

"In 1849 boring operations were carried out on the Goodwins by the engineering staff of Trinity House. The Deputy Master and Brethren, whose generous offer of assistance on all matters relating to this subject I gratefully acknowledge, have kindly lent a model made at the time, which shows the nature of the sand found at increasing depths. Solid chalk was reached at 80 feet below the surface."

THIRST-QUENCHING DESERT PLANTS

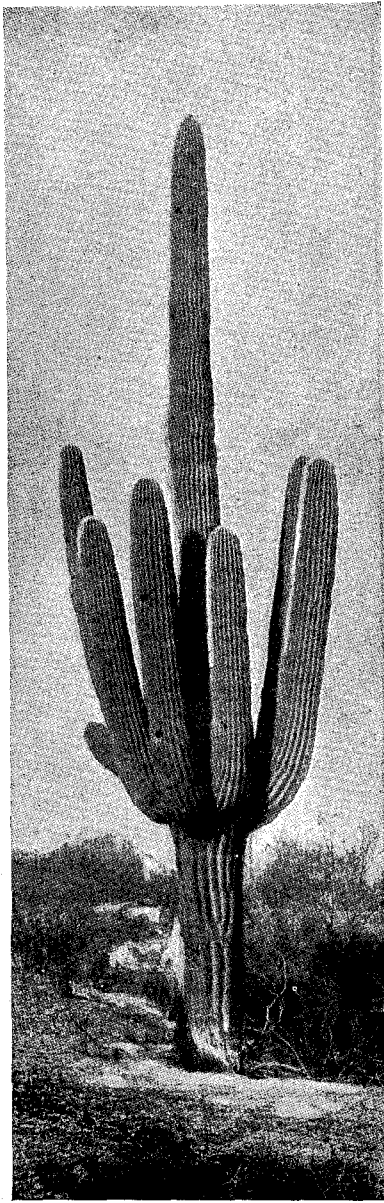
ACCOUNTS of plants resorted to by thirsty travelers in the desert for their abundant juices are frequently found in popular works, often, unfortunately, more or less apocryphal. The following brief but authoritative summary is from an article in *The National Geographic Magazine* (Washington, August), entitled "Notes on the Deserts of the United States and Mexico" and abstracted from a recent Carnegie Institution publication written by the director of the Department of Botanical Research, Dr. Daniel T. McDougal. We read:

"The Indian and the desert traveler often seek relief in the juices of plants when water fails. The fruits of some of the prickly-pears are slightly juicy, the stems of the same plant or the great trunks of the saguaro contain much sap, but for the most part it is bitter, and while it would save life, in extremity, yet it is very unpleasant to use.

"The barrel cactus, or bisnaga (*Echinocactus*), however, contains within its great spiny cylinders a fair substitute for good water. To get at this easily one must be armed with a stout knife or an ax with which to decapitate the plant, which is done by cutting away a section from the top. Lacking a suitable tool, the thirsty traveler may burn the spines from the outside of the bisnaga by applying a lighted match, and then crush the top with a heavy stone. This or other means is taken to remove a section six to eight inches in thickness. Next a green stake is obtained from some shrub or tree that is free from bitter substances, and with this or with the ax the white tissue of the interior is pounded to a pulp and a cavity that would hold two gallons is formed. Squeezing the pulp between the hands into this cavity will give from three to six pints of a drinkable liquid that is far from unpleasant and is generally a few degrees cooler than the air.

"Scouting Indians have long used the bisnaga, and a drink may be obtained in this manner by a skilled operator in five to ten minutes. Some travelers are inclined to look with much disfavor on the liquid so obtained, but it has been used without discomfort by members of expeditions from the Desert Laboratory. That it is often preferred by Indians to fair water is evinced by the fact that the Whipple Expedition found the Mohaves near the mouth of the Bill Williams River, in 1853, cooking ducks and other birds in the juice of these plants by means of heated stones dropt into the cavity containing the pulp.

"The sap of the saguaro (*Cereus giganteus*) and of other cacti contains bitter substances that make it impossible to be used to allay thirst by man, altho it may be given to burros. A supply is usually obtained by felling the heavy trunk and elevating the ends a few inches above the ground, while the middle is allowed to sag lower over a bucket or vessel that has been suitably placed in a hole in the ground below. A cut is made above the bucket to allow the liquid to escape while the process is hastened somewhat by building a fire under the ends.



GIANT CACTUS IN THE SANTA CATALINA MOUNTAINS.

