SCIENCE.

FRIDAY, OCTOBER 16, 1885.

COMMENT AND CRITICISM.

THE INTEREST EXCITED in England by the address of Sir Lyon Playfair before the British association is well shown in the comments of the London press, which are summarized in an article in *Nature* for September 24. The subject of state aid to science has been before the English public for many years, but has never attracted at any time the same earnest and general attention that it has since Sir Lyon Playfair's address. The comments of the London *Times* upon the address probably best show the condition of public opinion upon the question in England. The *Times* acknowledges the reproach that countries less wealthy than England make efforts to encourage science, by the side of which the encouragement afforded in England by the state sinks into insignificance; but it urges that, aside from state aid, there are the large ancient endowments for the benefit of education, which, although they may still be largely misapplied, yet could be used for the encouragement of science if vested interest and lack of intelligent initiative did not stand in the way. The *Times* urges that, until these obstacles are removed by the pressure of an active intelligent public opinion in England, the state itself can hardly be expected to do more than it does.

THERE HAS LATELY GONE THE ROUNDS of the press a description of a meteorite which startled south-western Pennsylvania on September 26. It was reported that it finally struck the earth on the farm of Mr. Buckston, Jefferson township, Washington co., near the West Virginia line. The stone was said to have been broken into three pieces, which became partly buried in the ground. The color was described as gray with streaks of red running over it, and the size of the meteorite was given as from 30 to 50 feet in diameter. The last statement was not, however, received by all as probable. We wish to call attention to a letter in another column, from Prof. S. P. Langley of the Allegheny observatory, who sent one of his assistants to examine into the truth of the reports. It seems that the 'red streaked' meteorite, 50 feet in diameter, is a fiction of the news-gatherers.

TIMING THE FLOOD ROCK EXPLOSION.

HOWEVER successful the explosion at Flood Rock may have been as to its main feature in the removal of an obstruction to navigation, it is to be regretted that one of the minor features of considerable scientific interest should have been seriously interfered with by the blundering delay in the time of firing the mine. At the request of the U.S. geological survey, observers at a dozen or more observatories within 200 miles of New York were watching to note the time of arrival through the ground of the tremors from the explosion, observing in most cases with their meridian-instruments over the mercury nadir-basin, much the most powerful and sensitive apparatus for detecting tremors.

Reports at hand up to time of writing indicate that out of 17 stations (3 occupied by geological survey parties and 14 co-operating with them) 5 hung on till the disturbance came and got more or less satisfactory observations (at one of these the rock was directly in sight, and the others so near that the observers felt sure that it had not escaped them); 4 observed and timed some slight disturbances between $11^h\ 3^m$ and $11^h\ 7^m$, and, attributing them to the explosion, ceased watching for more, and either missed it entirely or were taken by surprise with chronographs stopped, etc.; 2 heard nothing at all up to about $11^h\ 10^m$, and so ceased observing, and missed it; and 6 are yet to be heard from. The observations of those who got any records at all must be considered as due to persistent pluck and good luck rather than the natural and easy result of intelligent co-operation on the part of the army-engineers.

H. M. PAUL.

SCIENCE AND THE STATE.

SIR LYON PLAYFAIR, in his recent address before the British association in Aberdeen, said much that was instructive and suggestive in respect to the progress of science, and the conditions on which it depends; but there is one portion of his address which is entitled to careful perusal, because the speaker is one of the few men in the world who has had the training of a man of science and of a statesman. His early career, as the older readers of *Science* must be aware, was that of a chemist; and of late he has been an active

and influential member of parliament. At one time he held a seat in the cabinet. From both positions, as a savant and as a statesman, he is entitled to speak upon the relations of government to science. It is interesting to note that the principles which he defends were uttered by Prince Albert in his address at Aberdeen in 1859, and long before by George Washington in his farewell address. Prince Albert laid down the doctrine that Science should "speak to the State, like a favored child to its parent, sure of his paternal solicitude for its welfare," and also "that the State should recognize in Science one of the elements of its strength and prosperity, to foster which the clearest dictates of self-interest demand." The words of Washington hardly need to be quoted to American readers:—"Promote as an object of primary importance institutions for the general diffusion of knowledge. In proportion as the structure of a government gives force to public opinion, it is essential that public opinion should be enlightened."

Sir Lyon Playfair goes back to the Greeks and the Arabs, to remind his hearers that in ancient as well as modern times the encouragement of science has been a duty of statecraft, and with many an intermediate allusion he comes to the actual state of affairs in the United Kingdom,—where the working classes now show a respect for science by selecting as their candidates for parliament in the next election such men as Professors Stuart, Roscoe, Maskelyne and Rücker. Playfair has himself received invitations from working-class constituencies in a dozen of the leading manufacturing towns.

In confirmation of the views which he advocates, Playfair refers to the action of France and Germany, and in still more emphatic terms to the practice of the United States. In some respects, he says, this young country is in advance of all European states in joining science to its administrative offices. He points particularly to the excellent work of the U. S. fish commission, and makes this amusing comparison of the English and American methods of promoting fisheries. In England there are expensive commissions to visit the coast and question the fishermen; and the fishermen, having only a knowledge of a small area, give the most contradictory and unsatisfactory evidence. "In America, the questions are put to nature and not to fishermen,"—and the results of the inquiry are therefore far more fruitful. In this bright antithesis—questioning nature, not the fishermen—there is a ready answer to those who wish for 'practical' science, not abstract science. It seems 'practical' to question fishermen; the process proves to be fallacious. It seems 'abstract' to question nature; but this method is found to be the surest road to positive knowledge, and hence to the best results.

THE EXPLOSION AT FLOOD ROCK.

THE scientific as well as the general public has felt no little interest in the explosion which occurred on last Saturday at New York, through the effects of which one of the most dangerous obstructions to the East River passage was so altered in its conditions as to be removable in the near future. The destruction of Hallett's Point reef in 1876 was a notable exhibition of engineering skill in the use of explosives, and by its complete success gave confidence to General Newton and his aides in their attack upon Flood Rock, which, in the area undermined and in the amount of explosive material made use of, far exceeded the reef at Hallett's Point. The methods of procedure in the latter case were, in general, similar to those of the former, the two operations differing more in magnitude than in anything else.

On the occasion of the explosion of 1876 it was observed that, although in the immediate vicinity of Hallett's Point no very violent or destructive disturbance took place, the resulting earth-tremor was noticeable over an area several miles in radius. Some observations were made at that time to determine the velocity of transmission of the seismic wave, under the direction of General Abbott of the Engineer corps. The results obtained indicated a much greater speed of transmission than had been previously admitted for such disturbances, and they received considerable criticism at the hands of well-known seismologists. The explosion of last Saturday offered an opportunity for a repetition of these experiments on a greater scale and under circumstances much more favorable, as it was fair to assume that the earth-tremor would be perceptible at a much greater distance from the origin of the disturbance, and that thus not only would certain errors of observation become of less importance, but any marked variation of velocity with distance would be detected.

A line of points for time observations was established by General Abbott on Long Island, which were connected, it is understood, with each other and with the point from which the mine was fired, by telegraph.

As stated in the last number of this journal, arrangements to secure observations were made by