

The Search for Shigeo Satomura

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In the early autumn of this year's jubilee, when, from 18 October onwards, the anniversary “150 years of friendship Japan–Austria” is being celebrated with a special exhibition at the Minato City Local History Museum in Tokyo, titled: “The Beginning of Relations between Japan and Austria as seen Through the Lenses of Photographers in the Early Meiji Era”, the author had an urgent wish to travel from Austria to Japan one more time. As a researcher in the history of physics since 1988, his wish was to seize the opportunity to get to know more about the history of physics in Japan. The author's research efforts have been focussed on Hideki Yukawa and Hantaro Nagaoka, whom he holds in high esteem, and his plan has furthermore been to make a search for Shigeo Satomura.

Why the latter scientist in particular? The achievements of Satomura actually is an excellent illustration to remind us of the beneficial relations between Japan and Austria, and, moreover, as the reader will soon understand, between Japan and the entire world. In fact, we owe the saving of many human lives to Shigeo Satomura: A medical physicist at the Osaka University, a far-sighted and forward-looking intellect who, when he came upon the universal Doppler Principle—which had been discovered and understood by the Austrian physicist Christian Doppler in 1842 and which is named after him—realized the implications from this principle for medicine for the very first time. Thus, Shigeo Satomura actuated a development of medical apparatuses which would globally revolutionise medical diagnostics. Alas, Satomura, the Osaka pioneer at ultrasonic Doppler flow-metry, passed away shortly after his successful demonstration of the first commercially available equipment named “Doppler Rheograph” at the then Nippon Electric Company NEC in 1959, 60 years ago. From Austria, the author had not been able to find out more details about the life and career of Satomura. So he travelled to Japan, wishfully hoping to find out more in Satomura's homeland and somewhat encouraged because, in 1988, the author did successfully re-voke the Salzburg physicist Christian Doppler, that remarkable scientist, who had fallen into oblivion until then.

“Doppler” is certainly one of the most frequently mentioned physicist names yet is it used only when related to the Doppler principle or Doppler effect, were it only on the daily weather forecast briefly referred to in the USA as “the Doppler”. However, the human who stands behind “Christian Doppler” was forgotten for as many decades as the friendship of Japan-Austria has been lasting. In 1988 his research led the author to locate Doppler's place of death and commemorative monument in Venice and to discover a daguerreotype of him with his family, made by Daguerre himself, from which the now commonly known portrait picture of Doppler has been produced. The author's discoveries have been highly acclaimed in Salzburg, the famous Mozart town in western Austria, where Christian Doppler was born in 1803.

In Salzburg, back in 1986, the new construction of the Faculty of Sciences of the University of Salzburg had been started, together with the setting up of a technology centre with a focus on computer science and IT research—the Salzburg Land had become aware of the urgent need for her to catch up with Modern Science and Technology what had been neglected so far. Now, Salzburg, being with Mozart the metropolis of Music, should be associated with a name of her own for technology—this was the right moment to revive Christian Doppler. Soon later, in 1987, the then Salzburg Land governor [Landeshauptmann] Dr. Haslauer would

found the “Christian Doppler Foundation” [CDF] in Salzburg and to the author's search reports on Christian Doppler [CD] was given interested support. The purpose of the CDF is a double one, to propagate the life and works of CD on the one hand and, on the other hand, to deepen the consciousness about the manifold applications of his principle that satisfy a vast field of sciences—that is, astronomy, geodesy, medicine, navigation, physics, modern general research in science and technology—by means of written reports, symposia and meetings.

Both the first CDF president and his successor having been physicians, the initial undertakings were focussed on the medical applications of the Doppler principle, that is the Doppler sonography. Subsequently, in 1989, the “Christian Doppler Institute for Medical Science and Technology” was founded, based at the “Christian Doppler Clinic” in Salzburg, with a programme of special courses in Doppler sonography and with research projects on the topics of apoplexy and suicide prevention.

It had been Prof. Ziro Kaneko from the Kansai Rosai Hospital in Amagasaki, Japan, who was elected the first honorary member of the CDF. Together with Shigeo Satomura he had centred his research on the Doppler sonography, the further developing of which he continued after the tragic early death of Satomura in 1959. Prof. Kaneko passed away in 1997.

In the meantime, the CDF pursued a number of activities—setting up an internet platform sub www.christian-doppler.net as well as organizing symposia and international conferences. Of the latter, it is to be noted that the double Doppler jubilee year in 2003 celebrated the two centuries after the birth and the 150 years after the death of Christian Doppler (1803–1853). Ceremonies were held and memorizing tablets were mounted at all the places where CD had lived and worked, that is in Salzburg, Prague, Vienna, Schemnitz [today Banska Bystrica in Slovakia]. The CDF is supporting research work on CD. Thus became possible the publishing of the results of the author's historical research on Doppler's life and work in 1992 [1], followed by his CD monography in 2003 [2] as well as its translation into English in 2005 [3]; in 1989 the author made the script for a biographical film on CD [4] and in 2017 became published his epic poem as a homage to CD [5], which the author conceived as a literary approach to the Doppler phenomenon.

