Philippines. It will occur on the east African coast near the equator shortly after sunrise. If present plans are carried out there will be at least one other eclipse expedition sent out from the United States to observe this eclipse, the Sproul Observatory expedition from Swarthmore College. This institution, whose department of astronomy is under the direction of Dr. John A. Miller, has been particularly active in observing recent eclipses. English, French and German observatories also are now planning to send expeditions.

CANARIES SAVED FROM PNEUMONIA

Inkwells for canaries are the latest dodge in travel convenience, intended to prevent pneumonia. For many years railway companies have been allowing claims on bird pets that died in transit. Railway express investigators discovered that water from the drinking bowls splashed by the jolting of trains got under the birds' feathers, causing them to catch their death of cold. Provided with inkwells filled with water the canaries are able to peck out the necessary moisture without getting a cold bath.

HAFNIUM NEWEST ELEMENT USED IN ELECTRIC LIGHTS

The "baby" among chemical elements, hafnium, atomic number 72 in the table of elements, has been found useful in the making of filaments fof electric lights.

This element, very closely related to the metal zirconium and contained to the extent of 1 to 5 per cent. in the zirconium in commerce, was discovered by G.Hevesy and D. Coster in Copenhagen, who first detected it in the X-ray spectrum and then isolated it chemically.

Now. J.A.M. van Liempt, of the physical chemical laboratory of Philips' Glow-lamp Works, Ltd., Eindhoven, Holland, has found that a small amount of hafnium oxide mixed with the tungsten used for electric light filaments makesit possible to readily swage and draw the tungsten. Pure tungsten cannot be used for incandescent filaments because of distortion of the metal due to recrystallization that takes place after manufacture.

SOUTHERN ALFALFA FIELDS THREATENED BY NEW PEST

Scientists of the U. S. Department of Agriculture are preparing to take the field to fight the mysterious alfalfa failure which has become prevalent in the black-soil belt of the lower Mississippi valley, seriously threatening the recent extension of alfalfa culture into the South.

After the boll weevil had made cotton farming unprofitable in the region, many farmers on the rich valley lands tried alfalfa. At first results were very promising, but lately a disease of very baffling character has been causing a great deal of trouble. So severe has the epidemic become that in some counties where formerly two or three thousand acres of alfalfa were cultivated there are now barely four or five hundred acres.

The disease is the more puzzling in that it has no marked symptoms. Sowing of new seed results in a good standof young plants, but later they simply become stunted and refuse to grow, without showing discolored leaves, wilting, or any other tangible evidence of sickness. No bacterium, fungus, or other organism has been discovered on which the blame can be placed; and weather and soil conditions do not seem to be sufficient to account for the plague. The Department plans to send a corps of specialists in various scientific lines to work on the problem.

FATAL BAIT FOUND FOR BEETLE PEST

Seeking for a siren lure for the scourge of New Jersey and Pennsylvania orchards and gardens, the Japanese beetle, the Bureau of Entomology, U. S.Department of Agriculture, has discovered that geraniol sprayed on plants brings every Japanese beetle for a long distance to windward to the tree. They hover around it, inhaling the odor with apparent delight.

The beetles do not eat the geraniol, but recent experiments have shown that they enjoy the taste of lead oleate. Previously it has not been possible to persuade them to eat arsenate of lead, because some instinct seems to warn them it is poisonous. But when this is mixed with lead oleate the taste of the arsenic and lead is disguised.

WHITE INDIAN BOY GOOD AT LESSONS

Chepu, the eleven-year old White Indian boy from the San Blas region, Panama, is in school in Brockport, New York, and is doing very well at his work, in spite of the fact that when he first came to this country a little less than a year ago he did not know a word of English. He is a very lively younster and has made many friends among his Caucasian playmates.

Mrs. R. O. Marsh, wife of the explorer-engineer who discovered the White Indians and brought several of them to America last year, adopted Chepu when her husband returned to Panama with his party in January. She has stated her intention to give to the little "Indian pale-face" every advantage which her own four children will receive.

TABLOID BOOK REVIEW

ARROWSMITH: By Sinclair Lewis. New York: Harcourt, Brace & Company. $2.00.

Scientists are supposed never to read fiction but they may make an exception of this, for Sinclair Lewis has turned his microscopic eye and caustic pen to the fresh field of scientific research. As in portraying the pettiness of "Main Street" and the braggadocio of "Babbitt", he exaggerates to the point of caricuture, yet we must admit in all these cases that it is genuine caricature; that is to say, he exaggerates real and existing characteristics, not fictitions, and in this latest novel, as in the earlier, we can recognize types, if not distinguish individuals. Great men are not great all around, and a man may be a genius at research like his "Gottlieb" and still make a failure when promoted to the postion of director of an institution, and, on the otherhand, a self-seeker like his "Dr. Tubbs" may do much for the advancement of science. The author shows the dangers that beset the investigator at both ends of his career; when he is poor and unknown the temptation to give up his ideals or prostitute his profession, and after he becomes rich and famous the temptation to go into society and neglect research. He also shows how the fiery zeal of the true scientist may overcome both obstacles, and cause him in the end to sacrifice wealth, ease and domestic happiness to devote himself unreservedly to the pursuit of truth. Thanks to the aid of Dr. DeKruif, Mr. Lewis handles the technique of the bacteriologist with amazing facility.

Automobiles equipped with radio sets are being used by Scotland Yard to aid in the detecting and preventing of crime.

Roman pottery of the first century A.D. has been discovered at Caversham, England; one of the vessels is believed to be a burial urn containing cremated human remains.

Booth bees and wasps originally came from the same parent.
