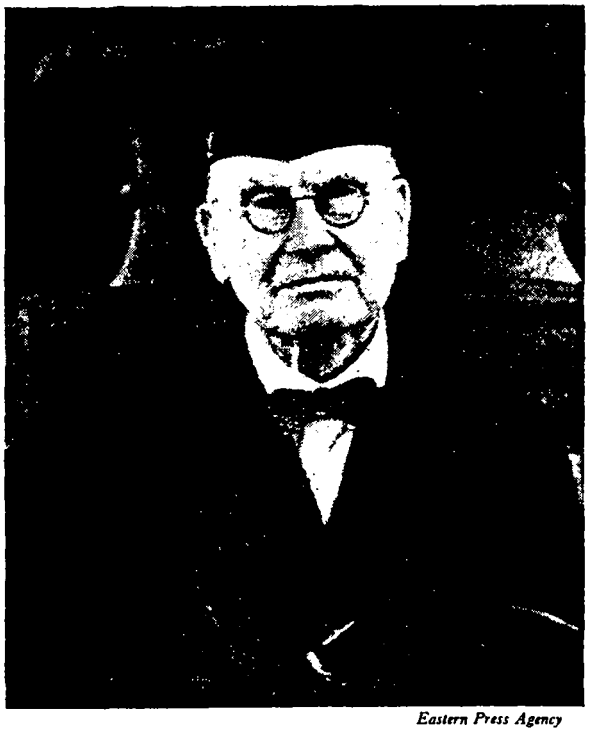
GRANDE-BRETAGNE

OBITUARY

SIR GERALD PONSONBY LENOX-CONYNGHAM, F.R.S.

When Sir Gerald and Lady Lenox-Conyngham were entertained by some friends to a luncheon at Trinity College, Cambridge, to mark their entry into the tenth decade, he enlivened the proceedings by a charming and effortless speech. So the news of his death only eighteen days later on October 27, 1956, was indeed wholly unexpected.



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Some account of his long career, first in the Survey of India and then at Cambridge; written by Sir Edward Bullard, was published in the *Bulletin Géodésique* (Nouvelle Série, No. 3, 1947) shortly after his eightieth birthday. He had then recently retired from the Readership in Geodesy at Cambridge and from control of the Department of Geodesy and Geophysics which he had brought into existence in 1931, crowning his earlier labours as Praelector of Geodesy from 1921.

I shall try to picture the circumstances of geodesy in the nineties of last century which confronted Lenox-Conyngham when he joined the Survey of India. Everest's grid-iron system of geodetic triangulation extended over 28° of latitude from the Himalaya to Cape Comorin and over 25° of longitude from Baluchistan to Burma. It had been rigorously adjusted—an operation taking four years (1875–79)—and provided a reliable basis for deflexions of the vertical. The four meridian deflexions available in the 'fifties (on which Pratt formed the belief that the attractions of the Himalaya were compensated completely and that deflexions might be attributed to 'local attraction' alone), had been greatly added to: for some 200 deflexions had been observed. Pratt's view was however accepted, and provided little motive for study of the general form of the geoid: for this was supposed to differ from a unique spheroid (ellipsoid of revolution) by only trivial local amounts. It was the elements of this spheroid which geodesists then sought to determine, as though it had actual existence.

Burrard had joined the Survey of India in 1884, to be joined five years later by Lenox-Conyngham. Very soon they were joint observers at opposite ends of electro-telegraph arcs: and so continued for some six years. During this period of partnership a source of error in determining collimation was tracked down. This allowed troublesome discrepancies in the previous longitude arcs to be removed, and avoided their recurrence in current and future work. Then, when Burrard became Superintendent of the Trigonometrical Surveys, Lenox-Conyngham continued field observations, now for latitude, for the better understanding of the deflexion problem, for which local attraction failed to account. Later on and still with the same aim in view, he was entrusted with the task of initiating a comprehensive gravity survey of India, for which he was deputed to Europe in 1902 to obtain and standardise the best pendulum equipment.

