SCIENTIFIC CENTENARIES IN 1940

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IN looking back once again for the names of men who were born or who died, one, two, three or more centuries ago, to whom the world is indebted for some discovery, or contribution of note to the progress of modern science, the first name which stands out clearly is that of William Gilbert, the physician of Elizabethan days. He was born in 1540. When sixty years of age he published his famous book "De Magnete, magnetisque corporibus et de magno magnete tellure". This was the first great work on physical science published in England. A century or so after Gilbert died, Dryden wrote the lines

"Gilbert shall live till loadstones cease to draw
Or British fleets the boundless ocean awe."

Gilbert was born at Colchester towards the end of the reign of Henry VIII. At the age of twenty he graduated from St. John's College, Cambridge. He afterwards spent some years in travel and study on the Continent and in 1569 obtained the degree of M.D. Four years later he settled in practice in London and ultimately became physician to Queen Elizabeth. His home was in St. Peter's Hill, and one of his haunts was the College of Physicians, then housed in Linacre's house in Knight-Rider Street not far from St. Paul's. He rose to be president of the College; and to it he bequeathed his books, globes and apparatus, but these were all destroyed in the Great Fire of 1666. He died at Colchester on November 30, 1603, and was buried in Holy Trinity Church, in which a monument was erected by his brothers.

Gilbert's experiments in magnetism and electricity mark an epoch in science in Great Britain. They were fully appreciated by some of his contemporaries and Galileo, in one of his "Dialogues", makes the imaginary Salviati say of the "De Magnete": "I highly praise, admire and envy this author for having formed such a stupendous conception on a matter which has been treated by many sublime intellects, but solved by none. . . . I do not doubt that in due course of time this new science will be perfected by new observations and by true and cogent demonstrations. But the glory of the first inventor will not be diminished thereby. . . ."

Another celebrated man of science who was born in 1540, and who died in 1603, was the French algebraist François Viète, commonly known as Vieta. Born at Fontenay-le-Comte, Vendée, he was educated for the law and for some time practised at the bar in Paris. When forty years of age he was given the post of master of requests, attached to the Parliament of Paris, and from that time he gave up his leisure to mathematics. Of the three books printed during his lifetime—for private circulation—the first was his "In Artem Analyticam Isagoge" (1591); this is the earliest work on symbolic algebra. In his article on Vieta, in the old "Penny Encyclopædia", the mathematician Augustus de Morgan wrote: "If a Persian or Hindu, instructed in the modern European algebra, were to ask 'Who of all the individual men made the step which most distinctly marks the separation of the science which you now return to us from that which we delivered to you by the hands of Mahommed ben Musa?' the answer must be Vieta."

Among the French mathematicians born a century after Vieta were Jacques Ozanam (1640–1717) and Phillippe de Lahire (1640–1718). The former wrote nearly twenty books, but he is remembered to-day for his four volumes of "Recreations Mathematiques et Physiques". The youngest son in a well-to-do family, Ozanam was intended for the Church. This prospect, however, had no appeal for him, and he became a teacher of mathematics at Lyons. He there appears to have developed a passion for gaming, but some time afterwards he removed to Paris and devoted himself entirely to mathematics and was elected to the Royal Academy of Sciences. It is said that when religious matters were being discussed he remarked "that it was the business of the doctors of the Sorbonne to dispute, of the Pope to decide, and of a mathematician to go to heaven on a straight line". His contemporary Lahire was the son of a court painter and it was hoped he would become one, but geometry proved too strong an attraction. In his thirties he began observing at the newly erected Paris Observatory where Cassini was similarly employed. By the Minister Colbert he was appointed to assist Picard in geodetical work for the chart of France. He wrote a variety of works and from 1690 onwards held a professorship in the famous Collège de France.

The year 1640 also saw the birth of Dr. Robert Plot (1640–96), author of natural histories of Oxfordshire and Staffordshire, a secretary of the Royal Society and the editor of vols. 143–166 of the *Philosophical Transactions*. When Elias Ashmole established the first University chemical laboratory at Oxford, it was placed under Plot's charge.