The openings in the trunk and branches lead to large sac-shaped cavities, originally excavated by woodpeckers for nests, and afterward occupied by several other species, as well as colonies of honey bees. This specimen is 40 feet tall.

to a list supplied by a reputable body, say a local medical society in the case of medical cases. An engineering or chemical society should similarly nominate experts for their particular lines. To eliminate the dangers of officialism and the exclusion of experts from abroad or of new men not yet recognized as expert, there should be provision for the court calling any man jointly requested by the defense and prosecution if it so desires. We presume this will come in time—if not already provided for in the twenty States now studying the matter; but even if there is no such provision, it is no ground for opposition, as the measures are so infinitely superior to the present horrors that every one should demand the early enactment of the bills. Their passage will prevent the miscarriages of justice which have so disgraced American jurisprudence."

CONCRETE PILLARS BY CENTRIFUGAL FORCE—In Germany concrete pillars and piles are now being cast in a rapidly whirling cylindrical mold, which packs the concrete into a crust, leaving a hollow center. The results are said to be far superior to those reached by any other method. Says a writer in the *Revue Scientifique* (Paris):

"The manufacture of columns, and even of piles, from reinforced concrete has now entered into current practise, but the

"The experiences of the expeditions from the Desert Laboratory made it evident that a still or condenser, by which even a small quantity of drinkable water could be obtained from the abundant sap of these plants or from alkaline waters, would greatly facilitate field-work. After some experiment, one was designed by Mr. Godfrey Sykes, in which the cactus pulp or liquid to be distilled is placed in a boiler of prest steel. This apparatus is now used by the laboratory parties while at work in the deserts. It has a capacity of several gallons per day, which enables a party to make an extended stay at a locality where the untreated water is undrinkable."

TO REFORM EXPERT TESTIMONY

THE REFORMATION of our methods of using the testimony of scientific experts, so that it will be of real value to courts, now seems to be assured in at least twenty States, we are told by an editorial writer in *American Medicine* (New York, August). Says this paper:

"The old disgraceful conditions are doomed because it has been finally realized that they are standing in the way of justice. The bills being prepared for legislative action all seem to be on the one plan of getting such testimony from a witness called by the court, paid by the State or county, and absolutely independent of prosecution or defense—as nearly impartial as human plans can make it in our present state of imperfection and fallibility. There may be defects in the bills, no doubt there are, for no human action is perfect; but it must be confessed that no better plans have been suggested so far and that some of the ablest physicians and lawyers have given the subject very serious consideration. The accused and prosecutor can employ all the experts they desire to help in the conduct of the case, but such men will now be openly acknowledged as hired partizans who can not occupy the witness chair.

"The proposed laws exclude the partizan expert and, as the court is not presumed to know who are competent, confine the choice to a list supplied by a reputable body, say a local medical society in the case of medical cases. An engineering or chemical society should similarly nominate experts for their particular lines. To eliminate the dangers of officialism and the exclusion of experts from abroad or of new men not yet recognized as expert, there should be provision for the court calling any man jointly requested by the defense and prosecution if it so desires. We presume this will come in time—if not already provided for in the twenty States now studying the matter; but even if there is no such provision, it is no ground for opposition, as the measures are so infinitely superior to the present horrors that every one should demand the early enactment of the bills. Their passage will prevent the miscarriages of justice which have so disgraced American jurisprudence."

columns of this kind made by the firm of Otto & Schlosser, of Meissen, Saxony, are remarkable for the very original process used in their preparation.

"These columns are hollow, and a rotative machine using centrifugal force is used to make them. In a mold of wood covered with sheet iron, open at the ends, is first placed a reinforcement composed of longitudinal steel rods connected by a spiral of iron wire. . . . A proper quantity of a mixture of cement-mortar and asbestos-fiber is then turned into the mold [and] . . . it is placed in a special machine . . . which gives it a rotary motion of 500 to 1,000 turns a minute. The plastic mass is thus thrown against the walls of the mold, burying the reinforcing rods, and the violence of the centrifugal force produces a compression of the layer of reinforced concrete thus formed. The surplus water also is prest from the concrete by this means.

"The time of treatment varies from 10 to 15 minutes, according to the thickness that it is desired to give to the layer. At the expiration of this time, the mold may be removed from the whirling-machine, but it must of course be left in place long enough for the concrete to set completely, which will take place in from 12 to 24 hours. The column is then buried under a layer of wet sand, where it is allowed to harden slowly for three to four weeks. Different thicknesses may be given to different parts of the crust by inclining the mold properly during its rotation, the plastic mass tending to move toward the lowest point. Columns of this kind are made up to lengths of 45 feet, with diameters of 6 to 15 inches and a thickness of crust of one to three or four inches. They are strong and elastic."—*Translation made for THE LITERARY DIGEST.*



"WE HAVE MADE A FETISH OF BOOKS."

Dr. F. Park Lewis believes we are sacrificing the eyes of our school-children to a worship of the printed page.

