SCIENCE.

FRIDAY, SEPTEMBER 10, 1886.

COMMENT AND CRITICISM.

THE SMITHSONIAN REPORT for 1885, which we may hope will be issued with less delay than its predecessors have been, will contain an account of the progress in astronomy for that year, by Mr. William C. Winlock of Washington, which has already appeared with sufficient promptness as a separatum. Mr. Winlock forestalls at once any criticism we might otherwise like to make by pleading the brief time necessarily available as an excuse for any shortcomings that may be found, and remarks that his record is intended primarily for the large and increasing class of those who have a general rather than a special interest in the progress of astronomy, while it may be of use to the professional astronomer also, as a convenient collection of reviews and notes. Abstracts of the most important papers are given, while other papers appear by title only, and free use has been made of reviews in such periodicals as *Science*, *The athenaeum*, *The observatory*, and *Bulletin astronomique*. Comets, a specialty of Mr. Winlock's, are very fully and accurately dealt with; and his method of indicating the names of all these objects, now become so numerous with every year, is an important advance.

Independently of the excellences or shortcomings of the present work, we think the question may fairly be raised whether these annual reports are worthy of continuance or not. They are, through no fault of the author, rather tame reading for those having only a general interest in astronomy, being largely a mere recital of the new facts of the year's finding out, with no connecting-link to the astronomy of the past. To be sure, the developments of astronomy within a twelvemonth are rarely sufficiently far-reaching for even the practical astronomer to keep in mind the precise relations of past and present research. Again, if these reports are prepared for the convenience of the professional astronomer, it may well be doubted whether they are worth what they cost the astronomer who undertakes to prepare them; for the work is no approach, in point of serviceableness, to a complete bibliography for the year, such, in fact, as Mr. Winlock himself broaches the preparation of, perhaps through the co-operation of astronomers. If this is found practicable, then the editor of the Smithsonian report might well confine himself to the presentation of a quinquennial history of astronomical progress, to be prepared by the ablest astronomer who would undertake the task, and who would be expected to indicate clearly the bearings of recent research upon that of previous years, and weld the scattering links into a continuous chain. It is easy to see that the work executed in this manner would have an important bearing upon 'the diffusion of knowledge among men,' which, in its present form, it does not possess.

JUDGING BY THE SCIENTIFIC AGITATION which has shaken England for so many years, one would hardly credit the statement made by Sir John Lubbock in his address at the unveiling of the statue of the founder of the Mason science college, that, in 54 of 240 endowed schools for boys which have reported, no science whatever is taught; in 50, one hour is devoted to it per week; in 76, less than three hours; while only 56 devoted as many as six hours to it. According to the report of the Technical commission last year, there were only three schools in Great Britain in which science is fully and adequately taught. In urging the benefits of science, Sir John Lubbock says, "In the first place, science adds immensely to the interest and happiness of life. It is altogether a mistake to regard science as dry or prosaic. The technical works, descriptions of species, etc., bear the same relations to science as dictionaries to literature. . . . Occasionally, indeed, it may destroy some poetical myth of antiquity, such as the ancient Hindoo explanation of rivers, that 'Indra dug out their beds with his thunderbolts, and sent them forth by long continuous paths.' But the real causes of natural phenomena are far more striking, and contain more real poetry, than those which have occurred to the untrained imagination of mankind."

DR. THOMAS TAYLOR'S MICROSCOPIC METHOD for detecting the adulteration of butter with foreign

fats seems destined to assume as many shapes as Proteus. At first the globose forms, obtained by the boiling and subsequent slow cooling of butter, and exhibiting the Saint Andrew's cross under polarized light, were brought prominently forward as distinguishing marks of pure butter. Prof. H. H. Weber, however, upon testing the method as described by Dr. Taylor, found, that, although the so-called butter crystals could be readily prepared from butter, they could be as readily prepared from beef-fat, or mixtures of beef-fat and lard, under like conditions. The necessary conditions are, the slow cooling of the melted fat in the presence of minute solid particles about which the fat may crystallize, the so-called 'butter crystals' being aggregations of minute crystals radiating from a centre. In the test as described by Dr. Taylor, the butter is boiled for one minute, and then slowly cooled. During the boiling, some of the water of the butter evaporates, and a corresponding portion of its salt solidifies, and the minute crystals thus formed serve as centres of crystallization for the fat during the subsequent cooling.

After the publication of these results, the 'butter crystal' and its Saint Andrew's cross were relegated to a subordinate position, and in several publications Dr. Taylor insisted that his most important test had been neglected, viz., the appearance of the unboiled material under polarized light with a selenite plate. According to Dr. Taylor, butter shows a uniform tint, while lard and tallow show prismatic colors. Here, again, however, he has been pursued by Professor Weber, who shows that either butter-fat or lard or tallow, when cooled quickly, will show a uniform tint, while if cooled slowly, so as to admit of the formation of larger crystals, prismatic tints are shown by both. Since imitation butter is cooled rapidly when made, and since both genuine and imitation butter are liable to undergo sufficient changes of temperature after manufacture to allow of a partial re-crystallization, the test is plainly fallacious. Apparently, Dr. Taylor prepared his annual report with these results in mind, for there, and in his paper before the annual meeting of the American society of microscopists at Chautauqua, Aug. 10–16, he gives his method a still different exposition.

Dr. Taylor's first step is now to search for fat crystals in the test sample by plain transmitted light. By the application of polarized light, 'amorphous crystals,' whatever these may be, may be detected. To determine whether these 'amorphous crystals' are of beef-fat or lard, the sample is boiled and slowly cooled, as already described, and mounted in oil. Under these conditions, he now finds, in accordance with Professor Weber, that butter, lard, and beef-fat all give globular crystalline bodies which (apparently with the exception of lard) show the Saint Andrew's cross. These bodies are to be distinguished by their forms, lard giving a stellar form, butter the well-known 'butter crystals,' and beef-fat a stellar form with biserrated spines. Dr. Taylor has also discovered the noteworthy fact that Tennessee butter of a certain grade yields globules which are flattened or indented on one side! The above account of Dr. Taylor's method, as at present described by him, is drawn mainly from his last annual report to the commissioner of agriculture, —his Chautauqua paper, to judge from the published abstract, having been chiefly a criticism on Professor Weber's experiments. We shall endeavor to keep our readers informed of the changes which the method undergoes in the future.

THE EARTHQUAKE OF AUG. 31, 1886.

THE accompanying map has been hastily compiled from the great mass of conflicting data from all sources now available, and probably gives a fair general idea of the origin of the shock, the limits of the area disturbed, and the intensity at many points within this area (plotted on the American scale of intensity, 1 to 5). It will be readily appreciated by every one that in this preliminary report all that is or can be arrived at is to give a general outline, as determined by the most probable evidence at hand, to serve as a good working hypothesis: to attempt any thing further at present would be to make a mere pretence at accuracy.

A line of weakness in the earth's crust extends from Troy, N.Y., south-westward, along the line of tidewater, past Baltimore, Washington, and Richmond, losing itself in a broad flexure south of Raleigh. The cause of the shock seems to have been a renewed faulting or displacement along the line where it crosses the Carolinas. This severe shock appears to have had its origin along this line in central North Carolina and eastern South Carolina, at 9.49 P.M. (75th meridian time), Aug. 31. It was not without warning. For a long time slight shocks have been occasionally felt in North Carolina, and only a few