The bicentenaries which occur this year recall, among others, the names of two authors concerned with those indispensable works—encyclopædias. In May 1740 Ephraim Chambers died and was buried in the cloisters of Westminster Abbey. As a youth he had come to London from Westmorland to learn globe-making at the hands of Senex. From globe-making he turned to writing and, conceiving the plan for a dictionary of science, took chambers in Gray's Inn and there in 1728 produced his "Cyclopaedia, or . . . Dictionary of Arts and Sciences". It immediately won a reputation for him and he was elected F.R.S. Several editions of his work appeared and it formed the basis of the Cyclopædia of Dr. Abraham Rees (1745–1823). In between the publication of the encyclopædias of Chambers and Rees came that of the "Encyclopædia Britannica" (1771), projected, printed and published by the public-spirited Edinburgh printer and naturalist William Smellie, who was born the year Chambers died.

The record of scientists, inventors and pioneers born in 1740 includes the names of Henry Cort (1740–1800), whose patents of January 17, 1783, and February 13, 1784, for the production of wrought iron plates, bars and rods form a milestone in the history of our iron industry; of Joseph Michel Montgolfier (1740–1810), who with his brother Jacques Etienne Montgolfier (1745–99) made the pioneering experiments with balloons; of the astronomers Thomas Bugge (1740–1815) of Copenhagen, Jacques Andre Mallet (1740–90) of Geneva, Andre Jean Lexell (1740–84) of Sweden and St. Petersburg, and of the famous geologist, physicist and mountaineer, Horace Bénédict de Saussure (1740–99). Like Mallet, de Saussure long held a chair in the University of Geneva, but it was his travels, his observations of rocks and his climbing expeditions which contributed most to his renown. His excursions culminated during the years 1787–89 with the ascent of Mont Blanc, a stay for thirteen days on the Col du Géant, and a tour of Monte Rosa. Mont Blanc, it may be added, was first climbed in 1786 by the hunter Jacques Balmat and Dr. Paccard.

Some of the eminent men of science who died in 1840 were referred to at the anniversary meeting of the Royal Society of that year. Among these was the French mathematician Simeon Denis Poisson (1781–1840); the German anatomist and naturalist Johann Friedrich Blumenbach (1752–1840) and the German astronomer Heinrich Wilhelm Matthäus Olbers (1758–1840). Olbers and Blumenbach when they died had passed the allotted span of life, but Poisson, apparently by his unceasing labour and his neglect of exercise and healthy recreation, had shortened his life. From a boy upwards he had been a prodigious worker. He was a younger contemporary of Lagrange, Laplace, Fourier, Monge, Prony and other members of the brilliant group of scientists in Paris during Napoleonic and post-Revolutionary times. He occupied positions at the École Polytechnique, the Collège de France, and the Bureau des Longitudes. "If he was inferior to Fourier or to Fresnel," said an obituary in the *Athenæum*, "in the largeness and pregnancy of his philosophical views, he was incomparably superior to them in mathematical power: if some of his contemporaries rivalled or surpassed him in particular departments of his own favourite studies, he has left no one to equal him, either in France or in Europe at large, in the extent, variety, and intrinsic value of his labours".

Five others who died in 1840 were Joseph Johann von Littrow (1781–1840), the Bohemian astronomer who from 1821 was director of the Vienna Observatory; André Jean Francois Marie Brochant de Villiers (1772–1840), who with Elie de Beaumont and Dufrenoy made a geological map of France; Nicolas Aylmer Vigors (1787–1840), the Irish M.P. who was a founder and the first secretary of the Zoological Society; Sir Anthony Carlisle (1768–1840), the surgeon who with William Nicholson on May 2, 1800, decomposed water with the aid of the first voltaic pile made in England, and Sir Robert Seppings (1768–1840), an eminent naval constructor in the days of our 'wooden walls'.

Seppings was a shipwright apprentice in 1782, master-shipwright at Plymouth in 1800, and at Chatham in 1804, and in 1813 was appointed surveyor to the Navy, a post he held until 1832. He introduced a form of keel blocks for dry docks which enabled ships to be dealt with rapidly, and a system of diagonal trussing for ships which was extensively used. In 1818 he was awarded the Copley Medal of the Royal Society for his communications on warship construction. He died at Taunton on April 25, 1840, and his monument is in St. Mary's Church.