Egyptian hieroglyph or the crude sketch of one of our aborigines. It consists of a group of arbitrarily chosen forms which placed in certain combinations—more or less variable as we modify our spelling—represents the symbol of the thing. Consider for a moment the number of mental processes that are required to enable a child to grasp the idea which the word is intended to convey. . . . That which requires a page of description is told in much less than half the time required to read it—and all of this and much more, if seen, is comprehended at a glance. The expression of the face, the tone of the voice, the gesture, the human interest conveyed, are all interpretative. With a foreign language, still another additional mental process is exacted, and we find our students after two, three, or four years devoted to the study of French or German disappointed and unhappy to find that it is to them a dead language and that the result of their labor is a book knowledge only; while a little gamin from Palermo or Budapest will pick up a useful vernacular in the streets to which he will add a richness of slang, and, thereby, of vitality, that we may envy, but can never hope to attain."

We must realize, Dr. Lewis goes on to say, that there is another and a more direct way of getting at the intelligence of the child, than that which we commonly employ. We

have too many books; too many studies; not enough athletics of the right sort; not enough training in mental agility and logical thinking. We should teach real values; not their symbols; and we should make our teaching more direct and personal. He goes on:

"These are neither visionary nor theoretical ideas to which I am giving expression. They are the outgrowth of the real philosophy of Froebel. They have found expression with marvelously satisfactory results in our manual and industrial training schools. We have used them to some extent, tho not nearly enough, in our schools for the blind, but in their fullest development and most satisfactory results in the schools for the mentally slow. I saw a chosen group of the laggards in a school in Rochester, N. Y., in a gymnastic class following the rapidly given orders of the instructor in the game 'Simon Says' and then imitating the equally swift motions of the arms and legs, without a word of command. It was evident that the training in quick coordination, in mental alertness, and in fixity of attention was vastly more effective than any corresponding amount of book work could possibly be. If this were true of those whose responses were slow, how much better proportionally would it have been with children of active mentality? Lest I may seem to be wandering from the subject under discussion, let me say that the conclusions expressed are not only relevant, but they are an essential part of my thesis. At the request of the Association of Women Principals of New York City, a number of eminent oculists made a careful examination of existing conditions and formulated certain recommendations which they urged should be adopted. These recommendations were referred by the Board of Superintendents to a special committee of two whose judicious and thoughtful summary of the whole matter is worthy of careful consideration.

"The subject of the paper to be used in the school-books, the type, the position of the child, the lighting, are all considered, not only with the judgment of men of trained minds, but with the practical knowledge of the experienced teacher. 'It is impossible,' says this committee, 'to dispense with the teaching of reading and writing.' It is impossible, undoubtedly, and also undesirable. But is it impracticable to limit very largely the amount of reading and writing, in that way not only saving the eyes from unwarrantable use, but, by limiting the hours of work, leaving some time for the study of the fundamental things of life?

"In the report occur these words: 'Your committee believe that this question can not be settled by educators, publishers, or printers, but should be determined by oculists.' . . . 'The latter have never made an extended investigation of the subject and hence can only give expert opinion which is not based on

OVER-USE OF THE EYES IN EDUCATION

ARE WE making too much use of the printed page in educative processes? That close attention to books for six to eight hours a day, with incidental reading and writing, is responsible for the destructive processes that are injuring our children's eyes, is maintained by Dr. F. Park Lewis, of Buffalo, in a paper on "Conservation of Vision" read before the last meeting of the National Educational Association. "We are rapidly becoming a bespectacled nation," Dr. Lewis thinks; and by this use of corrective lenses we are not going to the root of the matter. We must lessen the hours of work during which the eyes are subjected to strain. He says:

"The labor-unions have wisely limited the working day to eight hours for strong men whose body tissues are developed and resistant, while we compel the child at the formative period of his life to use his most vital and impressionable eye-structures as much as eight hours, and permit him to use them in close, taxing work for ten hours or more a day. His eyes will no more tolerate such unwarrantable abuse than will his muscles or his brain. Something must in time give way, and usually it is the retaining coat which gives form and stability to the globe.

"It would seem to me that we are not getting at the root of the matter at all. We have reasons to congratulate ourselves on the splendid advances that have been made in pedagogic methods during the last few years. Practical work is being introduced in the school, such as printing and industrial and domestic science, but in the fundamentals we are still teaching largely through the method of the printed page. We have made a fetish of books. We have become a reading rather than a thinking people. We have come to believe that the most effective way in which knowledge can be communicated from one person to another is through the medium of the printed page, while it is in fact an indirect route to the mind. A picture of a thing—and especially of a thing in action—becomes almost immediately a thought. The printed word is not the thing itself. It is not even the symbol of the thing, as is an