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SUNSHINE FOR BRAINS

By Dr. Edwin E. Slosson, Director , Science Service

It has been known for some years that the ultra-violet rays, whether they come from the sunlight or the mercury-quartz lamp, will greatly benefit and often cure children crippled by rickets or tuberculous joints. It is now found that light treatment not only betters their bones and improves their general health, but also brightens their brains and sweetens their dispositions.

A class of boys from the London slums who were taken to the garden of a private house on Clapham Common, where they studied and played all day long, attired in "very short shorts and no shirts", showed at the end of six weeks that even such feeble sunlight as London affords had increased their mental capacity and alertness as well as their appetites.

A comparsion of the results of mental tests made in the special schools for physically defective children in London with those made on the children who had taken the light treatment at the Lord Mayor Treloar Cripples' Hospital at Alton showed a marked superiority for those who had the advantage of the sunshine. Both groups of children were naturally retarded on account of their disease, but the mental retardation of the London children was on the average 1.95 years, while that of the Alton children was 1.14 years. Both groups were about the same age, 11 years, and the London children had had more schooling.

Sir Henry Gauvain, superintendent of the Treloar Hospital , in reporting these results is careful to add:

> "It is not our object to aim a blow at the solidly founded theory that intelligence is innate and cannot be increased. It is probably quite indisputable that an individual's amount of mental energy is fixed and unalterable. But it is unalterable in the same way that the maximum power of an engine is unalterable. An engine of a maximum of 40 horsepower can by no trick be made any more powerful. But the ways are legion whereby it can be made less powerful--a dirty sparking plug, a faulty magneto, dust in a delicate piece of mechanism -- any of these things, and many others, may reduce its power far below 40. It is suggested that the case is no different with mental energy."
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> "We advance the suggestion, which further investigation may confirm or disprove, that ultra-violet light, shown to be an important factor in effecting tissue change, may thus improve the nutrition of the grey matterof the brain and in this way increase the output of mental activity which we claim follows judicious exposure to light."

A more exact test was made at Alton on a ward containing 20 small children all afflicted with tuberculous disease of the spine, and therefore bound immobile to their beds. The diet and treatment of all were the same, but 10 of the children were given systematic treatment with artificial light. Sir Henry Gauvain reports:

> "While the physique of those receiving light treatment showed improvement as compared with the others, the effect on the mentality was even more definite. Those exposed to light were markedly happier, more vivacious, more alert, and I may add, more mischievous."
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> "They would often laugh and sing and appeared to be overflowing with animal spirits, while their fellows remained silent."

So, if any parents or teachers find their children are not mischievous enough, they may liven them up a bit by letting a little sunshine in. But not too much or too long at a time. Interrupted and periodic exposure to solar rays is superior to continual treatment. Five or ten minutes at a time at first, gradually increasing so as to produce tanning without burning. And remember that window glass is opaque to the short rays that are wanted. So is clothing, except the very thinnest. Artificial silk, rayon, is more permeable to these rays than natural silk, but even lightest fabric of artificial silk will cut off more than half of the ultra-violet rays. Though it be the brain that one wants to stimulate "direct action" is dangerous. Hats or eye-shades are usually needed.

Every one who has dabbled in photography knows how variable sunlight is in its proportion of the short waves that affect a sensitive plate, and the same is true of a sensitive skin. Ten minutes of sunning will sometimes raise a blister, and on another day when the daylight seems equally bright one can stand an exposure for hours without blushing or browning. A photographic exposure meter or strip of sensitive paper can serve as a test of the actinic and therapeutic intensity of the light. On account of the variable and uncertain character of sunlight, hospitals often prefer to use the rays given off by the mercury-quartz or carbon arc lamps where the dose can be definitely regulated.

