Biographical Encyclopedia of Astronomers

Esclangon, Ernest-Benjamin

Born Mison, Alpes-de-Haute-Provence, France, 17 March 1876

Died Eyrenville, Dordogne, France, 28 January 1954

Ernest Esclangon is often remembered for his contributions to applied physics during World War I, and for his automated distribution of time signals by telephone.

Esclangon began his studies in a collège (school) in Manosque, his brother being a schoolmaster. He later attended the lycée (academy) in Nice before entering the École Normale Supérieure in Paris (1895). He received his degree in mathematics and secured a position at the Bordeaux Observatory in 1899 under Georges Rayet, which determined the course of his career. There, Esclangon served as *aide-astronomer* and *astronome adjoint*. While in Bordeaux, he taught courses in rational mechanics as well as in differential calculus

In 1919, Esclangon became director of the Strasbourg Observatory. With help from André Danjon, he revived the institution in the postwar period. Esclangon then succeeded Henri Deslandres as director of the Paris Observatory in 1929, a position he held until his retirement in 1944. At both Strasbourg and Paris, he was simultaneously a professor of astronomy at the cities' universities. His teaching abilities were highly valued by his students, and Esclangon remained open to new ideas.

The first research work performed by Esclangon was his doctoral dissertation (1904), which examined quasiperiodic functions. Introduced in 1893 by mathematician Piers Bohl, these functions proved particularly powerful in the case of Fourier series, producing a limited number of terms in their application. Esclangon perfected their theory, studied the corresponding differential equations, and established their use in mathematical physics. This work constituted his main contribution to pure science, for which he was awarded the Grand Prix of the Académie des sciences

Esclangon was also fond of the practical uses of mathematics, and his reputation was enhanced in two very different fields. Soon after World War I began, Esclangon proposed to the Service Géographique de l'Armée his idea of pinpointing the enemy's location by triangulating the sounds of artillery firings. Through field experimentation, Esclangon successfully constructed equipment that performed this task. General Ludendorff, head of the German staff officers, later argued in his memoirs that Esclangon's defensive device was one of the keys behind the victory of the Allied troops

At the Paris Observatory, Esclangon creatively responded to an increasing demand from citizens to obtain the correct time by telephone. He created the first "talking" (i.e., automatic self-announcing) clock. Esclangon broadcast the time through a series of photoelectric cells, which activated *pistes sonores* located on a rotating cylinder. The corresponding "blips" were issued from a synchronous clock, driven in turn by a fundamental clock at the observatory. The

time service was inaugurated on 14 February 1933, and immediately the number of calls jumped to more than several thousand per day. The accuracy of the time provided on the telephone was better than 0.1 seconds

During his lifetime, Esclangon published more than 200 papers on a variety of subjects, including the mechanics of flight, acoustics, and relativity theory. Most of his publications were related to positional astronomy, instrumentation, and chronometry. Esclangon's last paper investigated the orbital mechanics of an artificial Earth satellite, several years before the Sputnik satellite was launched by the Soviet Union

Esclangon's mathematical and scientific skills were called upon by various administrative agencies. His wartime contributions led to appointments as an attaché in the cabinet of the Minister of the Navy, along with an artillery commission. He later became a member of the Commission des inventions for the Centre National de la Recherche Scientifique. Esclangon was elected to the Académie des sciences in 1929 and to the Bureau des longitudes in 1932. He was made a *Commandeur de la Légion d'honneur*. Esclangon was elected president of the International Astronomical Union (1935–1938) following his organization of its general assembly in Paris, and its participants were addressed by the President of France.

Esclangon lived in the village of Eyrenville, where he owned a house in which he installed a watermill to provide electricity

He rode an old bicycle, which made such a noise that the citizens were preinformed of his arrival. They much appreciated Esclangon's kindness, simplicity, and the accuracy of his weather forecasts.

Jacques Lévy

Selected Reference

Danjon, A. (1955). "Ernest Esclangon." *Monthly Notices of the Royal Astronomical Society* 115: 124.