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# Memorial of Tom F. W. Barth
# May 18, 1899—March 7, 1971

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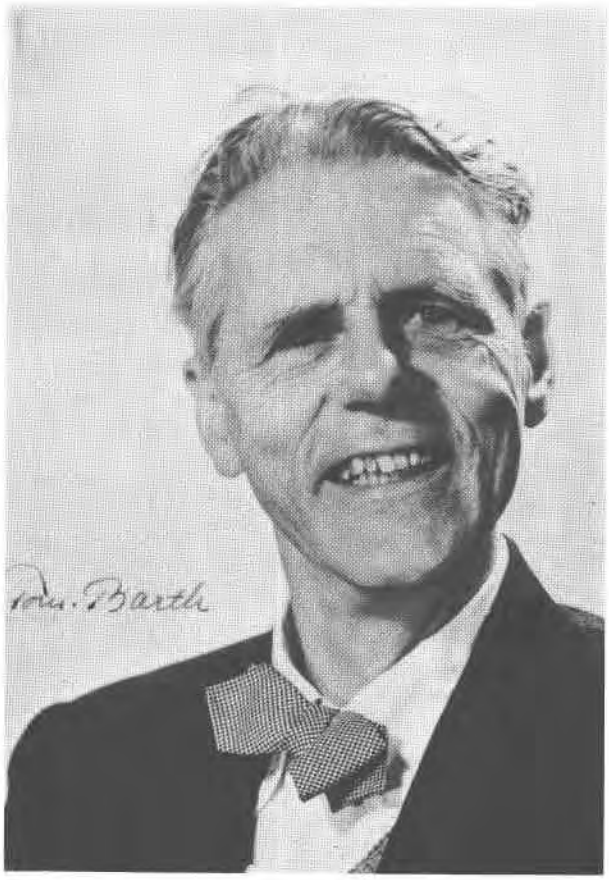


Thomas Fredrik Weiby Barth died at his home in Oslo, Norway, March 7, 1971, at age 71, in the setting of the Norwegian woods that meant so much to him, and in the presence of members of his family. Thus ended the life of an extraordinary man, renowned for his scientific work and for his warm, human qualities.

Tom Barth was born May 18, 1899, on the small island Bolsøy, on the west coast of Norway where his father was employed as a civil engineer. He took his early schooling in Trondheim, and eventually completed one year of study at the Norwegian Technical University, with the aim of learning mining engineering. A summer of practical work at the Kongsberg silver mine led him into conversations with Dr. Carl Bugge, then the mine superintendent but subsequently Director of the Norwegian Geological Survey, that inspired him to turn to geology. Tom Barth enrolled at the University of Oslo, Fall of 1919, and began his formal training under Professors Goldschmidt and Brøgger, at the Geological Museum in Tøyen, where instruction in geology was offered at the time. He worked as a research assistant to Dr. Eskola analyzing minerals. Contact with these eminent scientists had a strong effect on the developing young scientist.

After three years at the Museum, Tom Barth married Randi Thomassen, who was his loyal and loving companion his entire life. He took a position as a scientific assistant at the Agricultural College in Ås; during two years there, despite financial hardships, he finished his research on contact minerals of Pre-Cambrian limestones of southern Norway and successfully took his "Hovedfags" examination. In 1924, he became a researcher under Goldschmidt at the Museum, where pioneering studies of crystal structures and elemental distribution were going on. Tom Barth found participating in the research activities of the group engrossing and stimulating, and entered into a period of remarkable productivity. Between 1924 and 1927, when he completed his Ph.D., he published more than 20 papers on crystallographic topics and found time to do field investigations and to write his Ph.D. dissertation on nepheline syenite pegmatites of northern Norway. In this way were revealed early two characteristics of Tom Barth: his unusual ability to focus on problems at hand, and the combined field and laboratory approaches he was to use so effectively throughout his life. Although his formal academic training ended with receiving the Ph.D. degree, he continued to learn as long as he lived. With zest and keen insights, he continuously enlarged his grasp of science and of human affairs.