STONE AGE MAN EVOLVED IN ASIA, SAYS BRITISH ANTHROPOLOGIST

By E. N. Fallaize, Secretary of the Royal
Anthropological Institute, London

The span of man's evolution through the Old Stone Age is covered by the discoveries of the expedition of the American Museum of Natural History under Roy Chapman Andrews in the Gobi Desert in central Asia. Rudely shaped implements such as the extremely primitive Neanderthal man used, known technically as Mousterian types, have been brought to light by the American expedition, as well as the finely wrought chipped flints of the Azilian period, just before the beginning of the New Stone Age when men used tools and weapons of polished stone. It adds another link to the chain of evidence that thetypes of man may have evolved in Asia.

It was already known that there was a connection during the New Stone Age between western Asia and eastern China, for a few years ago the late Mr. Pumpelly, well-known American archeologist and explorer, unearthed at Anau in Turkestan fragments of neolithic painted pottery of a peculiar type identical with pottery fragments found in deposits of the same age in China. Similar pottery has been found

on a few sites scattered over the intervening regions of Central Asia.

Now the discovery of Mousterian implements with a skull of Neanderthal type in Palestine, and the discovery by Teilhard and de Chardin of similar implements in Northern China and Mongolia in deposits which appear to be of the same date as those in which Mousterian implements are found in western Europe, links up with this discovery in the Gobi Desert to prove for the first time that this primitive type of man existed over a wide area in Asia.

But the Galilean skull is not of the usual typical Neanderthal form of western Europe. It most closely resembles a skull from Krapina in Croatia which itself differs from the type; but it shows even more clearly than that skull an approach to the modern type of man. It is possible that it represents a stage towards the evolution of modern man which was taking place somewhere in the East. Further, the implements found with the Galilean skull seem to show an affinity with implements from North Africa.

The Azilian culture of the transition period from the Old to the New Stone Age appears to have come to Europefrom North Africa. If therefore it can be proved that the Azilian culture is much earlier in Asia than in Europe, as Andrews is stated to hold, the evidence from Palestine and from Mongolia might together support the view that a modern type of man and types of stone age culture were originally evolved in Asia and that some of these cultures, though clearly not all, reached Europe after travelling around the southern shores of the Mediterranean.

GERMANS PLAN EXPLOITATION OF NEW HELIUM SOURCE

A new way of getting helium has been suggested in Germany by Dr. Kurt Peters of the Physical Technical Institute of Berlin. It is to be distilled from radioactive minerals used in various industries, and mainly from monazite sand, which is made into Welsbach mantels. Although it has been known for a long time that these minerals give off helium when heated, the gas has never been recovered commercially Dr. Peters claims that it is the largest source of helium in Germany at the present time. He estimates that a production of from fifteen to twenty thousand cubic feet is available annually, which is a thousandth as much as was lost in the Shenandoah disaster in one day.

While this amount will not be sufficient for use in dirigibles it is expected to suffice for technical purposes. Helium has been most difficult to obtain because the United States, which is the only country in the world producing the rare gas in large quantities has stringent export laws prohibiting its sale to foreign countries except with the sanction of the War and Navy Departments.

Dr. Meissner, also of the Physical-Technical Institute in Berlin, obtained about 25 cubic feet of the gas from a neon-helium mixture. This was obtained as a by-product in the manufacture of liquid air used in Berlin refrigeration plants, after months of distillation in the laboratory. It is estimated that this amount of helium came from about five million cubic feet of air. The new method of recovery from minerals instead of from air will yield greater quantities and purer helium, according to Dr. Peters.

ELECTRIC CURRENT NOW MEASURES ALTITUDE

A new instrument which measures altitude electrically, and about eight times as accurately as the ordinary barometer, to a height of at least one mile, has been constructed by the French physicists Drs. Huguenard, Magnan and Planiol, and was recently shown before the French Academy of Sciences. The apparatus is based on the fact that a heated object cools off much more quickly in dense air than in very thin air or near-vacuum, because in a near-vacuum there is very little matter to conduct or convey the heat away. The density of air depends on the altitude, so that an instrument that will measure air density will also give a measure of the altitude.

The device consists of a wire of great resistance, so that when an electric current is passed through a high temperature can be obtained. Heat is immediately lost by radiation, convection currents in the air, and to a certain extent by conduction. After each of these leaks has done what it can, the temperature of the wire has reached equilibrium; and when once this balance is attained, changes in the temperature of the wire will be due to changes in the density of the surrounding air.

