behind their mean dates in coming into flower, but the departures from the average were, as a rule, slight until about the middle of May. After that time, until the end of the flowering-season, the dates of blossoming were later than in any other year since the present series of records was instituted in 1891.

The Swallow, Cuckoo, and Nightingale were a few days earlier than usual in making their appearance.

The most remarkable feature as regards the weather and its effect on vegetation was the way in which it favoured the growth of all the farm-crops except potatoes and hops. For it is seldom in the same year that the yield of wheat, barley, oats, beans, peas, turnips, mangolds, and grass are alike abundant even in a single district, much less in all parts of the Kingdom, as was the case in 1902.

On the other hand, all the fruit-crops were more or less deficient, with the exception of strawberries, which yielded well, but were, like most other fruits, lacking in flavour.

James Glaisher, F.R.S.

Longevity appears to be the prerogative of the meteorologist. Luke Howard, the father of English Meteorology, lived to the age of 92 years, Henry Perigal to the age of 97 years, and Glaisher, after an active and energetic life, has now passed away at the age of 94 years.

James Glaisher was born at Rotherhithe on the 7th of April, 1809. In early life he appears to have formed an invaluable friendship with William Richardson, the ablest observer on Pond's staff at the Royal Observatory, and was probably indebted to Pond and Richardson for instruction in the use of instruments, especially the Mural Circle, then just beginning to be used. Officially there is no record on this head, but Glaisher often declared that he had visited the Royal Observatory as early as 1829, and frequently spoke in glowing terms of his recollection of Pond's delicate manipulation of instruments. The first official work upon which he was engaged (1829 to 1832) appears to have been the trigonometrical survey of Ireland (the Ordnance Survey) under Lieut.-Col. James, in which he received a foretaste of experience in the upper air upon the summits of the Bencorr and Keeper peaks, an experience which no doubt often recurred to him in after life, when engaged in more hazardous experiments. In 1833, having received an introduction to Airy (from Richardson) he was appointed Assistant in the Cambridge Observatory, where he remained until the end of the year 1835. Airy seems to have formed a high opinion of Glaisher's powers, for immediately after taking office as Astronomer Royal, he appointed him an assistant at Greenwich, to fill the vacancy caused by the retirement of F. W. Simms. His work at

Cambridge was purely astronomical, and his office-hours were fully occupied with the reduction of the planetary observations, and the re-computation of the Groombridge Catalogue. His last work at Cambridge consisted of an important series of observations of Halley's Comet, afterwards reduced by him at Greenwich. Having taken up residence at Greenwich, he set to work with characteristic energy, and devoted much time to the Cambridge reductions, which were completed in 1838 by the formation of the first Cambridge Catalogue of 726 stars. The project of Airy for the establishment of Magnetical and Meteorological Observations at Greenwich, which had been maturing since 1836, had now begun to assume definite shape. The Magnetical Observatory was built in 1838, and finally established as a distinct department in November 1840, under the superintendence of Glaisher. This independent and onerous charge, separated entirely from the astronomical branch, and the superseding to some extent of the older assistants of Pond, must have been regarded at the time as a distinct leap in the dark. It was not intended at first that the Magnetical establishment should last beyond the year 1843, and it was expected to be brought to a close on the return of Sir James Ross's Antarctic Expedition. As regards the permanence of the meteorological portion of the work nothing had been settled, and it was not until 1843 that it was decided that the Magnetical and Meteorological Department should be maintained in perpetuity.

The development of the new department called out all Glaisher's energy. Justifying Airy's selection, he worked hard and determined to make a name for himself in this new field of research. But he had not altogether given up his love for astronomy. The discovery of Astræa by Hencke about this time acted as an incentive to him to institute a search for small planets with one of the idle equatorials at the Observatory: but unofficial zeal was not to be recognized; he was sternly forbidden to carry on this search, and seldom troubled himself afterwards with astronomical matters.

In 1848 he produced his tables of corrections for diurnal range based upon the observations made in the years 1841–1845 (*Phil. Trans.* 1848), and about the same time produced his 'Hygrometrical Tables,' in which he skilfully combined the various formulæ of Apjohn and Regnault for the calculation of the hygrometrical conditions of the atmosphere, thereby effecting a great saving of labour. He also carried out an extensive series of experiments on radiation, following later with an elaborate reduction of the thermometrical observations made at Somerset House and at the Royal Observatory from 1771 to 1849. These papers gained him the honour of election to the Royal Society in 1849. In that year he commenced his series of Quarterly Reports on the Meteorology of England, which he supplied with unfailing regularity to the Registrar-General for more than half a century, and in 1850 he welded his corps of observers throughout the country into the British (now the Royal) Meteorological Society, of which he was successively Secretary and

President. In 1851 he served as Juror on Class X., "Philosophical Instruments," at the Great Exhibition, and drew up the report of the Jury with great discrimination. In 1853, on the death of the director of the *Nautical Almanac*, he became a candidate for that office, but was not supported by Airy, and the office was given to Hind. In 1855 he presented an invaluable report to the Board of Health on the meteorology of London during the cholera epidemic of 1853–1854; in 1856 served as a member of a commission appointed to report on the subject of the ventilation of buildings; and in 1863 drew up a report on the Meteorology of India in relation to the health of the troops stationed in that dependency.