Of men of science born a century ago in Germany one of the most notable was Ernst Abbe (1840–1905) whose optical investigations, combined with the work of the instrument-maker Carl Zeiss (1816–88) and the glass-maker Otto Schott, made "Jena glass" famous the world over and Zeiss instruments the standard of excellence. Abbe was a professor in the University of Jena at the age of twenty-six he became associated with Zeiss. After Zeiss's death he was responsible for the business, which he formed into a sort of trust called the Carl Zeiss Stiftung. Speaking at the Optical Convention of 1905, shortly after Abbe's death, Glazebrook said that "Abbe's work in Jena is perhaps the most striking illustration of the way

in which progress depends on the co-operation of science and experience". Another German physicist born in 1840 was Friedrich Kohlrausch (1840–1910), the successor of Helmholtz and the predecessor of Warburg, as president of the Reichsanstalt at Charlottenburg. In France 1840 saw the birth of Emile Duclaux (1840–1904), an early assistant to Pasteur, who after his master's death became director of the Pasteur Institute.

Sweden has long been famous for its chemists and metallurgists, and among the former are Lars Fredrik Nilson (1840–99) and Per Theodor Cleve (1840–1905). Both studied at Uppsala, both held chairs there and at Stockholm and both were elected foreign members of the Chemical Society. The memorial lecture to the Society on Nilson was given by Prof. Otto Pettersson and that on Cleve by Sir Edward Thorpe. Speaking of the position Sweden occupied in relation to chemistry, Thorpe said that "when regard is had to her position among continental nations—to her chequered political history, to her geographical isolation, the comparative sparseness of her population, her relative poverty, the fewness of her seats of learning—the influence which Sweden has been able to exert on the development of that branch of science, which it is the proper function of this Society to foster, must always excite our wonder, admiration and gratitude. The mere mention of the names of Bergmann, Scheele, Berzelius, Mosander, Gadolin, Nilson, is sufficient to remind us how great have been her services to the science of chemistry".

To this necessarily incomplete list of men distinguished in science, invention or engineering may be added the names of the American geologist Edward Drinker Cope (1840–97); the American-British inventor and engineer Sir Hiram Stevens Maxim (1840–1916); the Irish astronomers Lord Rosse (1840–1908) and Sir Robert Stawell Ball (1840–1913); the Scottish inventor John Boyd Dunlop (1840–1921) of pneumatic tyre fame; the English metallurgist James Riley (1840–1910), and the great civil engineer Sir Benjamin Baker (1840-1907), whose name will always be remembered in connexion with the Forth Bridge, the Aswan Dam and other important constructions. Baker was elected F.R.S. in 1890, and served as president of the Institution of Civil Engineers in 1895. He died at Pangbourne on May 19, 1907, and was buried at Idbury, in the Cotswolds. On December 3, 1909, a memorial window to him was unveiled in the north aisle of the nave of Westminster Abbey.

FOOD FROM GARDENS AND ALLOTMENTS

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THANKS to numerous official inquiries, the quantities of food required by the population of Great Britain are fairly well known. Our diet is both generous and varied. The total food consumption averages rather more than 900 lb. a head without counting milk and eggs. Apart from these the *per capita* consumption falls into five groups: about 200 lb. each of (1) wheat, (2) potatoes, (3) other vegetables and fruits, and (4) meat and fish combined; (5) some 140 lb. of other foods, chiefly sugar (94 lb.) with smaller quantities of butter (25 lb.), margarine (8 lb.) and cheese (10 lb.).

We produce at home all the potatoes, the liquid milk, and much of the vegetables; about half the meat and fish, but only 15 per cent of the wheat and some 10 per cent of butter. We produce rather less than 40 per cent of the total money value of our foods, and rather less than 50 per cent of the total weight. On an average, for each individual there is in peace time an import of about 4 cwt. of food per annum.

One of the most urgent problems at the present time is to reduce this figure. It is made up roughly as follows:

Wheat	1½	cwt.
Meat and fish	1	,,
Fruit, butter, cheese, etc. ..	1	,,
Sugar	60	lb.
Total	4	cwt. approximately

The largest item is wheat, of which 170 lb. is imported out of the 200 lb. consumed. We shall, however, produce more. The plan of the Ministry of Agriculture is to plough up two million acres of land in all; in the War of 1914–1918, when this was nearly accomplished, we had added 50 per cent to our wheat production.

If we succeed in doing as much this time, we shall reduce the 170 lb. of imports to 155 lb., but it seems scarcely likely that we can get much below this. Something could be saved by closer milling, but that would only mean less food for our animals and therefore less meat and milk. For one thing we have insufficient land available;