When the wire is made of a metal whose specific heat is known, the measure of its resistance to an electrical current can be used to determine how hot ie should get; and from that the density of the surrounding atmosphere can be deduced. It is a well known fact that the electrical resistance of the wire itself changes with the temperature. A variation in the density of the air will therefore cause a variation in the intensity of the electric current; and this fluctuation can be used to measure the altitude, since the density varies according to the distance above sea level.

CHEMICAL ALADDIN'S CAVE FOUND IN GERMANY

A series of grottoes, mined for alum and vitriol long before Columbus was born, and rediscovered shortly before the world war by the Berlin geologist, Dr. Hess von Wichdorff, have just been found to be a veritable chemical treasure trove. A spring claimed to be the "strongest" spring in the world issues from one of the most beautiful parts of the grottoes and contains phosphorus, arsenic and iron sulphate.

Minerals of the rarest colors jewel the caves in numberless many-hued formations. Chemists, physicists and geologists who examined the springs and minerals systematically for a year and a half from a scientific and medicinal viewpoint, have found radioactive springs such as have never before been found. Tests have revealed that the springs are almost bubbling drugstores. Besides phosphorus, iron, and arsenic, they contain in addition molybdenum, copper, aluminium, manganese, calcium, magnesium, sodium and potash.

Investigation of Scottish rivers shows that there are fewer salmon in the small streams but that they spawn more frequently.

The average Englishman is five feet eight inches tall, according to the latest statistics.

PAPER SCRAPS AND GREASE SPOTS BRING MADE-TO-ORDER DREAMS

Dreams are made to order by tools as simple as bits of gummed paper about the size of postage stamps stuck to the skin, or bits of butter rubbed on it, by A. J. Cubberley, a Cambridge University psychologist. Mr. Cubberley's theory of dreams is that they are largely controlled by what he calls tensors and detensors, that is, spots where the usual tension of the skin and other tissues near the surface is increased or diminished. Application of the bits of gummed paper increases the tension, and rubbing on of oily substances decreases it.

Dreams seem to "go to the spot" thus treated. A bit of paper stuck to the outside of the lower part of a subject's leg brought a dream of being kicked by a horse on just that spot, or of barely escaping such a kicking. Diminishing the tension often gave dreams of opposite character; of slipping or falling, or of general languor. Alternating tensor and detensor applications brought alternations of opposite dreams.

The value of Cubberley's method, it is explained, is that it introduces exact experimental control into a field where speculative explanations have become the fashion and it makes possible dream-analysis with an approach to scientific precision since the state of the dreamer has been ascertained thoroughly. It also makes possible a study of the general problems of mind, since the whole surface of the body may be investigated for tension-associations and the possible translation of these into visual, emotional and other terms. The author does not dispute the value of dreams as an aid to diagnosis in cases where a positive disturbing factor exists but does urge the need of great caution in importing into normal psychology doctrines based upon the abnormal. In brief, his conclusion is that "The development of the dream is governed by the configuration of tensions in the dreamer's body."

SOCIAL SENSE OF STUDENTS MEASURED BY UNIVERSITY

A new kind of examination -- a test of social intelligence -- was applied to 1,200 students entering George Washington University this fall. The professors now have evidence as to which students are good mixers, which are quick to size up situations and people, and which are likely to get along in positions where they must direct other people.

"It is well known fact that many students who rate high in general intelligence tests do not make good in later life," said Dr. Fred A. Moss, associate professor of psychology at the university, and author of the sociallintelligence test. "Some of these make fine school records, but they lack what is popularly called the ability to 'get along in the world'. Since universities are trying to bring out the possibilities in their students and to start them off in some direction where they are likely to have success, we believe that a measure of each new student's social sense will provide valuable data."

The new type of test deals with practical conditions, Dr. Moss points out. The ability of the students to remember names and faces was first tested. Then their success at sizing up a series of social situations was measured. A typical problem in this test was:

"A Harvard graduate is holding a position as caretaker of a small playground. He is most likely one of the following -- (1) a drunkard or drug addict; (2) unusually fond of children; (3) unable to adjust to a position of responsibility; (4) a moron."