Two Austrian museums are exhibiting a permanent focus onto CD, in Salzburg at the “House of Nature” and in Styria at the European Centre for the History of Physics “echophysics”, based at the historic Poellau Castle which is situated between Vienna and Graz. Besides Doppler, the echophysics exhibition shows more than 600 historical scientific apparatuses dating to the second half of the 19th to the early 20th century, the details have been published in 2016 [6] [7], with the purpose to make the heritage of the European physics survive as real instruments and equipment, not in scientific data alone.

To make real the striving of the European Centre for the History of Physics for a “Double Star”[8] link between Austria and Japan named “Doppler-Satomura”, Echophysics is searching for more details on the life and work of both Satomura and Kaneko. Obtaining a facsimile of Satomura's first publication on the Doppler sonography and/or a copy of the announcing article in the Mainichi News of the 04 Dec. 1959 edition would bring an impressive enrichment on CD for the exhibition at the Echophysics museum. Also the author welcomes any copies of the publishing or reports on both Satomura and Kaneko and is

eagerly ready to keep alive their memories in Europe and to spread the obtained historical information by this first European Centre on the History of Physics.

Last but not least, the author would like to refer to another “Double Star” that arose between Austria and Japan in the pioneering for the modern space research, their names being Victor Franz Hess and Hideki Yukawa. Hess was awarded the 1936 Nobel Prize in Physics for his discovery of cosmic radiation in 1912 [9] [10]. Yukawa—he had been a lecturer for physics at the then “Imperial” Osaka University until 1939—won the 1949 Nobel Prize in Physics for his theoretical prediction of the existence of mesons acting on nuclear forces. And, when by 1969 the mesons had been verified in cosmic radiation as well, this next “Double Star” of “Hess-Yukawa” turned out. Echophysics houses also the heritage of Victor F. Hess at the “Victor F. Hess Research and Heritage Centre” at the same Poellau Castle. The author is currently researching the life and work of Hideko Yukawa to duly commemorate his achievement of the theory on mesons on the 70th anniversary of his Nobel award.

My thanks go to the Osaka University and especially to their helpful members Dr. Ayaka Saka and Ms. Ayako Onose, who offered me the opportunity of reminding their newsletter readers of Shigeo Satomura—we should well keep the name Satomura in mind because his innovative achievement is accompanying our entire way of life, from birth to the high age, and his medical applications spread the name Doppler into the world.

[1] Peter Maria SCHUSTER: *Christian Doppler (1803–1853)*, 2. Band: *Das Werk*, in: *Perspektiven der Wissenschaftsgeschichte*, Bd. 9, ISBN 3-205-05508-X

[2] Peter Maria SCHUSTER: *Weltbewegend, unbekannt—Christian Doppler; Leben und Werk des Physikers Christian Doppler und die Welt danach*, ISBN 978-3-901585-03-6

[3] Peter Maria SCHUSTER: *Moving the Stars—Christian Doppler; His Life, His Works and Principle, and the World After*; Translated by Lily WILMES, ISBN 978-3-901585-05-0

[4] TV Movie by the Austrian Broadcaster ORF Österreichischer Rundfunk in co-operation with the Southwest-German Broadcaster SWR Südwestrundfunk: *Köpfe; Christian Doppler (1989)*

[5] Peter Maria SCHUSTER: *Homage to Christian Doppler; The Creation Week—Day One*, Translated by Lily WILMES, ISBN 978-3-901585-37-1

[6] Hartmut KAHLERT, Heinz KRENN, Lily WILMES: *Echophysics—The first European Centre for the History of Physics in Pöllau (Austria)*, *Europhysics News* 42 (4) (2011) 28–30.

[7] Peter Maria SCHUSTER, Lily WILMES: *Unfassbare Strahlung – Werdegang zur Modernen Physik*, ISBN 978-3-901585-33-3

[8] Please note, that the term “double” is applied here with a two-fold reference to Doppler, because, on the one hand, the German spelling for “doubling” inheres the Doppler name and, on the other hand, his research on double stars had confronted Doppler with an astronomical phenomenon that was unexplainable at the time and which he succeeded to solve still before setting up his formulae of the Doppler principle in Prague in the year 1842.

[9] Peter Maria SCHUSTER: The scientific life of Victor Franz (Francis) Hess (June 24, 1883–December 17, 1964), *Astropart. Phys.* (2013), <http://dx.doi.org/10.1016/j.astropartphys.2013.05.005>

[10] This 1936 Nobel award having been in equal share with Carl David Anderson for his discovery of the positron.