Tom Barth was an international scientist. Through a variety of activities in many countries he developed a unique scientific philosophy and a broad awareness. His first foreign experiences were as an Assist-

ant Professor under Professor K. H. Scheumann at the Technische Hochschule in Berlin and the University of Leipzig, in 1927–28 and 1928–29. As a Rockefeller Fellow at Harvard University in 1929–30, he came into close contact with the American school of geologic thought as represented by the eminent Professors R. A. Daly, Esper Larsen and Charles Palache. Following his stay at Harvard, he became a researcher at the Geophysical Laboratory of the Carnegie Institution of Washington, where he was to remain until 1936. Here he worked with outstanding scientists, such as Drs. Posnjak, Sosman, Hendricks, Kracek, Tunell and Washington, and collaborated with researchers from Harvard and Johns Hopkins, which included Professors Donnay, Palache, and Peacock. The association of the Geophysical Laboratory with Harvard and Johns Hopkins, according to Dr. Gabrielle Donnay (1970), "was both a fruitful and a happy one, as witnessed by the formation of the delightful "Calaverite Club," composed of Palache, Peacock, Donnay, Tunell, and Barth." Tom Barth himself, in 1969, stated his feelings about the Geophysical Laboratory when asked by Donnay for aid in preparing a summary statement on 50 years of crystallography at the Geophysical Laboratory, as follows: "I shall be happy to do so; I spent the most pleasant time of my life at the Geophysical Laboratory."

In 1936, Tom Barth returned to teach at the University of Oslo, and the following year he became Professor and Director of the Mineralogical Institute. In 1939 the attraction of the Geophysical Laboratory drew him again to Washington, where he stayed for one year, returning to Norway to resume his duties at the Institute only a few days before the German occupation. During the trying days of the war, he and his students managed to continue scientific activities; more than 23 theses and dissertations were finished by his students. In addition, he indulged in so-called illegal activities, which resulted in a short confinement in a concentration camp. Characteristically, Tom Barth seized the opportunity while in the camp to write up some of his accomplished work on Iceland. Immediately after the war, he became a Professor at the University of Chicago, where he was until 1949, when he returned to the Mineralogical-Geological Museum, to remain, except for short stays abroad and extensive travelling, the rest of his life.

Tom Barth's overall accomplishments as a scientist have been summarized elsewhere, principally by Johannes Dons (1971) in Norwegian, and by Konrad Krauskopf (1973). Here it is appropriate to dwell principally on his mineralogical contributions. Tom Barth kept a steady interest in mineralogy; about one-half of his more than 200 published works can be clearly identified with mineralogy, the others being papers mostly in petrology and geochemistry. He felt that his most significant contribution was a short paper published with Posnjak in 1932 on "Spinel structures: with and without variate atom equipoints." In this paper it was demonstrated for the first time that chemically different atoms can occupy crystallographically identical sites. This new concept led to understanding of order-disorder relationships, which proved to be essential to the crystal structure determinations of many minerals, including the group of prime importance in mineralogy, the aluminosilicates.

Tom Barth early became fascinated by the complex crystal structures of the feldspars and the possibility of using measurable parameters of naturally occurring feldspars as a basis for interpreting their complicated geological histories. Probably best known is his suggestion that the sodium contents of coexisting plagioclase and potassium feldspars could be used to indicate the temperature of crystallization of the two minerals. Though this suggestion later proved to be of limited utility because of the chemical and physical complexities displayed in nature by the polycomponent systems in which feldspars crystallize, it focussed attention on feldspars and on the distribution of elements among coexisting minerals. His life long interest in feldspars culminated in 1969 with the publication of a book entitled *Feldspars*.

Tom Barth participated regularly in the affairs of international organizations, and served as an officer in many: President of the Commission on Geochemistry of the International Union of Pure and Applied Chemistry from 1957 to 1960; President of the Geochemical Society from 1960 to 1961; and President of the International Union of Geological Sciences from 1964 to 1968. He received many honors: he was a member of scientific academies of eleven countries; he was an honorary member of nine professional societies; he received honorary degrees from four European universities; he was awarded medals from scientific societies of four countries, including the Roebling Medal of this Society. He received Norway's highest award for civilian achievement, the Royal Order of St. Olaf. He was widely sought as a lecturer, consultant, visiting professor, and field trip leader.

