SCIENCE.

FRIDAY, APRIL 11, 1884.

COMMENT AND CRITICISM.

A COMMITTEE of the Massachusetts legislature is considering the introduction of an act authorizing the preparation of a topographical map of the state. The U. S. geological survey commenced its work in the state last year by placing a surveying-party in one of the western counties, with the intention of constructing a map of the state, to be printed on the scale of about half an inch to the mile. The director of the survey has now proposed to the committee to double the printed scale, as well as the original plot, making the latter about two inches to the mile, provided the state treasury will bear one-half of the expense, or a sum estimated at five dollars per square mile, — a final total expense to the state (800 square miles along the coast being already charted by the coast-survey) of less than $40,000.

This recalls the movement in the state ten years ago, when the American academy memorialized the legislature for a general survey of the commonwealth, — a project which received the cordial support of scientific, industrial, and educational bodies throughout the state, and which was lost by the casting vote of the speaker of the house. That plan contemplated, on the topographical side, an original map, on the scale of 1 : 25,000, or about two inches and a half to the mile, to be finally printed on some lesser scale. The cost of the field-work was estimated at $25 per square mile, or $175,000. But the plan proposed so much more than the topographical map, that the estimated expense of the entire survey was brought to $385,000; and it was doubtless the magnitude of the total cost which finally defeated the measure.

Half a century ago, a trigonometrical survey was ordered and executed, and a small map prepared. The triangulation was admirably performed by Borden; but the map was a mere patchwork of town-surveyor's work, and, at best, showed only the superficial area, and no topography whatever. Yet it has been a boon to the state, and no one has ever complained of the expense. This survey cost $70,000 when the total valuation of the state was $200,000,000. The present valuation exceeds $2,000,000,000; and a present expenditure of $700,000 would therefore be the equivalent of what was granted to the first survey. An appropriation of $40,000 to obtain what, under any other circumstances, would cost at least $80,000, would be a mere pittance beside this; and it would seem that the reception of the last movement, involving so large an outlay, should encourage the committee of education to believe that the legislature would respond freely to the offer of the director of the government survey.

The difference between a scale of 1 : 25,000, asked for ten years ago, and that of about 1 : 31,680, now proposed, is not great enough to materially affect the delineation of the general topography, and of the distribution of such natural features as are most needed for industrial and scientific purposes. It is not all that could be desired; and provision should be made in any matured plan to enable the commissioners to enlarge the scale in any district which would be ready to pay the additional cost required, as well as to secure for the state a transcript of all original plots. What the state will eventually need will be a far more detailed map. But it is questionable under what auspices such a work should be done, and it is morally certain that it will not be done for a long time to come. And in any case, failure to co-operate now with the U. S. geological survey would be to lose the services of a reliable and experienced corps in a plan offering

specially economical advantages. It would, in short, be wasteful of the public purse.

The recent glacial studies in the western states, mentioned in our notes, serve to call attention to more than their technical result. Important as this is, we believe a greater value lies in their standing as an example of non-professional work. A problem of the greatest interest has been successfully attacked, not by organized state surveys, but by persevering private enterprise, in time spared from regular pursuits; and success in such an endeavor is a hopeful sign of our progress toward the more popular and practical appreciation of theoretical geology, that has been fairly attained in England and Switzerland. We trust there may be many others working to the same end on the numerous problems that await them. The evidence found by Mr. Wright to suggest the former existence of a glacial dam across the Ohio, so as to form a long, irregular lake above Cincinnati, has been eagerly accepted by some of the Pennsylvania geologists to explain the high-level terraces farther up the river-valley. The southern shore-line of this hypothetical lake remains to be searched for, and, in connection with the physical history of the Ohio, forms a most attractive problem for detailed local study. The shore-lines of the Great Lakes, in the once expanded condition as marked by the lake-terraces, are also subjects for patient tracing from town to town. Scattered observations on them are already old. How long must we wait before local observers give a full picture of these inland seas?

It is time for a reform in the relations existing between the public and the college-professor, as regards the asking and giving of advice on matters which are not educational in character. We suppose that every professor is willing to answer questions that pertain to education or to pure science, — not only willing, but glad to do so, if there is a fair prospect that the answer will be of real assistance; but it does not follow that he ought to answer questions bearing upon business-matters. Why, for instance, should a chemist known to us be expected to comply with such requests as, 'Please give me a sketch of Glinsky's dephlegmator?' 'Would *papier-maché* be a good substitute for leather in the manufacture of shoe-soles?' 'Please describe an easy method for making a complete analysis of water,' etc.; all of which, besides many others, have been received within a few days past? This amounts to asking for professional advice, and is to be compared with asking the advice of a lawyer or physician. No one expects these gentlemen to dispense their knowledge freely to all comers, and they are protected by the understanding that answers to professional questions involve pecuniary compensation. The clergyman is the only professional man, besides the professor, who is expected to give advice without compensation; but it is not probable that his advice in business-matters is often asked. Advice in spiritual matters he is, no doubt, ever ready to give, as the professor is in educational matters; but if, in addition to being a clergyman, he happened at the same time to be a physician or a chemist, it is not probable that he would feel it to be his duty to answer all questions pertaining to medical or chemical subjects.

