

fat under examination is adulterated or not. The range of degrees in the Butyro-Refractometer as given by the different Provincial Governments is not in agreement with the observation which we have made and have collected in our trials of a few hundreds of samples of pure butterfat. The range which we have observed for pure butterfat at 40°C. is from 40°–44.8° on the scale of the Butyro-Refractometer.

In some of the Provincial Laboratories (*Vide* U. P. Government standards) the observations are taken at 25°C. We fail to understand how a reading could be taken at 25°C. or why it should be taken at all at 25°C. when we know that many samples of pure butterfat have a melting point very much above 25°C. As is well known, no reading could be correctly taken in the Butyro-Refractometer unless the sample is *in a melted condition*, during the process of examination. We have found in the case of many adulterated samples that the range of melting point exceeds 44.5° C. and the characteristic colour-fringes—bluish green or orange red, etc.—betray the adulteration of the sample. For a qualitative test, which does not take more than a few minutes,

we are of opinion that the observation of the Refractive Index *along with the Coloured Lines* is of great help in pronouncing an opinion on the purity of a sample.

Regarding the other Values like the Saponification Value, Iodine Value, Kirschner Value, sterols, etc. although these are valuable in themselves, we do not think that *directly* they are of much help. At best, they will render only *supplementary help*. But we would emphasise that the A- and B-values, if carried out carefully, will enable a chemist to draw perhaps the most accurate inference. The other values because of their wide range cannot be of much help unless they are all *put together*.

It is imperative in the interests of national health that a very effective legislation should be enacted to stop the adulteration of butterfat, one of the most important food-stuffs of the vegetarian dietary. But at the same time it is equally desirable in the interests of science and justice that the standards adopted in various provinces should be thoroughly examined, corrected, and re-arranged in order to protect the legitimate interests of the dealers in this article.

Centenaries in February 1936.

Gray (Stephen), 1696-1736.

FIFTEENTH of this February marks the bicentenary of the death of Stephen Gray. The exact date of his birth is not known. It is generally believed that he was born in the year 1696. What little is known about him is to be gathered only from the internal evidence contained in his contributions to the *Philosophical Transactions* of the Royal Society. He appears to have lived originally in Canterbury. But most of his experiments in Electricity appear to have been made in Charter House, where he was residing as a pensioner and in the residences of his friends, Wheeler and Godfrey.

ELECTRICS AND NON-ELECTRICS.

His first paper on electricity is the one entitled *An Account of some new Electrical Experiments* and published in 1720 in Vol. 31 of the *Philosophical Transactions*. In this paper, he added the following ten substances to the list of "Electrics" known before his time:—"(1) Feathers. (2) Hair.

(3) Silk. (4) Linen. (5) Woollen. (6) Paper. (7) Leather. (8) Wood. (9) Parchment. (10) Ox-guts in which leaf-gold is beaten."

CONDUCTION OF ELECTRICITY.

His greatest discovery was that of the conduction of electricity. This discovery was made in 1729 but was published in the *Philosophical Transactions* only in 1731. "He made several attempts to carry the electric virtue in a line horizontally" and failed. At last, on June 30, 1729, "Mr. Gray went to Otterden-place, to give Mr. Wheeler a specimen of his experiments. . . . as also of the method and materials made use of." Giving up the nail as the supporter of the line of pack-thread, he used, as suggested by Wheeler, a silk line to support it. With this "they succeeded far beyond expectation. The first experiment was made in the matted gallery, July 2, 1729, about 10 o'clock in the morning." The experiment was repeated with success with increasing lengths of pack-thread, until they succeeded in transmitting the effect, some days later, to a distance of 765 feet.

ELECTROSTATIC INDUCTION.

The fundamental phenomenon of induction, which forms the basis of electrical condensers was first described by Gray in the same paper of 1731. Mr. Gray made his first experiment in induction on August 5, 1729 and described it as "An experiment showing that the electric virtue may be carried several ways at the same time, by a line of communication, without touching the said line."

FIRST HUMAN BEING TO BE ELECTRIFIED.

The same paper of 1731 establishes the claim that Stephen Gray was the first man to electrify a human being. On "April 8, 1730, Mr. Gray made the following experiment on a boy between 8 and 9 years of age. His weight, with his clothes on, was 47 lb. 10 oz. He suspended him in a horizontal position, by 2 hair-lines, such as clothes are dried on: they were about 13 feet long, with loops at each end. There was driven into the beam of his chamber, a pair of hooks opposite to each other; and 2 feet from these another pair in the same manner. On these hooks the lines were suspended by their loops, so as to be in the manner of two swings, the lower parts hanging within about 2 feet from the floor of the room: then the boy was laid on these lines with his face downwards; one of the lines being put under his breast; the other under his thighs. Then the leaf-brass was laid on a stand, which was a round board of a foot diameter, with white paper pasted on it, supported on a pedestal a foot high, which Mr. Gray had frequently used in his experiments. The tube being rubbed, and held near his feet, without touching them, the leaf-brass was very vigorously attracted by the boy's face; so as to rise to the height of 8, and sometimes 10 inches."

