readily distinguished from calaverite (AuTei) by its perfect cleavage in one direction (parallel to the plane of symmetry), but in this character it resembles the very rare orthorhombic mineral krennerite ([Au, Ag]Te2). (L. J. S.)

**SYLVESTER, JAMES JOSEPH** (1814-1897), English mathe­matician, was born in London on the 3rd of September 1814. He went to school first at Highgate and then at Liverpool, and in 1831 entered St John’s College, Cambridge. In his Tripos examination, which through illness he was prevented from taking till 1837, he was placed as second wrangler, but being a Jew and unwilling to sign the Thirty-nine Articles, he could not compete for one of the Smith’s prizes and was ineligible for a fellowship, nor could he even take a degree: this last, however, he obtained at Trinity College, Dublin, where religious restrictions were no longer in force. After leaving Cambridge he was appointed to the chair of natural philosophy at University College, London, where his friend A. De Morgan was one of his colleagues, but he resigned in 1840 in order to become professor of mathematics in the university of Virginia. There, however, he remained only six months, for certain views on slavery, strongly held and injudiciously expressed, entailed unpleasant consequences, and necessitated his return to England, where he obtained in 1844 the post of actuary to the Legal and Equitable Life Assurance Company. In the course of the ensuing ten years he published a large amount of original work, much of it dealing with the theory of invariants, which marked him as one of the foremost mathematicians of the time. But he failed to obtain either of two posts—the professorships of mathematics at the Royal Military Academy and of geometry in Gresham College—for which he applied in 1854, though he was elected to the former in the following year on the death of his successful competitor. At Woolwich he remained until 1870, and although he was not a great success as an elementary teacher, that period of his life was very rich in mathematical work, which included remarkable advances in the theory of the partition of numbers and further contributions to that of invariants, together with an important research which yielded a proof, hitherto lacking, of Newton’s rule for the discovery of imaginary roots for algebraical equations up to and including the fifth degree. In 1874 he produced several papers suggested by A. Peaucellier’s discovery of the straight line link motion associated with his name, and he also invented the skew pentagraph. Three years later he was appointed professor of mathematics in the Johns Hopkins Uni­versity, Baltimore, stipulating for an annual salary of $5000, to be paid in gold. At Baltimore he gave an enormous impetus to the study of the higher mathematics in America, and during the time he was there he contributed to the *American Journal of Mathematics,* of which he was the first editor, no less than thirty papers, some of great length, dealing mainly with modem algebra, the theory of numbers, theory of partitions and universal algebra. In 1883 he was chosen to succeed Henry Smith in the Savilian chair of geometry at Oxford, and there he produced his theory of reciprocants, largely by the aid of his “ method of infinitesimal variation.” In 1893 loss of health and failing eyesight obliged him to give up the active duties of his chair, and a deputy professor being appointed, he went to live in London, where he died on the 15th of March 1897. Sylvester’s work suffered from a certain lack of steadiness and method in his character. For long periods he was mathemati­cally unproductive, but then sudden inspiration would come upon him and his ideas and theories poured forth far more quickly than he could record them. All the same his output of work was as large as it was valuable. The scope of his researches was described by Arthur Cayley, his friend and fellow worker, in the following words: “ They relate chiefly to finite analysis, and cover by their subjects a large part of it—algebra, deter­minants, elimination, the theory of equations, partitions, tactic, the theory of forms, matrices, reciprocants, the Hamiltonian numbers, &c.; analytical and pure geometry occupy a less prominent position; and mechanics, optics and astronomy are not absent.” Sylvester was a good linguist, and a diligent com­poser of verse, both in English and Latin, but the opinion he cherished that his poems were on a level with his mathematical achievements has not met with general acceptance.

The first volume of his *Collected Mathematical Papers,* edited by H. F. Baker, appeared in 1904.

**SYLVESTER, JOSHUA** (1563-1618), English poet, the son of a Kentish clothier, was born in 1563. In his tenth year he was sent to school at Southampton, where he gained a knowledge of French. After about three years at school he appears to have been put to business, and in 1591 the title-page of his *Yvry* states that he was in the service of the Merchant Adventurers’ Company. He was for a short time a land steward, and in 1606 Prince Henry gave him a small pension as a kind of court poet. In 1613 he obtained a position as secretary to the Merchant Adven­turers. He was stationed at Middelburg, in the Low Countries, where he died on the 28th of September 1618. He translated into English heroic couplets the scriptural epic of Guillaume du Bartas. His *Essay of the Second Week* was published in 1598; and in 1604 *The Divine Weeks of the World’s Birth.* The ornate style of the original offered no difficulty to Sylvester, who was himself a disciple of the Euphuists and added many adornments of his own invention. The *Sepmaines* of Du Bartas appealed most to his English and German co-religionists, and the trans­lation was immensely popular. It has often been suggested that Milton owed something in the conception of *Paradise Lost* to Sylvester’s translation. His popularity ceased with the Restora­tion, and Dryden called his verse “ abominable fustian.”

His works were reprinted by Dr A. B. Grosart (1880) in the “ Chertsey Worthies Library.” See also C. Dunster’s *Considerations on Miltons early Reading* (1800).

SYLVITE, a mineral consisting of potassium chloride (KC1), first observed in 1823, as an encrustation on Vesuvian lava. Well-formed crystals were subsequently found in the salt deposits of Stassfurt in Prussia and Kalusz in Austrian Galicia. It crystallizes in the cubic system with the form of cubes and cubo- octahedra and possesses perfect cleavages parallel to the faces of the cube. Although the crystals are very similar in appear­ance to crystals of common salt, they are proved by etching experiments to possess a different degree of symmetry, namely plagihedral-cubic, there being no planes of symmetry but the full number of axes of symmetry. Crystals are colourless (sometimes bright blue) and transparent; the hardness is 2 and the specific gravity 198. Like salt, it is highly diathermanous. The name sylvite or sylvine is from the old pharmaceutical name, *sal digestivus sylυii,* for this salt. (L. J. S.)

**SYMBOL (Gr.** *συμβoλov,* **a** sign), the term given to a visible object representing to the mind the semblance of something which is not shown but realized by association with it. This is conveyed by the ideas usually associated with the symbol; thus the palm branch is the symbol of victory and the anchor of hope. Much of early Christian symbolism owes its origin to pagan sources, the interpretations of the symbols having a different meaning; thus “ the Good Shepherd with the lamb ” is thought by some to have been derived from the figure of Hermes (Mercury) carrying the goat to sacrifice, and “ Orpheus charming the wild beasts,” which, when painted in the cata­combs, was probably intended as the representation of a type of Christ. One of the earliest symbols of the Saviour, the fish, was derived from an acrostic of the Greek word *lχθvs,* the component letters of which were the initials of the five words 'I*ησoυs Χριστός,* θεου) ϒιος, Σωτηρ, Jesus Christ, Son of God, Saviour. The ship, another early symbol, represented the Church in which the faithful are carried over the sea of life. Other symbols are those which were represented by animals, real or fabulous, and were derived from Scripture: thus the lamb typified Christ from St John’s Gospel (i. 29 and 36), and the lion from the Book of Revelations, in which Christ is called the “ Lion of the tribe of Judah.” The peacock stood for immortality; the phoenix for the Resurrection; the dragon or the serpent for Satan ; and the stag for the soul thirsting for baptism. The sacred monogram Chi Rho, supposed to have been the celestial sign seen by the emperor Constantine on the eve of the defeat of Maxentius, represents the two first letters of the Greek word