SCIENCE NEWS

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PSYCHOLOGISTS AT ITHACA

A RACE of super-men in intelligence might be attained through selective breeding, provided social factors ever permitted the experiment, it is indicated by experiments reported before the American Psychological Association, meeting at Ithaca on September 8, 9 and 10, by Dr. R. C. Tryon, of the University of California. Such a super-intelligent race has actually been produced among rats in the laboratory by Dr. Tryon. He has also produced by selective breeding another race of moron rats. The bright "family" display their superiority throughout most of the life span, and are succeeded by superior progeny. In this first experiment thus demonstrating the hereditary nature of intelligence, the entire environment was kept strictly the same for both races of rats. The inheritance of physical factors such as weight, sex, pigmentation and fertility seemed to have no relation to the inheritance of mental ability.

IF you drink alcohol with the idea of pepping up your physical processes and stimulating your behavior, you are taking the wrong drug for the purpose, according to a report by Dr. A. L. Winsor, of Cornell University. Alcohol, he has found in experiments where he measured the flow of saliva, slows that part of the digestive process and should be classed not as a stimulant but rather as a narcotic. Willing male adults served as subjects in the experiment and submitted to the examination before and after drinking the alcohol. Cocktails, Dr. Winsor found, serve as an appetizer only when taken just before the meal. Later, when the alcohol has reached the blood, they have the opposite effect.

KEEP your lines of type short. Print in a color contrasting in brightness with the background. Use a moderate space between lines. Use 10-point type. Use any one of eight type faces in common use, but no "freaks." These are rules which the advertiser might formulate for securing ease in reading his printed message, as a result of experiments conducted at the University of Minnesota by Dr. Miles A. Tinker and Dr. Donald G. Paterson, and reported by Dr. Tinker. No important differences in speed of reading were found between the more common type faces. Text in American typewriter was read somewhat slower than the others, and cloister black and old English much slower. Lines 3½ inches long with 2-point leading between were most legible with 10-point type. Printers would save considerable money if they realized that a one-point space between lines is no better than type set solid.

MORE than four numbers on a license plate makes it impossible to catch speeding drivers by noting their numbers, Dr. James L. Graham, of Lehigh University, warned psychologists. A specially devised apparatus with a reducing lens which changed the apparent distance, made it possible to test in the laboratory ability to read plates rapidly fading into distance. With three-number plates in black letters on a white ground, 94 per cent. were seen correctly, but only nine per cent. of seven-number plates were legible. Only 64 per cent. of five-number plates could be read, although speed used in the laboratory was only a third to a fifth of usual road speed. Bright reflecting surfaces greatly reduce legibility, he said, and color is also important. When lighted only by tail light, blue on orange background is about 30 per cent. better than the same colors reversed.

A MINIATURE car with standard automobile controls traveling on a miniature highway was used by Dr. Alvhh R. Lauer, of Iowa State College, in testing drivers to find the psychological factors underlying good and bad automobile driving. Response to traffic signals and ability to park in a minimum space were also measured on a "life size" field. Men differ from women, it was found; parking time for women being more than twice that required by men.

AN ape brought up with a child in a human family is superior to her human "brother" in performance on a number of mental tests and experiments, according to Dr. W. N. Kellogg. Motion pictures were shown by Dr. Kellogg, professor at Indiana University, of an infant chimpanzee and human baby learning to untie knots and performing other tests of their mental development. The two had been brought up together for nine months. The ape learned more rapidly, remembered longer, and for the first five months responded to more words than the boy. The superiority of the ape was probably due in large measure to her strictly human environment.

OTHER experiments, however, reported to the same meeting by Dr. Louis W. Gellermann, of Yale University, indicate that infants and apes do differ in reasoning ability even at that early age. One of the tests he gave in identical fashion to two babies and two chimpanzees was to distinguish between a triangle and a square in order to secure food. Human babies have greater ability to catch on to the relationship between the correct food box and the shape of the marker placed above it. The chatter of the babies as they puzzled over the boxes showed that they learn not alone by trial and error, but by thinking out the problem in words. Dr. Gellermann indicated that this superior ability to "verbalize" distinguishes the mentality of humans from that of apes.

LOSS of the entire vision centers of the brain does not result in complete blindness, Dr. Donald G. Marquis, of Yale University, told his colleagues. It has been previously supposed that such a serious injury to the mechanism of vision would render the eyes completely useless. Dogs who have been so deprived of part of the brain have showed no evidence of sight when observed by ordinary methods. They bumped into walls and objects, made no response to food held or moved before their eyes, and did not blink at movements toward them. A new method employed by Dr. Marquis, however, demonstrated that the animals were still sensitive to light and could distinguish correctly between different intensities.

He trained the dogs to respond to certain degrees of brightness in a certain way, and found that they could distinguish these accurately. After the loss of the visual cortex, the habit was severely impaired, but was relearned in about the same time as that required originally.

