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SUCCESSFUL PROGRESS OF THE GREAT JETTIES.

Captain Eads' improvements at the mouth of the Mississippi river having successfully progressed to a point at which, under the act of Congress relating to the subject, a second installment of half a million dollars falls due to him, Generals Barnard and Wright, of the United States Engineers, recently made a thorough examination of the new channel. The substance of their report is given below.

It is safe to say that no engineering work of similar magnitude has ever been maintained and conducted with such splendid success, under so many unfavorable conditions. From the very outset Captain Eads has met with opposition none the less bitter because it came from official sources. He was confronted by adversaries who would neither support his plan nor agree among themselves upon the feasibility of any other project, and the prospect was that the Mississippi would remain unopened to commerce indefinitely into the future. With a boldness born of perfect faith in his scheme, Captain Eads broke through the deadlock of conflicting opinions by himself assuming the entire expenses of putting the same into practice, and asking no reimbursement or pay until the officers of the United States should themselves testify to the successful attainment of various points in the progress of operations. Congress at length passed the requisite act, and Captain Eads began the apparently unpromising work of building his great jetties out into the open sea.

Certainly no engineer has ever before undertaken such a task under such auspices. Executing a great enterprise of the first national importance, he has been entirely without Government aid; on the contrary, at the outset, officers of the Government, if not active opponents, did not in many cases hesitate to predict the failure of the scheme. Still Captain Eads has labored on, always successfully, until now large ocean vessels may safely pass through the channel he has made, and his title to the gratitude of the people rests on an unassailable foundation.

We have published, both in these columns and with much detail in those of the SUPPLEMENT, information concerning the steadily successful progress of the work; and from the beginning the SCIENTIFIC AMERICAN has been among the few steadfast supporters of the correctness of Captain Eads' theories and plans. It is therefore with no small gratification that we now congratulate Captain Eads on his triumph. Generals Barnard and Wright in their report state that there is now a channel nowhere less than 200 feet wide and 22 feet deep from the South Pass between the jetties to the deep water of the Gulf of Mexico. The width between the 22 feet curves varies from 300 feet to more than 500 feet. At the head of the Pass a channel 264 feet wide and 22 feet deep exists, and a practicable channel 23 feet deep was also found. No more complete announcement of the success of Captain Eads' work, or one which at the same time emphasizes more strongly the error of his opponents, can be made than is embodied in the following words from the report of the above named distinguished officers: "If we look at the actual facts presented by the prosecution of this work, we find that while two and a half years ago there was a bar at the mouth of the South Pass, over two miles in extent, measured from twenty-two feet of water inside to the same depth outside, over about a half a mile of which there was eight feet of water, a wide and deep channel exists; and a result inferior in physical magnitude, but of no less importance, has been attained at the head of the Pass. This result is so exclusively due to the jetties and auxiliary works, that the auxiliary aid of appliances, if in such we include dredging machines, is utterly insignificant. About 2,500,000 cubic feet of material were excavated by the current, against 200,000 by dredging."

UNSCIENTIFIC SCIENTISTS.

Mr. William Crookes, F.R.S., is an English scientist of reputation and of no small ability. He is the inventor of the radiometer, and a very close investigator of so-called spiritualistic manifestations. We mention these two peculiarities in preference to many other very excellent and useful rôles which Mr. Crookes has assumed, because, on account of them, he is at present involved in controversies which are remarkable in their way, for bitterness on one hand and absence of production of definitely settled fact or theory on the other.

We suppose that as an originator of experiments for testing spiritual mediums in such a way that the latter always come out apparently triumphant, Mr. Crookes is unrivaled. Not that we mean to assert for a moment that the gentleman allows his belief in things supernatural to influence his actions, or that he approaches his investigation with anything but a sincere desire for simple truth, but it so happens that, by the aid of Mr. Crookes' ingeniously contrived apparatus for crucially testing them, mediums withstand remarkable trials, whereas, when people with not half the scientific acumen of Mr. Crookes apply their tests, the same mediums egregiously fail or are exposed in their fraud.

