

STONYHURST COLLEGE OBSERVATORY,
LANCASHIRE, ENGLAND.

BY REV. I. J. KAVANAGH, S.J.

MY reason for selecting the Stonyhurst Observatory for my topic is largely a personal one, for I shall be talking about what is my own by many ties. The memory of pleasant years, of hard work done and of petty triumphs achieved, the memory of friends and their helping hands, are fair excuse for the personal note that may sound through my theme. Possibly this very thing may commend my effort to your kindly attention, for the whole world loves a lover. Besides it is encouraging to consider, in the case of the rise and growth of Stonyhurst Observatory, how small beginnings and patient work can culminate in deserved and gratifying success.

The Society of Jesus was early in the field of mathematical science, and, as far as circumstances have permitted, it has striven to maintain its traditions in this respect. Galileo counted the Fathers amongst his friends, and not the least among these was the great Jesuit Cardinal Bellarmine. The names of Boscovitch, Clovius, Hill, Kircher, Scheiner, Grimaldi, and, in our own day, de Vico Secchi and Perry have their place in the honorable annals of astronomy. Even now, in the midst of the strained conditions of the times, the Society counts 22 astronomical observatories, many of them splendidly equipped in men and instruments. Some have fallen from high estate. For instance, little has been done in Rome in recent years. The observatory and equipment that enabled Secchi to do such good work were taken from him and the Jesuits by the Piedmontese invaders. However, the work is started again and is now in the hands of Father Hagan, late of Georgetown Observatory, in Maryland. Elsewhere, as in Havana and Manila, the magnitude and economic importance of the meteorological results have masked the less brilliant but useful monotony of astronomical routine. A case in point is Father Algué's monumental work on the phenomena

of cyclones, just about to be published by the U. S. Government. Father Algué is Director of the Havana Observatory. Father Vinès, of Manila, on the theory of typhoons has been honored in the same way.

I might mention that both these men, as well as Secchi and one of the native Chinese Jesuits at Zi-ka-wei, and others, received a portion of their training at Stonyhurst Observatory, to which I beg to turn your kind attention. The story of Stonyhurst College goes back to the days when a Catholic College in England lay under the ban of a penal legislation. To meet these unfortunate conditions, the Jesuits founded in 1592, at St. Omer, a college for the education of English Catholic youth. In 1794, after many vicissitudes, the College faculty and the students came over to England, and settled down in Lancashire, on the old-time Sherbourne domain called Stonyhurst, which had been presented to them by one of the old boys, Sir Thomas Weld of Blundel. Curiously enough, the Rector of the College, as lord of the manor, had the right of presentation to the neighboring Protestant parish of Mitton; a right, however, he never exercised.

Perforce the College made haste but slowly. It was only in 1838 that in the quaint old Dutch garden, in the midst of secular yew hedges, the second oldest and finest in all England, there arose the domed roof of the observatory. The principal instrument was a 12 cm. Jones equatorial. Twenty years after, at the instance and under the very friendly advice of Sir Edward Sabine, Father Weld purchased a set of magnetic instruments for eye observations. Thenceforward the record is unbroken. Shortly after, the Board of Trade selected Stonyhurst as one of its seven meteorological stations. Thereupon a full complement of apparatus was installed and the observatory was able to carry on its work with ease and efficiency. The new self-recording instruments for the photographic registration of the magnetic elements were installed in a many walled excavation, in which the equable temperature and the hygrometric conditions have proved most satisfactory, the latter being an important affair in rainy Lan-

cashire. The Mercury Barograph is also installed here. On the occasion of the British Association Meeting at Southport, in 1883 I think, a large party came up to Stonyhurst. Naturally a number of ladies and gentlemen went down to examine the magnetic installation, much to the confusion and consternation of the magnets. These timid creatures thereupon described such extraordinary and eccentric curves, that the graphs had to be rejected from the month's average, but are kept as curiosities. Had a dozen of the old Sherbourne Crusading Knights come up from their marble tombs in Mitton Church, clad in full armor, the behavior of the magnets had scarcely been worse. The arrival of a new 20 cm. equatorial by Carey made it necessary to build a dome some hundred yards away, where the heavy iron mounting would exert no disturbing effects on the magnets. The Jones equatorial was then also removed from the main octagonal building which was becoming inconveniently crowded. Two of the wings still shelter the meridian instruments and the sidereal clocks.

The normal, the wet, and dry bulb thermometers are photographically self-recording. I need no more than mention the anemograph which registers the velocity and direction of the wind by pencil tracings on a clock-driven cylinder. These registers are all the more valuable because the apparatus has never stopped since its first installation, a notable tribute to the maker and to the care of the assistants. Of course, there are also sunshine recorders and automatic registering rain gauges. To those who know something of the Lancashire climate I need not suggest which of these two is the harder worked.

Besides the Jones, which is now given over to students' work, there is an 18 cm. Newtonian, a 24 cm. Cassegrain altazimuth, and a 12.5 cm. telescope by Clarke. Upon the death of Father Perry, who was for many years an esteemed and efficient Director, it was resolved by his many friends to set up a fitting monument to his memory. It was decided to erect a 38 cm. equatorial under a new dome. Fortunately the new instrument thus procured has proved equal to all expectations.