This boy and another appear to have become a permanent part of Gray's apparatus and were in constant use. Mr. Gray would no doubt have had to display considerable daring at passing, for the first time, an electrical charge through a human being. Hence an individual of only a menial status was enlisted in the cause of science. His own footboy was chosen for that honour.

A POSTHUMOUS PAPER AND A DECEPTION.

Some Electrical Experiments intended to be communicated to the Royal Society, by Mr. Stephen Gray, F.R.S., and taken from his mouth by Cromwell Martimer, M.D., R.S.Sc., February 14, 1735-36, being the day before he

died is the title of a paper which appears in Vol. 39 of the *Philosophical Transactions*. "He told the Doctor, he had thought of these experiments only a very short time before his falling sick; that he had not yet tried them with variety of bodies but that from what he had already seen of them which struck him with new surprise every time he repeated them, he hoped, if God would spare his life but a little longer, he should, from what these phenomena point out, bring his electrical experiments to the greatest perfection; and he did not doubt but in a short time to be able to astonish the world with a new sort of planetarium never before thought of, and that from these experiments might be established a certain theory for accounting for the motions of the grand planetarium of the universe."

Here, however, the dying man had been deceived. The familiar conjuring trick of the goblet and the ring was wrongly attributed by him to electrical forces.

Barring this posthumous paper, Mr. Gray had contributed nearly a dozen papers on electricity, each paper being usually in the form of a descriptive account of a number of experiments on electrical conduction and induction. Gray is said to have astonished his onlookers by drawing an electric spark from the surface of water kept in a drinking glass. He used to maintain spheres and conical-shaped masses of sulphur in an electrified state for weeks and even months. Mr. Gray was essentially a pioneer and an earnest worker in experimental electricity. He richly deserves the appellation "Father of Electric Science" given him by Historians of Physics.

S. R. RANGANATHAN.

Adams (William Grylls), 1836-1915.

JUST a century after the death of the abovementioned "Father of Electrical Science," 16th February, 1836, saw the birth of W. G. Adams who advanced the sciences of Light, Electricity and Magnetism in no small measure before his death on 10th April, 1915. Adams was educated in a private school at Birkenhead and at St. John's College, Cambridge, and was subsequently elected a Fellow of that College.

In 1865 he succeeded Clark Maxwell as Professor of Natural Philosophy and Astronomy at the King's College, London and held that position till 1906. The Royal Society's *Catalogue of Scientific Papers* lists

25 papers of his in addition to a joint paper. The first paper *On the application of the screw to the floats of paddlewheels* was published in the *Philosophical Magazine* in 1865 and this constitutes his sole contribution to applied mechanics. His most famous contribution is to be found in Vol. 23 of the *Proceedings* of the Royal Society. It gives the substance of his Bakerian lecture on *The forms of equipotential curves and surfaces and lines of electric force*. He was one of the foundation members of the Physical Society of London.

The chief dates in his scientific career are the following:—

- 1872 Elected Fellow of the Royal Society.
- 1875 Delivered the Bakerian lecture.
- 1879 President of the Physical Society.
- 1880 President of the A Section of the British Association.
- 1883 Delivered Cantor lectures on electric lighting.
- 1884 President of the Institution of Electrical Engineers.

S. R. RANGANATHAN.

Obituary.

Mr. V. Ramaswami Aiyar, M.A. (1871-1936).

IT is with very deep regret that we learnt that the founder of the Indian Mathematical Society (started as the Indian Mathematical Club in 1906), Mr. V. Ramaswami Aiyar, M.A., retired Deputy Collector, suddenly passed away at Chittoor on the 22nd ultimo.

Mr. V. Ramaswami Aiyar was born in 1871 in Coimbatore district. After a brilliant educational career he served for a short time in the Central College, Bangalore and the Maharajah's College, Mysore, and (rather unfortunately for the development of mathematical research in India) he then entered the Madras Civil Service. His interest in mathematics continued unabated till his death all through his career as a revenue and judicial officer. It is even rumoured that this contributed adversely to his advancement in service. He was an outstanding example of a very enthusiastic lover of mathematical research. One of his great aims was to promote the cause of mathematical research in India. It can easily be said that he has achieved it remarkably well, considering the fact that India entered the field of mathematical research after a lapse of nearly ten centuries.

One memorable episode of his life was the

discovery of Ramanujan, one of the greatest geniuses of mathematics that the world has ever produced.

The place of Mr. V. Ramaswami Aiyar in the development of mathematical research in India cannot be determined solely by the work that he produced. If he were born in an advanced western country with ample opportunities for learning under great workers with every sort of facility, he would no doubt have contributed substantial works. At least if he were a professor of mathematics in any of our universities, his great imagination, which stands forth prominently in his contributions to the so-called "Modern Geometry of the Triangle", would perhaps have been used in modern projectile geometry producing valuable results. His were days when very few people in India realised that there was mathematical research beyond the problems in Journals such as the *Educational Times*.

Perhaps his was the only example of a research worker and enthusiast in mathematics in India outside the ranks of our universities, whose interests continued unabated all through his life. We offer our sincere condolences to his bereaved family.