As a test of keenness at reading faces, a number of photographs of a screen star were thrown on a screen and the students were asked to tell what emotion was being registered on the actor's face. Still another branch of the examination dealt with general information on art, science, literature, politics, and sports, because the wider the range of an individual's interests the more likely he is to understand and get along with his fellows.

Dr. Moss' social intelligence test has already been tried out with several thousand cases. He states that certain parts of it have been used in selection of policemen in Los Angeles and in New York state, but this is the first time that a university has attempted to catalogue its new students from the social angle.

Dr. Moss says that the test data will be kept on file and compared with the records of the students in university activities and possibly in their later careers.

U. S. SLEUTHS TRAIL WESTERN BOLL WEEVIL

A western relative of the cotton boll weevil is being watched apprehensively by field agents of the U. S. Bureau of Entomology. This insect, which is a hardy pioneer type of boll weevil, has for years hunted the wild cotton of Arizona for food. But entomologists fear that sooner or later it will find its way to the cultivated cotton fields of Arizona and Texas, and once it tastes the succulent squares of the cultivated plant it will probably turn into as terrible a glutton as the southern cotton pest.

J. L. Webb, of the Bureau of Entomology, says that the Southwest has so far escaped the attacks of the boll weevil because the southern type of weevil does not thrive in an arid climate. The western cousins of the southern weevil, however, are used to dry weather. The accepted theory is that years ago the ancestors of the western weevils wandered away from the rest of the tribe and migrated to Arizona. There some sturdy specimens survived and established a new line of boll weevil with habits adapted to the western country.

These weevils live in more or less isolated regions, Mr. Webb points out. But in one or two instances in the past year specimens have been taken from cultivated cotton in Arizona, and government agents are now working on an investigation of the insect's habits and its population statistics so as to be prepared to combat it in event of emergency.

A full meal for a bedbug is twice its weight in blood; when gorged it hurriedly retreats to a crack or crevice and digests its meal in the course of two or three days.

MOUND-BUILDING INDIANS VALUED PERFECT PEARLS

Pearls from the Ohio mound hoards show that the ancient Indians who built them and accumulated the jewels found in them were as fastidious as modern jewelers about their quality, according to Dr. Walter Hough of the U.S. National Museum. They used only perfectly shaped pearls, rejecting even the baroques that receive at least minor favor from Europeans.

The Ohio finds, though unusually fine, even sensational in their quality, are not the first discoveries of pearls in the Indian mounds of that region, Dr. Hough said. Some years ago, an expedition under Dr. F. W. Putnam of the Peabody Museum of Harvard University worked on mounds near the Miami and Muskingum rivers in Ohio, and found great quantities of pearls, nearly a peck of them in all. Unfortunately, they had been buried in acid soil, which had roughened and discolored their surface. If the surface layers were peeled off the nacre underneath shone with an exceedingly beautiful but evanescent luster, like the "peeled" pearls of modern jewelers' practice. Pearls, Dr. Hough explained, are chemically quite similar to limestone, and unable to withstand even the weak acids of the soil. Cleopatra's famous stunt of dissolving a pearl in vinegar can be repeated by any one willing to stand the expense. Fortunately, the pearls recently found were buried in a limy, alkaline soil and have not been spoiled. Dr. Hough recalled also a store of pearls found by an expedition under William C. Mills, which had been perfectly preserved by burial in ashes. Included in this find was one necklace of an estimated value of $150,000.

The source of the pearls is obvious enough. The mussels, or "clams" abundant throughout the Mississippi Valley frequently contain pearls, which are sometimes of great value. The mound-builders were mussel-eaters, and must therefore have found many pearls, which became part of their tribal hoards. There is small likelihood that any of them came from the sea, for though the mounds sometimes contain seashells obtained in barter from more southern tribes there is no indication that sea-pearls were thus obtained.

The tools used by the ancient Indians were primitive, but their basic technique was surprisingly like that of modern jewelers. Some of the pearls were bored for stringing by means of a fine stone splinter, but most of them by means of a slender stick and a little sand and water.