Some notes on the life of Father Perry, who did so much for Stonyhurst Observatory, may not come amiss, especially as some years back he came to this country and carried away, amongst other souvenirs, the pleasant remembrance of his visit to the Meteorological and Magnetic Observatory in the neighbourhood of Toronto, then, as now, under the very competent management of R. F. Stupart.

Stephen J. Perry was born in London in 1838 and went abroad for his education to the Benedictine College of Douai, where he remained seven years. He already manifested exceptional ability along scientific lines. Purposing to be a priest, he entered upon the study of philosophy in Rome at the English College. While here he resolved to seek admission to the Society of Jesus, being, as he says, largely influenced in this action by reading the life of the founder, St. Ignatius of Loyola. He was admitted to the Noviciate at Hodder House in England, and after the two years of probation required before anyone may take upon himself the obligations of the religious state, he took up his studies again, alternating with teaching, as is the custom of the Jesuits, till he had covered the usual 10 years of philosophy and theology preparatory to the priesthood.

Father Perry's mathematical talent was further developed under the teaching of such men as De Morgan in London and Cauchy, Delaunay, and Bertrand in Paris. Among his stories of these days was one about Bertrand, who was not noted for his neat blackboard work. One day he had to be replaced, on account of illness, by an assistant professor, a very competent man. The young professor, having expounded the matter clearly and neatly, had the mortification to see that many of his audience had left the hall. The truth is that these men had come from all parts of Europe to hear the great Bertrand and to note the unexpected and unprepared scintillations of genius, not to witness the commonplace proving of a proposition.

In 1868 he took up the Directorship of Stonyhurst Observatory with which he had had some connection at different times. He also did some teaching at the College. During the vacation

months he conducted magnetic surveys of Belgium and the various parts of France. These surveys furnished the first really satisfactory magnetic maps of these regions. He was attached to the Cadiz Eclipse parties in 1870, and was chief of four other Government Eclipse Expeditions. The last was to Isle du Salut off French Guiana (1889), where, through over exertion, he fell a victim to fever. The Jesuit missionaries at Georgetown, in Demerara, who were English, some of them old friends, had the melancholy consolation of giving him a last resting place. He had been in command of two Transit of Venus Expeditions: one to Kerguelen Island, the other to Madagascar. Father Perry was a good, organizer, a patient worker, an observer of the highest class, safe, cool, deliberate, ready for emergencies, most careful and foreseeing in his preparations, and dead sure of his results. He was, moreover, marvellously acute in their interpretation. However, he used to say that his colleague Father Walter Sidgreaves, the present director of the observatory, was the better observer, the best in England.

Though the study of colored and variable stars had been in vogue under Father Weld, the investigation of solar phenomena had not been neglected. Under Father Perry this latter received its greatest development. During all the twenty years of his directorship the drawings by projection of the Sun's surface, in general, and in detail, under low and high power, were made as often as possible. This work is done by W. McKeon, a lay brother of the order, a close observer, a skilful and conscientious draughtsman. Twenty years experience has rendered him exceptionally expert in *seeing* and *portraying* the delicate evanescent effects flitting, so to speak, over the paper. In case of a blurred, ill-defined, unseizable image, he tells me that a slight vibration given to the paper unravels, as it were, the jumbled details. It would appear a useful hint. I am convinced that the trained, discriminating eye can secure results far beyond the range of the dead, mechanical photographic lens. The Stonyhurst collection of solar drawings, executed with such accuracy and covering so long a time, has a high value, and, when placed

side by side with the contemporaneous magnetic records, throws suggestive lights upon the connection between magnetic and solar phenomena. Father Cortie of the observatory staff for some 16 years has written valuable papers in this relation and recently found himself crossing swords with Mr. A. W. Maunder of Greenwich.

Without in any way cutting in on solar work, under the present director, Father Walter Sidgreaves, Stonyhurst Observatory has done a great deal of stellar spectroscopic work. A Christie Hilger star spectroscope was purchased in 1883, but long before that a Troughton Sims instrument was in use for solar work, as was also a splendid Browning battery of 12 prisms, with a reversing prism, to be attached to the equatorial. Before Father Perry's time some special work had been done on the multiple and the colored stars, but it was he who gave the study of solar phenomena the greatest development. So that Father Sidgreaves' work was not a new departure but a mere natural development assiduously carried on. His studies of the Nova of Perseus and that of Auriga attracted much attention, while his monograph on β *Lyræ*, richly illustrated with spectrum photographs, is exhaustive. In this work he sometimes used the Hilger spectrograph with a fine Rowland grating (8 cm.) fed from a siderostat. The large equatorial, fitted with a Hilger poly-prism, is used for radiations less refrangible than the violet; for the violet and ultra-violet the 10 cm. Cross equatorial, fitted with a $22^{\circ}5$ Thorpe prism, is brought into action. Father Sidgreaves finds that shorter exposure and results altogether satisfactory are achieved by doing away with the slit and running the star parallel to the refracting edge of the prism. Of course, this means very fine adjustment.

Besides the interest that attaches to the Observatory, there are also attractions for the lover of beautiful scenery and for the antiquarian. I sincerely hope that some of my readers may have an opportunity of realizing how well I am keeping within the bounds of strict truth in singing the praises of Stonyhurst in Lancashire.

LOYOLA COLLEGE, MONTREAL.