Mr. Crookes' arch enemy just at present seems to be Dr. Carpenter, another English scientist of high standing. Others have entered the arena, but the battle of the giants is waged between these two. In the Nineteenth Century a while ago, Dr. Carpenter attacked Mr. Crookes for jumping at the conclusion that the radiometer is actuated by impact of light, while commending the series of investigations which led to the discovery of the instrument, and then, in order to exhibit the "quality" of Mr. Crookes' mental constitution, he shows up his unscientific course with relation to the

spiritualistic Home and the phenomena, supposed to be the work of the latter, which culminated in Crookes' hypothesis of Psychic Force. In a later number of the same periodical, Mr. Crookes defends himself, charges Dr. Carpenter with misconception in the matter of the radiometer, insists that he did not attribute the movement of that apparatus to light, and answers the strictures with reference to Home by explaining his precautions, etc., to eliminate chances of fraud in the experiments, and virtually demands any reasonable explanation for the phenomena observed other than that which he has adduced, and which involves the existence of an unknown and apparently supernatural force.

The drift of Mr. Crookes' line of argument seems to be summed up in some such demand as "either explain my conclusions in a way that will convince me that they are wrong, or else accept them and don't criticize," which, after all, is nothing but the song which the perpetual motionists, circle squarers, spiritualists, and their kind have sung from time immemorial. It so happens, however, that neither of the subjects in controversy are in that condition which admits of the proposing of definite explanation, and there is thus a species of false analogy between them which is apt to lead to their consideration as of like nature; whereas, while the one is a legitimate object for scientific investigation, which will in the end, if properly pursued, conduct to absolute truth, the other is simply an illusion which, when investigated, can terminate in the exposure of nothing but untruth. Theories as to the radiometer are numerous, and although it is now reasonably well settled that heat is the motive power, yet there are abundant conflicting hypotheses as to how the actuating force is exerted. No new phenomenon was ever discovered that did not undergo like stages, and the fact of theories conflicting at any period of its existence is no proof but rather assurance that in the light of constant progress they will react one upon the other, eliminate one another, and ultimately a hypothesis on which there will be agreement will be reached. On the other hand, nothing of this kind can be predicated as to so-called scientific investigations of spiritualistic manifestation. Such investigations are eminently unscientific because they aim to disprove that for which not even a shadow of foundation is assumable. A scientific investigation is simply a questioning of nature, and its object is to find the hidden laws which connect or underlie certain definite results. The fabric of truth reared, that of untruth falls by contrast—not by direct assault—just as popular errors are eliminated, not by diatribes and denunciation, but by the unswerving progress of knowledge among the people.

It goes, therefore, without saying that Mr. Crookes' line of defense is illogical. It is not for his defenders to say, "Here is an effect; we assume it to be due to a miracle; prove that it is not;" but, on the contrary, it is for them to show conclusively that it is utterly unaccountable under every known natural law; and this they have never done. Mr. Crookes' argument becomes still further weakened when those who have withstood his tests are exposed or their tricks repeated by easily explicable means, as has been frequently the case. Mr. Robert Heller, the conjuror, is exhibiting "manifestations" in this city, which are more mystifying than any we ever saw a spiritual medium execute. The cabinet business and other performances are done under the full glare of the gas, and submitted to the closest examination, and with a celerity that is astonishing. He says that spiritualists have insisted that he is an extraordinarily powerful medium, which fact they accuse him of concealing for sordid ends. He says further that he only produces effects—it is for the audience to find out how—and the name of his mysterious power is Hellerism. There is a curious analogy between his argument and that of Mr. Crookes; and we are not quite certain but that Hellerism is not as good a name as Psychic Force.

A NEW SYSTEM OF ARMOR PLATING NEEDED.

The trials of the 100 ton gun at Spezia, Italy, demonstrated quite conclusively, and to the no small astonishment of the adherents of heavy wrought iron armor for vessels of war, that iron plates were inferior to steel as a means of stopping shot. Prior experiments on steel plates were not wanting, and their results showed that steel had a tendency to split under the impact of shot. Curiously enough, with the enormous bolt of the 100 ton gun the conditions seem to have been entirely altered, and the conclusion was apparently reached that iron plates had had their day, that the contemplated 40 inch iron armor would never be rolled, and that the ironclad of the future would be encased in steel. The prematurity of this view, however, was soon after proved by the fact that steel plates broke and split up under the shot of smaller guns which produced little effect on the iron plates. The advocates of armor plating are therefore at the present time in rather an anomalous position. If vessels must be protected against the heaviest guns, then steel is required, but this can be shattered by light guns; if protection against the latter is deemed preferable, then it is certain that the armor will be riddled by the more massive projectiles. What is wanted, consequently, is some new kind of armor capable of resisting projectiles from both large and small guns, and the search for this bids fair to be as protracted and expensive as the long continued experiments during which wrought iron armor plating gradually grew in thickness from 4 to 24 inches.

Two plans are now before the English Government for so-called compound armor plates, by means of which it is hoped that all the advantages in both steel and iron may be secured