A Short Account of the History of Mathematics

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French Physicists Cointemporary with Fourier and Poisson

Sadi Carnot

Among Fourier's contemporaries who were interested in the theory of heat the most eminent was Sadi Carnot, a son of the eminent geometrician mentioned above. Sadi Carnot was born at Paris in 1796, and died there of cholera in August 1832; he was an officer in the French army. In 1824 he issued a short work entitled Réflexions sur la puissance motrice du feu, in which he attempted to determine in what way heat produced its mechanical effect. He made the mistake of assuming that heat was material, but his essay may be taken as initiating the modern theory of thermodynamics.

Ampère

André Marie Ampère was born at Lyons on January 22, 1775, and died at Marseilles on June 10, 1836. He was widely read in all branches of learning, and lectured and wrote on many of them, but after the year 1809, when he was made professor of analysis at the Polytechnic school in Paris, he confined himself almost entirely to mathematics and science. His papers on the connection between electricity and magnetism were written in 1820. According to his theory, propounded in 1826, a molecule of matter which can be magnetized is traversed by a closed electric current, and magnetization is produced by any cause which makes the direction of these currents in the different molecules of the body approach parallelism.

Fresnel, Biot

Augustin Jean Fresnel, born at Broglie on May 10, 1788, and died at Ville-d'Avray on July 14, 1827, was a civil engineer by profession, but he devoted his leisure to the study of physical optics. The undulatory theory of light, which Hooke, Huygens, and Euler had supported on a priori grounds, had been based on experiment by the researches of Young. Fresnel deduced the mathematical consequences of these

experiments, and explained the phenomena of interference both of ordinary and polarized light. Fresnel's friend and contemporary, Jean Baptiste Biot, who was born at Paris on April 21, 1774, and died there in 1862, requires a word or two in passing. Most of his mathematical work was in connection with the subject of optics, and especially the polarization of light. His systematic works were produced within the years 1805 and 1817; a selection of his more valuable memoirs was published in Paris in 1858.

Arago

François Jean Dominique Arago was born at Estagel in the Pyrenees on February 26, 1786, and died in Paris on October 2, 1853. He was educated at the Polytechnic school, Paris, and we gather from his autobiography that however distinguished were the professors in that institution they were remarkably incapable of imparting their knowledge or maintaining discipline.

In 1804 Arago was made secretary to the observatory at Paris, and from 1806 to 1809 he was engaged in measuring a meridian arc in order to determined the exact length of a metre. He was then appointed to a leading post in the observatory, given a residence there, and made a professor at the Polytechnic school, where he enjoyed a marked success as a lecturer. He subsequently gave popular lectures on astronomy, which were both lucid and accurate ‐ a combination of qualities which was rarer then than now. He reorganized the national observatory, the management of which has long been inefficient, but in doing this his want of tact and courtesy raised many unnecessary difficulties. He remained to the end a consistent republican, and after the coup d'état of 1852, though half blind and dying, he resigned his post as astronomer rather than take the oath of allegiance. It is to the credit of Napoleon III. that he gave directions that the old man should be in no way disturbed, and should be left free to say and do what he liked.

Arago's earliest physical researches were on the pressure of steam at different temperatures, and the velocity of sound, 1818 to 1822. His magnetic observations mostly took place from 1823 to 1826. He discovered what has been called rotatory magnetism, and the fact that most bodies could be magnetized; these discoveries were completed and explained by Faraday. He warmly supported Fresnel's optical theories, and the two philosophers conducted together those experiments on the polarization of light which led to the inference that the vibrations of the luminiferous ether were transverse to the direction of motion, and that polarization consisted in a resolution

of rectilinear motion into components at right angles to each other. The subsequent invention of the polariscope and discover of rotatory polarization are due to Arago. The general idea of the experimental determination of the velocity of light in the manner subsequently effected by Fizeau and Foucault was suggested by him in 1838, but his failing eyesight prevented his arranging the details or making the experiments.

It will be noticed that some of the last members of the French school were alive at a comparatively recent date, but nearly all their mathematical work was done before the year 1830. They are the direct successors of the French writers who flourished at the commencement of the nineteenth century, and seem to have been out of touch with the great German mathematicians of the early part of it, on whose researches much of the best work of that century is based; they are thus placed here, though their writings are in some cases of a later date than those of Gauss, Abel and Jacobi.