After probing into the Himalayan deflexions for all these years Burrard published in 1901 a most important paper.* In his memoir on Burrard, written for the Royal Society many years later, Lenox-Conyngham gives a good account of this paper and the circumstances which gave rise to it. With characteristic modesty he makes no claim for the part which he had played: for he and Burrard were close professional partners throughout and in frequent consultation. It is interesting to remark the changing aspect towards gravity in geodesy. Thus, prior to 1870, gravity was observed at a limited number of stations on the central meridian of the Indian triangulation system. It was—vainly—anticipated that the results, applied to Clairaut's theorem, would yield a much improved value of the flattening of the meridian, regarded as an ellipse with irregularities due only to 'local attraction'. The basis of Lenox-Conyngham's gravity survey in fact abandoned that mistaken view. There seems however no suggestion that any application of Stokes' geoidal theorem, already half a century old without application, was in mind. That theorem seems to have remained forgotten for yet another quarter-century. But the gravity survey which Lenox-Conyngham launched in 1903, and which had practically covered India and Burma by 1938, was of enormous value in developing geodesy and

* Survey of India, Professional Paper No. 5: *The Attraction of the Himalayan Mountains upon the Plumb-line in India.*

studies of earth crustal structure: and that in the region of the world's greatest mountains.

The two decades from 1890, years of the Burrard–Lenox-Conyngham partnership, were formative years for the Survey of India; and also had considerable external influence. The accumulated data of deflexions and of gravity—indeed of the gravity field—to which both contributed and which they discussed invalidated the local attraction creed: but still no geoidal studies were made prior to 1914 and the war years.

In 1909 Hayford published his first main work on isostasy. At a gathering that year in London of the (old) International Association of Geodesy he told Burrard that it was Survey of India Professional Paper No. 5 which had led him to study deflexions in relation to isostasy: and much later on, in a public address, he spoke of Burrard as being foremost in the study of isostasy in 1901. Lenox-Conyngham deserves some share of this tribute. I well remember Burrard expounding Hayford's theories to me towards the end of 1909. I think both he and Lenox-Conyngham preserved an open mind: but under their direction the laborious computations of all pendulum stations, as well as a portion of the deflexion stations, were carried out. We were all excited to know whether the Hayford doctrine would suit India. When considerable regions were found in which isostatic equilibrium did not exist, the question of the Figure of the Earth was replaced by the Form of the Geoid. That was the next phase, to be entered after the return of peaceful conditions.

It was my good fortune to accompany Lenox-Conyngham in the 1907–8 field season on gravity survey. The stations were at interesting and historic places—Bangalore, Mysore, Seringapatam, Salem, Yercaud and Kolar—and at the Kolar goldfield we observed at the top and at the bottom of an 18-ft. shaft, half a mile deep. I remember Lenox-Conyngham as a most kindly and appreciative leader and a frank instructor. He was also a liberal host. Joint camp life brings people close together and I can easily picture the intimacy which existed between Burrard and Lenox-Conyngham over many years.

During the war 1914–18 the Survey of India was heavily depleted of its officers, recalled to military duty. Burrard was then Surveyor General and Lenox-Conyngham was Superintendent of the Trigonometrical Survey from 1912 to 1920. From 1914 neither personnel nor funds were available for much field work—a frustration to the Superintendent. Fortunately his retirement in 1921 did not mean the end of his geodetic work: indeed it was little more than half done. In that year Sir J. J. Thomson, Master of Trinity College, Cambridge, wrote to him offering a Praelectorship in Geodesy and a fellowship of the college. As he himself recalled in his last speech, he accepted this offer with great satisfaction. The second half of his career found him enriched with first hand experience of some of the grandest geodetic circumstances.

The Fen country surrounding Cambridge was indeed in marked contrast from the outer Himalayan range on which his hill bungalow at Mussoorie was situated. The whole of Britain presented geodetic problems of only a minor order and scale. The field geodesist, observing for longitude, latitude or azimuth in India, could rely on clear skies for much of his season; and

might well be dismayed by the frequent cloudy skies of winter and the very short nights of summer in England.

In collaboration with Sir Horace Darwin, Lenox-Conyngham designed the pendulum apparatus which has subsequently been manufactured by the Cambridge Instrument Company, Ltd. Although some modifications have been introduced by later workers, the basic design has remained unchanged: and even now the instrument is regarded as one of the most accurate and reliable means of determining large differences of gravity.

It is not surprising that there was a trend towards geophysics and that in 1931 the Department of Geodesy and Geophysics came into existence in 1931, with Lenox-Conyngham at its head. This has attracted many research students. Lenox-Conyngham himself delivered lectures on geodetic subjects and 'geodetic and topographical surveying' became one of four divisions of the Geographical Tripos examination. The geodesy school became the natural way into the Colonial Empire Survey Departments, many of whose officers have benefited from the geodetic training they had at Cambridge. For them as well as for members of the Survey of India there was always a welcome at Desertlyn, Lenox-Conyngham's Cambridge house. This was widely appreciated and had great liaison value. It also exhibited the lasting respect and affection which Lenox-Conyngham had established in the geodetic world.

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