Pearls were also used as eyes in the carved stone ceremonial pipes that have been found in the mounds. These pipes are most frequently carved in the form of birds, but represent other animals also, and usually with the greatest realism and faithfulness of detail.

The copper ceremonial masks, Dr. Hough stated, were probably made by hammering sheet copper into shape over a wooden base or mould. They are all grotesques, and some of them are representations of animals. Some deer masks have been found, with branching horns that project well above the head.

Dr. Hough said that there is no question but that the mound-builders were Indians, so far as can be determined from a study of their skulls. About five or six years ago, however, there were discovered in some of the old mounds intrusive burials of another people, whose remains are still a riddle to anthropologists. These invaders possessed bone harpoons, weapons unknown to the Indians; moreover, in one place a jade ax was found, and the Indians never used jade. These remains strongly hint at a high-northern, Eskimo-like invasion; but no study of their skulls has yet been made, so that nothing positive has been determined.

GREAT ILLINOIS MOUND BECOMES STATE PARK

The great Kahokia mound, one of the most famous examples of the mound-builders' work extant, lying just across the Mississippi river and near the city of East St. Louis, has become the property of the state of Illinois. Preserved from the inroads of vandals and amateur excavators by the vigilance of the Ramey family, hereditary owners of the mound, it is still in much the same condition as it was when white men first saw it, and it will now be permanently protected as a state park. The state paid the owners the sum of $52,119 for a tract of 114 acres, including the great mound itself and several lesser mounds nearby.

A traditional name for the ancient earthwork is the "monks' mound". During early French days in Louisiana Territory, a community of Trappists settled there, and built their monastery on top of the artificial hill. Monks and monastery have long since disappeared, butthe name stuck long after they had departed.

INDIANS SWAP FOOD WITH FIELD MICE

The Golden Rule is extended so far as to cover dealings between men and mice by the Indians of the Dakotas, according to Melvin R. Gilmore, anthropologist, of the State Historical Society of North Dakota.

The Indians of the region, Mr. Gilmore states, are very fond of the under-ground fruits of the ground bean, which are very rich and nutritious. But the only creature that can successfully gather these beans is a species of meadow mouse, which hoards them in storage pits in the ground.

The Indians rob these pits as white men would. But they do something that it is doubtful would be imitated by white men, for they always leave part of the beans for the mice, and when they are about to make a raid they always speak politely to the "mouse people" about it. But what is even more alien to white men's ways, the Indians always give the mouse a fair equivalent in exchange, filling up the cache with corn, suet, or other food. This, the redskin explains to the mouse, enables both parties to enjoy a variety in diet.

UNTRAINED MONKEY SHOWS GOOD MANNERS

What is a monkey really like? That is, when he is brought up without any training or furbelows whatever, when he is left entirely uninfluenced to follow his own sweet way and is not even given monkey companions from which he can learn what is proper for monkeys to do. That is the question Prof. Pfungst, a member of the Berlin Physiological Society, wanted to get some light on in a study he made on a monkey brought up just like that.

As an infant, the monkey was raised on human milk with some admixture of cow's milk, for the monkey brand was unavailable. His face was so light at birth that it was easy to mistake him for a juman infant when in his nurse's arms. On the third day of his adopted life he began to suck his thumb and has not gotten over the habit yet in his fourth year of life. Thumb-sucking had never been observed in other monkeys, Prof. Pfungst said.

The little fellow knew good manners from birth. He could not bear being shouted at and he always turned his head and ignored the offender. It was just as bad when anyone stared at him; in fact, sometimes he was so upset by it that he showed he would rather be dead than go through with it, for he often lay flat on the ground and pretended he was. Anything that resembled big stary eyes frightened him. The sight of a man's head did not alarm him in the least but a gorilla's head aroused great fear.

The monkey yawned, not when he was bored or tired but when he was angry. He was serious and never laughed, although his mother before him had. He could not cry and even onions held before his eyes failed to evoke tears.

