

true, if we confine our attention to water pressure. It is not true, and the base shear actually changes its sign, if the weight of the dam be taken into account as it must be. That there is no *tension* in dams of the Assuan and Vyrnwy types in the outer toe we showed in our memoir, but there is *stretch*, and on this final rupture in part depends. The existence of this stretch is also indicated, although not referred to, in the measurements of displacement given by Sir John Ottley and Dr. Brightmore. I may have misinterpreted these authors' mode of experimenting, but I can find no evidence in their paper of the manner in which they deduced the shear due to weight only, and without this knowledge I venture to think that the whole of the superstructure they base on a uniform distribution of shear fails to find any adequate foundation.

KARL PEARSON.

University College, London, W.C.

The Inheritance of "Acquired" Characters.

I AM loth to take part in barren controversy on this subject again, but I feel it is really necessary to say a few words in reply to the letter of "A. D. D." in NATURE of February 13. When that gentleman refers to the slightly dogmatic tone of his original article he is not doing himself justice; the article was as dogmatic as it could possibly be. Now he asserts that there is no sense in the distinction between acquired characters and innate ones with regard to inheritance, that all characters are both acquired and innate. This in the accepted meaning of the words is simply untrue. If a man takes a summer holiday and becomes sunburnt, the colour of his skin is an acquired character; a negro's colour develops without exposure to the sun; he is brown (not black) when he is born; that is an innate character. The supernumerary toe in a Dorking fowl is an innate character; it is not acquired in the accepted sense of that word. Acquired characters are those changes in the individual which are due to a change of external conditions, *i.e.* of stimuli; innate characters are those which develop without any stimulus, except what Dr. Reid calls the stimulus of nutrition.

When Dr. Reid says that a scar on the nose due to injury is as much innate as the nose itself he is merely quibbling; he means, I suppose, that the scar could not be formed if there was not an innate power of producing a scar in healing a wound. But the only important point is that the scar is the consequence of a wound as well as of the innate qualities; the nose is the consequence of innate qualities only. "A. D. D." appeals to Dr. Reid, but Dr. Reid has most distinctly recognised the distinction which "A. D. D." denies. They may be left to neutralise each other.

J. T. CUNNINGHAM.

Technical Research and the College System.

SINCE I made the proposal, some time ago (*Chem. News*, vol. xxxix., p. 2, and vol. xl., p. 230), that research boards should be instituted in our technical colleges, with the object of supplying the college departments with subject-matter for research of a more or less technical nature, and at the same time of keeping in touch with the old students, I have had the opportunity of discussing the matter with men who occupy important posts in the technical world. They generally hold the opinion that some such scheme is urgently needed.

Many observations are made in works and works' laboratories which for several reasons cannot be properly investigated within the factory, but are yet admirably adapted to serve as subjects for scientific investigation in the laboratories of our technical colleges. Research of such a character would be not only of real educational value to the students, but serve a special purpose in giving useful preliminary training in the investigation of problems such as they are likely to encounter in real life.

The attitude of teachers in our colleges towards such questions has been recently stated by Dr. M. O. Forster. He acknowledged that, as a teacher, it became more and more clear to him that professors ought to be educated in technology. As I previously pointed out, the suggestion, which he again brings to the front, that manufacturers should supply problems for the consideration of young chemists in the college, is one which can hardly be met

in practice. The suggestion that manufacturers should supply raw materials for such trials is one that could easily be dealt with through ordinary channels if, and when, the subject-matter for research was available.

The suggestion that members of the college staff should enter the technical world for a time may be open to objection. Dr. Nichols, perhaps rightly, says that they could only return and "bring back to the students, and re-hash to them, what was daily becoming obsolete." On the other hand, they would undoubtedly benefit from contact with the outside world, especially in acquiring broader ideas and in realising the way in which constant development occurs in technical processes.

I think it may be held that there is no training in our technical colleges, taken as a whole, which can compare with that given in the medical schools. Here the students actually come in contact with the work they will ultimately be engaged on in their daily routine, *viz.* the study of abnormal cases. Even in the departments of our more recently built colleges, which are almost small factories in their way, these necessary conditions are in the majority of cases still absent. The course simply deals with the routine work of the factory, as represented by everyday operations. This is equivalent to supplying medical students with a set of perfectly healthy men for examination, an example which well illustrates the point under consideration, for in both cases the students go out into the world to engage in actual practice. Medical men trained on these lines would hardly be tolerated by the public, yet the manufacturer is expected to receive students so trained with open arms.

To meet the conditions obtaining in the technical world, I have proposed that in every college of standing there should be constituted a research board composed of members of the staff, with possibly a few old students as advisory members.

Past students would have the opportunity to submit to these boards subject-matter for research arising out of their actual observations, and of such a nature that it can be freely investigated in a college laboratory by picked students, working under the supervision of the board. The results, if satisfactory, would be published under the names of the old and present students from the college address.

In this way colleges would be supplied with the subject-matter now so urgently needed, and the old students would be kept in touch with their college in the best possible way.

The college staff would at the same time be relieved to a great extent from the burden of supplying subject-matter of a semi-technical nature, which, to be of real value, can only be suggested by those who are acquainted with modern technical problems.

The results of some such scheme might form the basis for grants from the Government in aid of research, and also supply a rough means of testing the comparative value of the training of the colleges.

I venture to put this matter forward for discussion. It is vitally necessary that a link between the colleges in this country, and the technical world should be found. On this point everyone is agreed. I fancy that some such link may be found in the above scheme.

Occasional lectures by old students who have specialised should be given at intervals during the session with the object of interesting students in modern technical developments.

Such points as these might be brought forward, in a more prominent way, by a federation of old students' associations, which should accomplish good work in many directions.

W. P. DREAPER.
Quilter Road, Felixstowe.

A Variation in *Amoeba*.

WHILE looking at some *Amoebae proteus* received from Mr. Thomas Bolton, I noticed a condition of the protoplasm of several specimens which I cannot remember to have seen before. The ectosarc was deeply striated, the lines extending some distance into the endosarc, wherever pseudopodia were not being put forth. On the formation of the latter the striæ disappeared, but again became