hydrated ore has much better depolarizing properties than an ore with less water of hydration. In the account given of "Gelatinizing substances", no mention is made of potato starch which is a much better gelatinizing agent than maize starch or wheat flour. It is also rather disappointing to find that nothing has been said about a somewhat novel type of dry cell using magnesium chloride instead of the usual ammonium chloride. The "Pertrix", a German make of cell, belongs to this type and was claimed to possess several advantages, over the ammonium chloride cell, particularly with regard to shelf life, a very important factor to be considered in tropical countries. On the whole, the Bulletin is a very useful publication and every would-be manufacturer of dry cells ought to possess a copy. C. V.

CENTENARIES

Halley, Edmund (1656-1742)

EDMUND HALLEY, a British astronomer, was born at Haggerston, London, November 8, 1656. He was educated at St. Paul's School and at Queen's College, Oxford. At the latter place he specialised in astronomy so remarkably that he was only 19 when the Royal Society accepted his first paper on the *Orbits of primary planets*.

The preparation of a new star catalogue was his ambition. But finding that project already pursued by Havellus and Flamsteed, he planned to supplement their work by the addition of the stars round the South Pole. For this purpose, he left the university before he had taken any degree and sailed for the island of St. Helena in 1676. He returned home with his catalogue of stars in 1678 when the Royal Society elected him a fellow, and Charles II gave him a mandamus to the University of Oxford for the degree of A.M.

His application for the Savilian professorship of astronomy at Oxford was rejected in 1691 on religious grounds.

Having visited the continent and having sailed in the Atlantic on various scientific missions he ultimately succeeded Dr. Wallis as professor of geometry at Oxford in 1703. Here he soon employed himself in translating from Arabic to Latin the works of Apollonius. In 1721 he succeeded Flamsteed as Astronomer Royal and devoted the next eighteen years to the duties of his office, hardly ever missing an observation.

One of the most remarkable services of Halley to science is the part he played in bringing Newton's *Principia* to the notice of the world. In January 1684 Wren offered Hooke and Halley a prize in the shape of a book worth 40 shillings if they would deduce the elliptic orbit from the law of inverse squares. Halley went to Cambridge and asked Newton, "What path will a body describe if it be attracted by a centre with a force varying as the inverse square of the distance?" Newton at once replied, "An ellipse with the centre of force as one focus". "How on earth do you know?" asked Halley in amazement.

"Why, I have calculated it", Newton said and began searching for the paper.

Halley found the papers to form a complete treatise on motion in general. With this burden of transcendental value, he hastened to the Royal Society, who wrote to Newton asking leave that it might be printed. When the consent came, Halley himself saw it through the press and met the entire cost.

The long life of this versatile man was devoted completely to the enrichment of several departments of knowledge both as an original contributor of 84 papers to the *Philosophical transactions* and as the Assistant Secretary and Principal Secretary of the Royal Society from 1685 onwards. His papers were all collected in three volumes under the title *Miscellaneous curiose*. His reputation as an astronomer rests on his discovery of the long inequality of Jupiter and Saturn and of the acceleration of the mean motion of the moon, on his prediction of the return of Halley's comet and on his suggestions for determining the solar parallax from observations on the transit of venus. His contributions to physics relate to terrestrial magnetism and optics. In pure mathematics, which he pursued only in leisure hours, he investigated the properties of loxodromic curve, first solved the problem of describing a conic section of which the focus and three points are given, improved the method of constructing curves of the third and fourth degrees and devised a new method for the tabulation of logarithms. His extensive voyages laid the foundation of physical geography and particularly meteorology. As the compiler of the *Breslau table of mortality*, he takes rank as the virtual originator of actuarial science.

In 1737, Halley was struck with paralysis in the right hand and when he was in the act of drinking a glass of wine, he expired in his chair without a groan, January 14, 1742.

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Madras.