In four years he had seen practically no other creatures except man. On two occasions he had been shown a cat, and then himself in a looking-glass. Then came his introduction to one of his own kind. At first he was very excited and afraid but his courage eventually returned. Before long he became trustful and gave his new companion a "skin treatment", as Dr. Wolfgang Koehler, an authority on apes, calls the great social game of hunting for fleas and lice and anything else that monkeys can find in their fur.

RUSSIAN ASTRONOMER FINDS COMET

Brook's comet, one of the seven periodic comets expected to visit the region of the earth this summer, has been discovered by a Russian astronomer named Tscherny, at the University of Kiev. When observed on September 19 it was in the constellation of Aquarius, which is now directly south at about 9.00 p.m. Its right ascension was 23 hours and 18 minutes and its declination 5 degrees and 13 seconds south of the equator.

Brook's comet is periodic, returning to the earth once in approximately seven years, and its observed position is within 5 degrees of the position which had been computed for it in advance, a little more than the distance between the two pointers in the Great Dipper. Since it was last observed, in 1918, it came close to the planet Jupiter, and its orbit was shortened by Jupiter's gravitational attraction, bringing it back several months sooner than it would have done otherwise. As it approaches nearer to the earth, it will become brighter, but it is doubtful whether it will become visible to the unaided eye.

ONLY ONE IN MILLION KILLED BY LIGHTNING

Fear of lightning is far out of proportion to the grounds for it, according to the revelations of a survey made by Dr. Arthur W. Gilbert, Massachusetts Commissioner of Agriculture. This survey showed that the chance of death by lightning is only one in more than a million.

For example, during a five-year period in Massachusetts only 19 persons were killed by lightning, an average of 3.8 persons a year. This is only one ten-thousandth of one per cent. of the state's population. It figures out one chance in 1,013,770 of a person being killed in the Bay State by a bolt from the clouds.

The survey indicated that the man on the farm is ten and a half times as likely to be struck by lightning as his city brother, due to the scarcity in rural communities of steel-framed buildings, trolley wires, etc. that in the city relieve much electrical tension while a thunder storm is gathering. But,Dr. Gilbert assures the farmer, if he is in a house properly equipped with lightning rods during a storm he is in no greater danger than the city fellow. On the other hand, the farmer is 20,000 times safer from harm than a man dodging motor traffic in a large city.

Dr. Gilbert's survey was made primarily to determine the extent of the damage to crops by thunder storms. He found that while these storms cause thousands of dollars' worth of damage to crops at times they aid agriculture much more than they harm it. The rainfall they bring saves large areas of products that would otherwise perish from lack of moisture.

TABLOID BOOK REVIEW

MARCH'S THESAURUS DICTIONARY, With an Amplified Appendix; 1190 & 251 pp.; Philadelphia, Historical Publishing Co., 1925 $9.00

To combine the functions of a thesaurus, which aims to relate words expressing similar ideas, and a dictionary, which lists the words in alphabetical order and gives their definitions, was the idea of Prof. Francis A. March when he first prepared this work, and that he succeeded is attested to by the high value which numerous literary persons have since placed on it. The alphabetical arrangement of the words , with references to the numerous lists of words expressing related ideas, as "Breadth- Narrowness", "Harmony - Discord", and "Love - Hate" make it an easy task to express the desired shade of meaning.

Useful as it was in general literature, the lack of many scientific words limited the utility of earlier editions to the scientist, and in recent years this disadvantage has been enhanced by the large number of such words that have come into common use. This difficulty has been ably overcome in the new edition by the addition of an appendix containing over ten thousand scientific terms, as well as new words of general origin, business words, pseudonyms of authors, etc, Use of the appendix has enabled the original plates to be used for printing the body of the book, and this has made it possible to sell the new edition at almost half the original price. A complete index of all the words in the appendix, and numbrous diagrams add still further to the usefulness of the work, and make it one to be heartily recommended to all who do writing for pleasure or profit.

In order to find the connection between air currents and the spread of the spores of the deadly grain disease known as stem rust, collections of germs are being made on sticky glass slides exposed in flying airplanes.