A TEST to discover whether the high C of the coloratura soprano is called high because it actually seems high in space to the listener, was described by Dr. Forrest Lee Dimmick, of Hobart College. It has been suggested that the terms high and low as applied to musical notes have more than a purely figurative meaning. The experiment conducted by Dr. Dimmick did not confirm this suggestion, however. When listeners were asked to tell the height from which a sound was coming, they found it difficult if not quite impossible to detect the location. The pitch of the sound had no influence on the height guessed.

DR. MILTON METFESSEL, University of Southern California, reported that engineers can see the parts of a revolving motor as though they were standing still. Singers can test the pitch of their voice by watching a revolving phonograph disc. And this without any complicated apparatus. Such effects are produced through the principle of stroboscopy, applications of which already make possible the photography of rapidly whirling objects. A tuning fork held against the head will vibrate the eye in synchronism with the disc, making the eye function only at the time that the disc reaches a certain position. The whirling disc then appears at a standstill. Singers can learn to cause the eye blinding vibration with their voices, Dr. Metfessel said. A low or middle C will make the spokes of a disc turning at 80 revolutions per minute appear motionless.

TELESCOPE FOR THE McDONALD OBSERVATORY

THE giant 80-inch reflecting telescope projected for McDonald Observatory of the universities of Texas and Chicago, to be erected by 1938 on a Davis Mountain peak in Texas, will be the most powerful in the world for some purposes.

Dr. Otto Struve, director of Yerkes Observatory, who will also have charge of the new McDonald Observatory, explained recently that for the photography of faint nebulae and distant universes it will be as powerful as the 100-inch telescope on Mount Wilson, now the world's largest. For other special tasks it will be even more powerful.

"It is not, however, our intention to surpass the remarkable performance of the Mount Wilson telescope," Dr. Struve stated, "but rather do we hope to supplement it and to develop such features which, for one reason or another, are omitted at Mount Wilson. It is our desire to make our work supplementary to that of other institutions and to avoid duplication of any sort."

The concave mirror on which the starlight falls will be 80 inches in diameter, and the beam will be focused 27 feet above.

The mounting of the McDonald telescope will be similar to that of the 72-inch reflector at Victoria, B. C., and the 69-inch at the Perkins Observatory, Delaware, Ohio, with a long axis in the north and south line, supported between two concrete piers, and inclined at an angle equal to the latitude of the observatory. This turns from east to west once a day to compensate for the motion of the earth. Another axis at right angles to this, and supported in its middle, permits the instrument to move in a north and south direction. The new instrument will differ from those at Victoria and Delaware, however, in that it will be possible to bring the starlight, concentrated by the telescope, into a closed room of constant temperature where it can be analyzed by spectroscopes and other instruments capable of use only in a physical laboratory. Such instruments can not ordinarily be attached to the moving end of a telescope. A similar arrangement is possible with the two great telescopes at Mount Wilson.

Dr. Struve has listed the following problems which the new telescope is expected to attack: the study of the chemical composition of the atmosphere of the stars; the study of the properties of matter exposed to temperatures ranging from 3,000 to 50,000 degrees or more; the study of distant universes, which involves a test of the Einstein theory; the study of the composition of gaseous nebulae, of comets, planets, etc.

The new observatory is made possible by the bequest of the late William J. McDonald, of Paris, Texas, who died in 1926 and left to the University of Texas a fund now slightly in excess of $840,000 for an astronomical observatory. The University of Texas will own the McDonald Observatory, but the University of Chicago will provide the staff. Its program will be coordinated with that of the present Yerkes Observatory.

THE ENZYME THEORY OF VIRUS DISEASE

EVIDENCE that the so-called "virus diseases" of plants and animals are caused by a non-living chemical substance that can attach itself to living matter, rather than by ultra-tiny living organisms, is claimed as the result of experiments on tobacco plants performed by Dr. Carl G. Vinson, of the University of Missouri. Dr. Vinson's work apparently supports the belief, held on theoretical grounds by many physiologists and pathologists during the past thirty years, that the causes of these mysterious diseases of plants and animals are compounds analogous to enzymes, the digestive and respiratory "ferments" of normal organisms, but malefic rather than beneficent in their effects.

Virus diseases afflict almost all plants. Their symptoms are such things as leaf mosaic, leaf curl and "yellows." Animals and man also have virus diseases; among them are smallpox, infantile paralysis and hog cholera. The causal agents of these diseases have never been positively identified as visible, and whatever they are they will pass through the pores of a stone filter and come out on the other side still virulent, which is something that ordinary disease germs, visible under a microscope, can not do.

