The International Survey of the Sky.

By Capt. C. J. P. CAVE.

THE Office National Météorologique de France attempted to obtain simultaneous photographs of clouds over France in January of last year. Encouraged by the success of the undertaking, a more

circulated in other countries by the Office National Météorologique. Even with this guidance, however, the technique is not easy without previous experience, and it was not to be expected that all the

FIGS. 1 and 2.—Cirrus and cumulus clouds at Cambridge, September 24, 1 P.M. Photographed by Mr. R. Hill.

extended survey was arranged for the week September 24-30, when photographs were taken over a large part of western Europe. In the British Isles the services of volunteers had to be depended on almost entirely; those professional meteorologists who assisted took photographs unofficially with their own cameras, though they were allowed to do this in their official time. The only official photographs were those taken at the Royal Observatory, Greenwich, and at the Royal Naval School of Photography at Portsmouth. Those who are unfamiliar with cloud photography find some difficulty in getting good results, and therefore all who signified their willingness to help were supplied with instructions drawn up by Mr. G. Aubourne Clarke, of Aberdeen; these instructions were also

amateurs who took part in the survey would be equally successful; but it is a matter for satisfaction that so many useful photographs were taken. Up to

the present time, 1844 prints have been received from 63 stations in the British Isles, besides some from Malta and Blue Hill.

Photographs were taken at 7 A.M., 1 P.M., and 6 P.M. The latter hour was rather late, and only occasionally could good results be obtained at a time that was just after sunset. As is inevitable, when volunteers are asked for, the most numerous stations are in the

FIG. 3.—Cirrus cloud at Milford, Surrey, September 24, 7 A.M. Photographed by Dr. G. S. Sansom.

most thickly populated districts: London stations numbered 10; Hampshire 6; Hertfordshire 4; Cambridgeshire, Devonshire, Lancashire, Surrey, 3 each; Cheshire, Cornwall, Derbyshire, Middlesex, Nottinghamshire,

Sussex, Yorkshire, 2 each; Berkshire, Buckinghamshire, Durham, Herefordshire, Kent, Leicestershire, Northamptonshire, Northumberland, Somersetshire, Worcestershire, 1 each; Scotland 4; Ireland 2; and Wales 1. It was suggested that where possible five photographs should be taken at each of the hours, namely, with the camera facing each of the cardinal points and the zenith; it was not to be expected that many amateurs supplying their own materials would take the maximum number, but Mr. C. P. Butler of the Solar Physics Observatory, Cambridge, took 120; Mr. John Ritchie of the Museum, Perth, 105; the Royal Naval School of Photography, 105; Miss A. M. Bulkley of St. Agnes, Cornwall, 86. Long series were also sent in by Mr. Alfred Moore, Lyndhurst; Dr. W. J. S. Lockyer, Norman Lockyer Observatory, Sidmouth; Dr. G. S. Sansom, Milford, Surrey; Colonel Arthur Hill, Selham, Sussex; Mr. Charles Leaf, Cambridge; Mr. F. W. Baker, Royal Aircraft Establishment; Mr. Wilfred Hall, Hepple Woodside, Northumberland; Mr. J. H. Pledge, Harrow; the Astronomer Royal, and Mr. G. Aubourne Clarke.

The part of the country where the best general survey was obtained was on the borders of Hampshire, Sussex, and Surrey, good series being obtained at Blackwater, Portsmouth, Stoner Hill, Selham, and Milford; these stations make an extremely good network, and as photographs were taken at most of the appointed hours and all show the cloud structure, practically the

whole sky was surveyed over the district. Several local photographic societies took part in the work, and at the Dudley High School for Girls one of the staff, Miss Stratham Norton, not only took photographs herself but interested some of the pupils in the subject and they also took photographs. At Cambridge, Mr. Robin Hill took a series of pictures in which the whole sky was photographed on one plate (Figs. 1 and 2). In spite of inevitable distortion these pictures give a far better representation of the cloud distribution than can be obtained with an ordinary camera unless a prohibitive number of plates are exposed.

The cloud structure during the week was not particularly interesting so far as the British Isles was concerned; there was a great deal of strato cumulus, and in many places the sky was covered with formless cloud at some of the hours; low cloud made photography impossible at times in hill stations, and the same was the case in the Outer Hebrides, where photographs would have been particularly valuable. The first day was perhaps the most interesting, when there was a great development of high cloud in advance of an approaching depression (Figs. 1, 2, and 3).

The collection of photographs from the British Isles has been sent to the Office National Météorologique, where they will be examined in conjunction with those from France and other countries. It is expected that the complete study of the whole collection will take nearly a year.

Obituary.

PROF. G. H. QUINCKE, FOR. MEM. R.S.

GEORG HERMANN QUINCKE, whose death took place on January 13, was born on November 19, 1834, in Frankfort-on-Oder. His student days were spent at Königsberg, Heidelberg, and Berlin between 1852 and 1858, and in the year following that of graduation he began his academic career as privat-docent at the University of Berlin. In 1872 he was appointed to the professorship of physics at Würzburg, and three years later he succeeded Kirchhoff at Heidelberg.

Quincke's first two papers were published at the age of twenty-two while still a student, and his scientific productivity continued almost to the end of his life. To have been able to extend active experimental work over a period of sixty-seven years is a rare and perhaps unique distinction. His work covered nearly all branches of physics, and it is not possible here to do more than mention some of his more important contributions. The dissertation for his doctorate dealt with what was then called the capillary constant of mercury and marks the first of a series of investigations on surface tension. In these investigations he found ample scope for his experimental skill, and it is to be noted that at an early stage he became aware of the rapid contamination by greasy matter of solid surfaces when exposed to air. In 1869 he tried to determine by an ingenious method the range of molecular forces, which he found to be about equal to the tenth part of a wave-length of green light. Quincke's optical investigations are numerous. In 1865 he published an extensive investigation on the

penetration of light into the second of two media when total reflection takes place at the surface of separation. He points out that the existence of such penetration was already demonstrated experimentally by Newton. It may be, perhaps, not amiss to note in passing that the usual theoretical formulæ which are given for this phenomenon suffer from a serious and even fatal defect, as they only take account of the surface conditions at the boundary of the two media, which is assumed to be infinite, but violate these conditions at infinity, and are correct only with important reservations. But Quincke only dealt with the experimental aspect.

It would lead too far to describe Quincke's optical measurements extending over almost the whole range of interference, diffraction and refraction, and dealing more particularly with elliptic polarisation and the reflection of light from metallic surfaces. In his detailed investigation on the behaviour of gratings, Quincke was the first to note the unexpected appearance of additional spectra which are not accounted for by the ordinary theory. These are now known to be due to periodical variations in the distances of successive grating-spaces, which are so difficult to avoid when the grating is ruled in the usual way.

Turning to electricity, we may note Quincke's discovery of the electromotive forces which are brought into action when an electrolyte is forced through a porous membrane.

Among many new devices for the determination of physical constants which we owe to Quincke, his method of determining the magnetic permeability of liquids is perhaps the most important. Utilising the