In 1859 the British Association decided to initiate a new series of balloon ascents in continuation of those made in 1852 by Mr. John Welsh, of the Kew Observatory. A powerful committee was formed, including Glaisher, and a grant made to cover expenses. After one or two abortive attempts with defective balloons, it was decided in 1862 to place the aëronautical arrangements in the capable hands of Henry Coxwell, and Glaisher was invited to make the observations, which, with unusual diffidence, he at last consented to do. The ascents made by Glaisher and Coxwell have become historical; 28 ascents in all were made in the years 1862 to 1866 (in the later years in a smaller balloon and with a different aëronaut, Orton), and the results are contained in five reports rendered to the Annual Meetings of the British Association. The accounts of these ascents were regularly reported by Glaisher in the public press, and he became a popular hero. The memorable ascent of 1862, September 5, has been frequently quoted and need only be referred to to point out that the height usually given as the extreme to which the balloon attained (37,000 feet), being an assumption, ought to be received with caution. It was considered that the objects of the experiments, "the determination of the temperature of the air and its hygrometrical condition at different elevations," had been well ascertained in these ascents; but Glaisher was not altogether satisfied with the determinations at low elevations, and therefore availed himself in 1869 of an offer made by M. Giffard to utilize his captive balloon, then at Ashburnham Park, Chelsea, to make 27 sets of experiments at moderate elevations, which were entirely satisfactory.

After this feverish and adventurous time, the remainder of his official career seems tame. In 1866 an unfortunate illness prevented him (greatly to his chagrin) from observing the return of the Leonids, which therefore devolved upon the junior members of the staff. In 1870 he contributed an account of his balloon ascents to 'Voyages Aériens,' par J. Glaisher, C. Flammarion, W. de Fonvielle, et G. Tissandier, afterwards superintending the production of the English edition of that work; and he subsequently edited the translations of Flammarion's 'Atmosphere' and Guillemin's 'World of Comets.' At the end of the year 1874, his long official

life came to a close, and he never re-entered the Observatory until after the retirement of Airy, and then on one occasion only. His later life, spent in honourable retirement at Blackheath and Croydon, was not inactive. He continued to supply his reports to the Registrar-General to the last year of his life, served on the several Committees of the British Association to which he had been appointed until his 90th year, and attended to the chairmanship of the companies with which he was connected almost till the day of his death, giving them the benefit of his ripe experience, and carrying on the business of the meetings with undiminished vigour. He died at Croydon on 1903, February 7.

His career may be summed up in the pregnant words applied to one of his contemporaries, "he seldom attempted anything to which his powers were not fully equal, and as a consequence whatever he did was done well." In addition to the Royal Society he was a Fellow of many other learned societies, among others the Royal Astronomical, the Photographic, the Royal Microscopical, the Aeronautical, &c., &c. He joined the Committee of the Palestine Exploration Fund at its formation, and for many years served as its Chairman. W. C. N.

Some New Methods of Transit-observing.

A SHORT note on the use of the Repsold Registering Micrometer, which had been used by the observers of the Potsdam Geodetic Institute with most excellent effect for some longitude determination, appeared in this Magazine last April. This subject of the elimination of personal equation and of the general improvement of transit observations seems to be engaging many minds at this time, so that it is proposed here to describe some plans suggested for this purpose.

The fundamental idea of most of these plans is to keep the star's image on a wire by mechanism, which mechanism will record signals at times which correspond to the times of passage of the star across the wires of an ordinary transit-instrument. The first suggestion of Repsold *, made in 1888, was to mount the base of the transit-instrument on a polar axis and, within a limited range, drive the instrument to the diurnal motion by means of clockwork, and by some sort of slow motion keep the star bisected on a wire, signals being sent automatically at certain positions of the instrument. This plan met the chief difficulty of the varying rate of motion due to difference of declination, but was abandoned on account of the great mass to be moved.

It is not known that this device was ever realized. The later

* *Ast. Nach.* No. 2828.