distinguish between sills and lavas, but this may be by no means easy. The Sciur of Eigg is a good example of the difficulty in iden­tifying intrusive masses. Lavas indicate that volcanic action was going on contemporaneously with the deposit of the beds among which they occur. Sills, on the other hand, show only that at some subsequent period there was liquid magma working its way to the surface. (J. S. F.)

**SILLIMAN, BENJAMIN** (1779-1864), American chemist and geologist, was bom on the 8th of August 1779 at Trumbull (then called North Stratford), Connecticut. Entering Yale College in 1792, he graduated in 1796, became tutor in 1799, and in 1802 was appointed professor of chemistry and mineralogy, a position which he retained till 1853, when by his own desire he retired as professor emeritus. Not only was he a popular and successful teacher of chemistry, mineralogy and geology in the college for half a century, but he also did much to improve and extend its educational resources, especially in regard to its mineralogical collections, the Trumbull Gallery of Pictures, the Medical Institution and the Sheffield Scientific School. Outside Yale he was well known as one of the few men who could hold the attention of a popular audience with a scientific lecture, and on account of his clear and interesting style, as well as of the un­wonted splendour of his illustrative experiments, his services were in great request not only in the northern and eastern states but also in those of the south. His original investigations were neither numerous nor important, and his name is best known to scientific men as the founder, and from 1818 to 1838 the sole editor, of the *American Journal of Science and Arts*—often called *Silliman's Journal,*—one of the foremost American scientific serials. In 1810 he published *A Journal of Travels in England, Holland and Scotland,* in which he described a visit to Europe undertaken in 1805 in preparation for the duties of his chair. He paid a second visit in 1851, of which he also issued an account, and among his other publications were *Elements of Chemistry* (1830), and editions of W. Henry's *Chemistry* with notes (1808), and of R. Bakewell's *Geology* (1827). He died at New Haven on the 24th of November 1864.

His son, Benjamin Silliman (1816-1885), chemist and mineralogist, was bom at New Haven on the 4th of December 1816. After graduating at Yale in 1837 he became assistant to his father, and in 1847 was appointed professor in the school of applied chemistry, which was largely due to his efforts and formed the nucleus of the subsequent Sheffield Scientific School. In 1849 he was appointed professor of medical chemistry and toxicology in the Medical College at Louisville, Kentucky, but relinquished that office in 1854 to succeed his father in the chair of chemistry at Yale. The duties of this professorship, so far as they related to the Academic College, he gave up in 1870, but he retained his connexion with the Medical College till his death, which happened at New Haven on the 14th of January 1885. Much of his time, especially during the last twenty years of his life, was absorbed in making examinations of mines and preparing expert reports on technical processes of chemical manufacture; but he was also able to do a certain amount of original work, publishing papers on the chemistry of various minerals, on meteorites, on photo­graphy with the electric arc, the illuminating powers of gas, &c. A course of lectures given by him on agricultural chemistry in the winter of 1845-1846 at New Orleans is believed to have been the first of its kind in the United States. In 1846 he published *First Principles of Chemistry* and in 1858 *First Principles of Physics or Natural Philosophy,* both of which had a large circula­tion. In 1853 he edited a large quarto illustrated volume, *The World of Science, Art and Industry,* which was followed in 1854 by *The Progress of Science and Mechanism.* In 1874, when the 100th anniversary of Priestley's preparation of oxygen was celebrated as the "Centennial of Chemistry " at Northumberland, Pa., where Priestley died, he delivered an historical address on "American Contributions to Chemistry," which contains a full list, with their works, of American chemists up to that date. From 1838 to 1845 he was associated with his father in the editorship of the *American Journal of Science,* and from 1845 to the end of his life his name appeared on the title page as one of the editors in chief.