The view of the matter here taken may appear to be a mercenary one, but that is not the point we wish to emphasize. We desire simply that the professor should be protected from unnecessary demands upon his time. If it were once understood that he is not expected to give free advice to any one who may care to ask for it, he would be saved a great deal of annoyance, and much time, which could, and presumably would, be put to better use. If the notion could once be spread abroad that a letter asking advice must be accompanied by a certain sum of money, most of the letters of the kind now written would never find their way into the mails, and the world would be the gainer in every way. A simple remedy for the difficulty complained of would appear to consist in ignoring the annoying letters; but experience has shown that this remedy, however simple it

may appear, is by no means satisfactory. The writer of the letter, in which he *may* have enclosed a stamp, though this is supposing an extreme case, receiving no answer, feels himself aggrieved, and writes again; so that in the end the receiver is forced to answer to protect himself. Is there, then, no remedy? Perhaps not. We nevertheless appeal to the public to bear in mind that the college-professor, however little he may have to do (and it is well known that this is very little), has at least something to do besides answering every question regarding business-matters in which it is thought that his advice may be of aid. Ask him any thing you please in the interests of matters pertaining to education or pure science, but draw the line when it comes to asking for what may fairly be called 'professional advice,' in the sense in which that expression is used by the lawyer and the doctor.

Two of the most unexpected discoveries in the deep-sea soundings during the last campaign of the Talisman, under the supervision of Prof. A. Milne-Edwards, are, first, the discovery of polished and scratched pebbles at a depth of five thousand metres, between the Azores Islands and the coast of France, indicating plainly the existence there of icebergs during the glacial epoch; and, second, of stones with impressions of parts of trilobites also brought up by the trawls. If these rocks with trilobites belonged where found, it will go far to prove the existence of an Atlantis continent during the secondary and tertiary epochs.

As a rule, one would not expect scientific knowledge to be much advanced, or very usefully diffused, by elegant extracts and quotations. But in a small book just issued by Appleton & Co., made up of 'characteristic passages from the writings of Charles Darwin,' Mr. Nathan Sheppard has really produced, in a form at once authentic, brief, and inexpensive, an instructive and very readable account of Darwinian doctrine in the words of its founder. The pieces are put together with no small skill, not in the order of publication, but rather in the order of evolution. It begins with the movements and habits of plants, rises from these to worms, discourses of the variation and struggle for existence of the higher living forms, and so to the highest, —

'The diapason closing full in man.'

LETTERS TO THE EDITOR.

*** Correspondents are requested to be as brief as possible. The writer's name is in all cases required as proof of good faith.*

The relations of Didymodus, or Diplodus.

MY reverence for the genius of Professor Cope is so great, and my confidence in his acumen so implicit, that when he assured me, first personally, and then in *Science* (iii. 275), that Didymodus (a substitute for Diplodus) was the proper name for Chlamydoselachus, I was willing to at least concede that the two forms might possibly be related. Knowing, as I did, that different types had been confounded under the name Diplodus, I was content to await the publication of Professor Cope's views before expressing a positive opinion, thinking he might have evidence in reserve which would gainsay what had been before offered. A *résumé* of Professor Cope's observations has just appeared, as promised, in the *American naturalist* for April (xviii. 412, 413), and we are therefore in a position to test his utterances. Notwithstanding the reverence and confidence that I have expressed, I can but think now, that for once Professor Cope has been too hasty, and tripped. I am convinced, not only that Didymodus has no generic nor even family relations with Chlamydoselachus, but that it represents even a different *order*. My belief in Professor Cope's candor equals my other sentiments, and I presume he will discard his first-formed opinion when his attention is called to certain facts.

The history of Didymodus, or Diplodus, is a long one, and is complicated with that of several others. I need only give the salient features.

In 1837 Professor Agassiz (*Poiss. foss.*, iii. 66) described a spine which he believed to have belonged to a fish like the sting-rays, as Pleuracanthus laevissimus. The only example was obtained from the Dudley coal-field.

In 1845 Professor Agassiz (*Poiss. foss.*, iii. 204) made known certain teeth, which he referred to sharks of the family of Hybodonts. Two 'species' were distinguished, D. gibbosus and D. minutus. Both were obtained from the English coal-measures.

In 1848 Professor Beyrich (*Berichte verhandl. k. preuss. akad. wiss.*, 1848) proposed the generic name Xenacanthus for a German carboniferous form referred to Orthacanthus by Goldfuss (1847), but which approached nearer to Pleuracanthus.

In 1849 Dr. Jordan (*Jahrbuch für min. u. geol.*, p. 843) described, under the name Triodus sessilis, a form subsequently ascertained to be identical with the Xenacanthus.

In 1857 Sir Philip de Malpas Grey Egerton (*Ann. and mag. nat. hist.*, xx. 423) contended that the spines of Pleuracanthus belonged to the same fish as the Diplodus teeth, and that Xenacanthus was likewise referable to the same type.

In 1867 Professor Kner (*Sitzb. k. akad. wiss.*, lv. 540–584) published an elaborate memoir, illustrated by ten plates, in which he proved conclusively