Rheologica Acta (2018) 57:691–692
https://doi.org/10.1007/s00397-018-1115-7

OBITUARY

Hanswalter Giesekus 1922–2017

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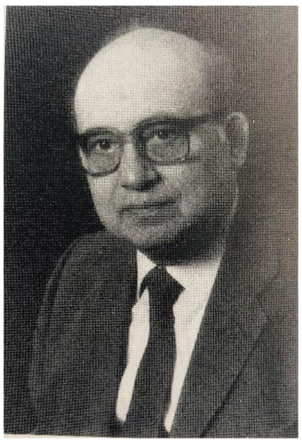
Received: 12 August 2018 / Revised: 19 September 2018 / Accepted: 19 September 2018 / Published online: 4 October 2018



Early days

Hanswalter Giesekus was born on January 4, 1922, at Hückeswagen, a small town about 20 km east of Düsseldorf in the province of Nordrhein-Westfalen. His father was Walter Giesekus and his mother was Emmy Giesekus, née Langenberg. Both father and mother were country folks and had received only an elementary school education. The parents were practising Christians and subsequently Hanswalter followed their example. In his childhood, he experienced the Great Depression and the subsequent rise of Nazism in Germany. During his school education, he displayed wide interests in literature, history, art and music (he learnt to play the violin) as well as in mathematics and physics. After leaving school, he went on a few months of pre-military service—spent partly in France—and then in the autumn of 1940 he enrolled in the University of Göttingen, concentrating on physics. However, after one year, he was called up to serve in an air intelligence unit. From 1943, he worked in a newly established Institute in Freiberg-im-Breisgau. There he experienced a bombing raid on November 24, 1944, and the house where Giesekus was living was destroyed. Fortunately, he was on his way to a bible class at the time of the raid, and so he escaped.

After the end of the war, in the autumn of 1945, he resumed his studies at Göttingen; he was permitted to do this because of his non-involvement in Nazi activities. He received his Diploma in 1948 and his Doctorate in 1950. In 1955, Hanswalter married Hanna (née Hoppe) and they had six children—five boys and one girl.

Industry and academia

In July 1950, Giesekus joined Bayer AG. At first, he was in a division at Dormagen, north of Cologne, and then he was moved to the Engineering Department of Applied Physics at Leverkusen in 1953.There he met Dr. Juri Pawlowski, who got him interested in rheology. Thus, he began his stellar career in the subject and he published a string of influential papers from 1954 onwards. The authors of this Obituary heard him give an extraordinarily interesting invited talk on secondary flow around a rotating sphere in a non-Newtonian fluid at the 4th International Congress on Rheology held at Brown University in Providence, Rhode Island, in August 1963; this was our first contact with Dr. Giesekus.

In 1970, Giesekus moved to the new University of Dortmund as Professor of Fluid Mechanics in the Department of Chemical Engineering. There he built up a research group practically from scratch. He spent 1978 at the Department of Chemical Engineering at the University of Delaware, following an invitation from Professor Arthur Metzner. During his tenure in Dortmund, he followed Dr. W.

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Meskat as Executive Editor of Rheologica Acta; he was Editor from 1975 until 1987—a total of 14 years.

Giesekus formally retired in 1987 but continued lecturing and research as Emeritus Professor after that. In his 'retirement', he published two books, one entitled 'Phänomenologische Rheologie' was published by Springer-Verlag in 1990 and is discussed below and the other is centred on the life and beliefs of Blaise Pascal, the scientist and philosopher after whom the unit of pressure (N/m^2) is named. Giesekus was awarded the British Society of Rheology Gold Medal in 1990.

His research

Although Giesekus's best-known work is in rheology, his early publications stemming from his doctoral thesis were on the physics of rare earths, and it was not until 1954 that papers on rheology began to appear. Bayer AG seemed to have given him liberty to do theoretical research on rheology, and a stream of excellent papers, mostly single-author works in the German language, was published from 1954 onwards. For some reason, these papers are not easy to track down on popular websites—for example the ISI Web of Science omits most of the early papers, but an editorial has been published which lists of all of them (Winter (1989)). To quote Winter: 'A general remark was that Giesekus had published many profound results in the German literature which, only many years later, were independently rediscovered and published in the international literature.'

His great capacity for accurate mathematical work is exemplified by a 1962 paper in which he computed the drag on a sphere in a viscoelastic fluid by a perturbation method (Giesekus 1962). The algebra involved in these calculations is very difficult, and there was some previous work in the literature, but Giesekus was the first to obtain a correct result, which has since been verified numerically by Professor Kostas Housiadas (Housiadas and Tanner 2012).

Giesekus investigated suspensions of various sorts of dumbbells using statistical methods and published a number of papers on turbulent drag reduction and stability of flow in viscoelastic flow. His best-cited paper (with over 500 citations on the Web of Science) is the paper where the Giesekus constitutive model was explored (Giesekus 1982). As the author explains in the text, most of the ideas were published some 16 years earlier as Giesekus (1966). The original paper was not widely cited and does not appear in the Web of Science.

The book 'Phänomenologische Rheologie' was published by Springer-Verlag in 1994 after his formal retirement from Dortmund, but it was thought out over a long period beginning during the time Giesekus was obtaining his Habilitation (licence to teach) at the Technical University of Darmstadt in 1962–1970. It is very thorough and each chapter is prefaced with a Biblical quotation from the books of Ecclesiastes and Job. They are often very appropriate. For instance in Chapter 2 (Kinematic Foundations), we find, from Ecclesiastes **7**:24 'In weiter Ferne liegt der Grand alles Geschehens und tief; ja tief verborgen:Wer kann ihn ausfindig Machen?' From an English Bible this verse reads 'That which is far off, and exceedingly deep, who can find it out?' Many rheologists would agree with this statement regarding the mysteries of finite strain.

Closure

After a marriage lasting 59 years, Hanna died on 1 July 2014. Hanswalter remained a very active Christian until his death on 4 December 2017. They are survived by the six children, 15 grandchildren and a great-grandson.

Retirement Party 1987. Hanna and Hanswalter with Ken Walters and the late Arthur Metzner.

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Publisher's Note