**SILLIMANITE,** a rock-forming mineral consisting of aluminium silicate, Al2SiO5. It has the same percentage chemical composi­tion as cyanite (*q.v.*) and andalusite (*q.v.*), but differs from these in crystalline form and physical characters. It crystallizes in the orthorhombic system and has the form of long, slender needles without terminal planes, which are often aggregated together to form fibrous and compact masses; hence the name *fibrolite,* which is often employed for this species. The name sillimanite is after Benjamin Silliman the elder. There is a perfect cleavage in one direction parallel to the length of the needles. The colour is greyish-white or brownish, and the lustre vitreous. The hardness is 6½ and the specific gravity 3·23. Sillimanite is a characteristic mineral of gneisses and crystalline schists, and it is sometimes a product of contact-metamorphism. It has been observed at many localities; *e.g.* in Bohemia (the *Faserkiesel of* Lindacker, 1792), with corundum in the Carnatic (fibrolite of comte de Bournon, 1802), Chester in Connecticut (sillimanite of G. T. Bowen, 1824), Monroe in New York (“ monrolite"), Bamle near Brevik in Norway (“bamlite"). Pre­historic implements made of compact sillimanite are found in western Europe, and have a certain resemblance to jade imple­ments. ' (L. J. S.)

**SILLY,** weakly foolish, stupid. This is the current sense of a word which has much changed its meaning. The O.E. *sælig* (usually *gesélig)* meant prosperous, happy, and was formed from *sél,* time, season, hence happiness, cf. Icel. *sæla,* bliss; Ger. *selig,* blessed, happy, &c., probably also allied to Lat. *salvus,* whole, safe. The development of meaning is happy, blessed, innocent or simple, thence helpless, weak, and so foolish. The old provincial and Scottish word for a caul *(q.v.)* was "silly- how," *i.e. "*lucky cap." The development of meaning of “ simple," literally “onefold " (Lat. *simplex),* plain, artless, hence unlearned, foolish, is somewhat parallel. A special meaning of “ simple," in the sense of medicinal herbs, is due to the supposition that each herb had its own particular or simple medicinal value.

**SILURES,** a powerful and warlike tribe in ancient Britain, occupying approximately the counties of Monmouth, Brecon and Glamorgan. They made a fierce resistance to the Roman conquest about a.d. 48, but a legionary fortress (Isca Silurum, Cærleon) was planted in their midst and by a.d. 78 they were overcome. Their town Venta Silurum (Cærwent, 6 m. W. of Chepstow) became a Romanized town, not unlike Silchester, but smaller. Its massive Roman walls still survive, and recent excavations have revealed a town hall and market square, a temple, baths, amphitheatre, and many comfortable houses with mosaics, &c. An inscription shows that under the Roman Empire it was the *chef-lieu* of the Silures, whose *ordo* or county council provided for the local government of the district. (F. J. H.)

**SILURIAN,** in geology, a series of strata which is here under­stood to include those Palaeozoic rocks which lie above the Ordovician and below the Devonian or Old Red Sandstone, viz. the Llandoverian (Valentian of C. Lapworth), Wenlockian and Ludlovian groups of Great Britain with their foreign equiva­lents. A word of caution is necessary, however, for in the early history of British stratigraphy the exact delimitation of “ Silurian" was the subject of a great controversy, and the term has been used with such varying significance in geological literature, that considerable confusion may arise unless the numerous inter­pretations of the title arc understood. The name “ Silurian " was first introduced by Sir R. I. Murchison in 1835 for a series of rocks on the border counties of England and Wales—a region formerly inhabited by the Silures. Murchison's Silurian em­braced not only the rock groups indicated above, but others below them that were much older, even such as are now classed as Cambrian. About the same time A. Sedgwick proposed the term Cambrian for a great succession of rocks which includes much of Murchison’s Silurian system in its upper part; hence arose that controversy which left so lasting a mark on British geology. In 1850 A. d'Orbigny suggested the name "Murchisonian " for what is here retained as the Silurian system. As a solution of the difficulties of nomenclature, Professor C. Lapworth in 1879 proposed the term Ordovician systems (*q.v.*)