Dr. Vinson's method of isolating the virus of tobacco mosaic was worked out during four years he spent at the Boyce Thompson Institute for Plant Research at Yonkers, N. Y., prior to coming to the University of Missouri. The first step was to freeze a quantity of mosaic-infested tobacco plants. Then the dead plants were put under heavy pressure, squeezing out their juice. Samples of this juice, filtered free of large particles, caused leaf mosaic when injected into healthy plants. The virus was thus evidently in the juice. The next step was to separate the juice into its various constituents, and find which of these could cause the disease and which could not. This Dr. Vinson did by adding acetone to the cold juice. This brought down a solid precipitate. The liquid left after precipitation could no longer cause the disease, but a solution of the precipitate could do so. The virus was thus evidently in the precipitate.

Dr. Vinson's further work has been in the greater refinement and purification of the precipitate, each step obtaining a more concentrated form of the virus. He states that analyses indicate its chemical make-up to be that of a protein or of some compound very similar to proteins. It is regarded as probable, however, that not the whole protein molecule is the real mischief-maker, but some relatively simple group of atoms that is attached to it or a part of it. Such an atom-group could conceivably attach itself to other protein molecules in healthy protoplasm, thus providing a mechanism of infection and propagation.

Dr. Vinson's work will of course be regarded agnostically by many of his colleagues, and all the results will be held provisional until the experiments are repeated and checked by other researchers. But if these checks confirm his theory, and extend it to apply to other virus diseases of both plants and animals, the effects of this research may well be very far-reaching. They will give a new physiological picture of many diseases that have hitherto baffled understanding, and perhaps pave the way for more effectual warfare against them.

ITEMS

ONE streamer of the sun's corona extended for at least three diameters from the sun at the time of the total eclipse on August 31. This is shown on a photograph taken by Dr. P. M. Millman, of Harvard College Observatory, with a short focus lens, an 88-second exposure and plates sensitive to infra-red or long-wave "heat" light. So far this is the longest extension reported by any observers of the recent eclipse.

No corpuscular eclipse was detected in radio tests in Newfoundland and Canada, Dr. A. S. Eve, of McGill University and chairman of the radio committee of the Canadian National Research Council, stated in a preliminary report of joint radio investigations during the total solar eclipse. British scientists had predicted the possibility of an effect on radio signals by an interruption of particles from the sun. Special radio eclipse expeditions to Vankleekhill and Cornerbrook, Newfoundland, both directed by Dr. J. T. Henderson, and to Kingston, Ontario, under Dr. D. C. Rose, measured distinct losses in ionization of both Kennelly-Heaviside layers, E and F, during the time that the optical eclipse was visible. This supports the idea that the radio reflecting layers are caused by ultra-violet light from the sun. Tests by the Northern Electric Company showed no intensity change in five hundred meter signals between Ottawa and Montreal and the Canadian Marconi Company found no changes in 22 to 37 meter transatlantic waves.

THE radio reflecting layer of the earth's atmosphere that is about sixty miles above our heads is caused by radiation from the sun traveling with the speed of light. This tentative verdict, announced by Dr. Lyman J. Briggs, acting director of the U. S. Bureau of Standards, comes as the result of extensive radio tests during the eclipse. A rival theory advanced by British investigators attributed the formation of the ionized reflecting layer to particles shot out from the sun with much less speed than light. The Bureau of Standards' results uphold the idea that ultra-violet light and not solar particles are responsible. The critical frequency of the E or lower region of the Kennelly-Heaviside layer decreased approximately a thousand kilocycles during the eclipse, lagging behind phases of the eclipse by approximately five minutes. After return to normal no later effects were observed.

THE American method of prospecting for oil by airplane is being applied in Australia in an effort to locate a native supply of petroleum. All gasoline and oil used in Australia now must be imported, and consequently its price is high. A Royal Australian Air Force Survey Squadron has left for the Northern Territory where two planes will make surveys from a base at Darwin, on the coast. After the completion of this work, the expedition will move to Broome and then to Onslow in Western Australia. Other bases are to be occupied, and finally the coast will be surveyed between Adelaide and Melbourne. Thus the greater part of the parameter of the continent will be covered. The surveys have been arranged by Sir George Pearce, the minister for defense, and Dr. W. G. Woolnough, commonwealth geological adviser. Dr. Woolnough recently visited this country where he studied the use of airplanes as an aid in locating oil and was impressed by their effectiveness.

AIRPLANE pilots could rise to altitudes of fifty thousand feet, nearly ten miles, without danger of death from the rigorous experience if the nitrogen gas in their bodies is expelled before they leave earth by breathing oxygen for one hour before the ascent. Sir Leonard Hill, the eminent British physiologist, will so conclude in a communication to *Nature*, as the result of experiments on animals under low pressure conditions. Previous experiments in France had led to the conclusion that about 45,000 feet was the limit of altitude that can be reached by man with safety, even when oxygen-equipped, unless his whole body is enclosed in a pressure chamber that shields him from the effects of the great height.