Tom Barth's contributions in areas other than mineralogy are impressive. He wrote about 100 papers on topics such as basalt differentiation, metasomatism, pegmatite genesis, volcanic and hot springs of Iceland, intrusive complexes of the Oslo district, the geochemical cycle of sodium, and crustal evolution. In his spare moments he wrote book reviews, newspaper and magazine articles, and even a popular book on Iceland. In addition to the book on feldspars, he wrote the section on petrology in the book *Die Entstehung der Gesteine,* co-authored with Correns and Eskola in 1939; his much used book *Theoretical Petrology* first appeared in 1952. Tom Barth was truly a prodigious worker who belongs with the great geologists of this century.

Though he did not hold much regard for himself as a scientific administrator, Tom Barth was effective in governmental and academic circles. He built on the traditions of the Mineralogical-Geological Museum established by his eminent predecessors, and managed to modernize the research capabilities through constant struggles with government officials. The Museum was recognized internationally as a place where foreign and Norwegian geologists could work effectively in a constructive and pleasant atmosphere. Those who have had the privilege of spending time at the Museum know well the good feeling generated by the warm and helpful responses of individuals there, at all levels. Members of the Museum staff were open in their admiration and regard for Tom Barth, and they recognized his role in setting the scientific and emotional tone at the Museum.

Tom Barth as a teacher and researcher had a capacity to inspire. He would show immediate interest in the ideas of others, quickly become enthusiastic, and follow through effectively in various ways. Hans Ramberg described his experiences as a student with Tom Barth: "After talking with Tom Barth about research matters, I would come away elated, feeling somehow that my thinking was of the highest scientific quality." However, Tom Barth was capable of responding directly when pressed. At the close of a lecture on metasomatism at Stanford University, where he was Visiting Professor in 1961, he was challenged by a member of the audience. The assertion was made that Barth had failed to take into account areas clearly of igneous origin, such as the Hawaiian Islands, where a wide variety of rock types had formed through differentiation processes. The response by Barth was instant and characteristic: "Gentlemen, I examine the Hawaiian Islands and what do I see? Basalt, basalt, and more basalt!"

Tom Barth's scientific accomplishments and personal qualities cannot be described adequately in written form. Glimpses, only, are possible. How can his complex nature be described? His humility combined with confidence? His ability to share himself with others and to preserve sufficient time to accomplish prodigious amounts of work? His indifference to personal comfort and great concern for others? His impatience with red-tape and his effectiveness in coping with it? He was dedicated to Norway, and fascinated by other countries. He loved his family, and they him; he extended his feelings beyond his family circle and shared himself with the world.

### Selected Publications of Tom F. W. Barth

The references listed below were abstracted from the complete bibliography of about 200 papers in Dons' (1971) memorial to Tom Barth. The papers were selected to demonstrate the span of his interests and to call attention to co-workers. The list is somewhat non-representative; for example, about one-third of the papers chosen were co-authored with others, whereas only about one-fourth of the papers of the complete bibliography were co-authored.

(1925) On contact minerals from Pre-Cambrian limestones in Southern Norway. *Norsk. Geol. Tidsskr.* **8,** 93–114.

(1925) (with V. M. Goldschmidt and G. Lunde) Geochemische Verteilungsgesetze der Elemente. V. Isomorphie und Polymorphie der Sesquioxyde, die Lanthaniden-Kontraktion und ihre Konsequenzen. *Vid.-Akad. Skr. Mat.-Nat. Kl. 1925,* **7,** 1–59.

(1926) (with G. Lunde) Beiträge zur Kenntnis der Mischkristalle. *Zeitschr. f. Physik. Chem.* **122,** 293–334.

(1927) (with G. Lunde) Der Unterschied der Gitterkonstanten von Steinsalz und von chemisch reinem Natriumchlorid. *Z. Physik. Chem.* **126,** 417–424.

(1927) Note on the symmetry of orthoclase. *Norsk Geol. Tidsskr.* **9,** 398–400.

(1927) Die Pegmatitgänge der kaledonischen Intrusivgestene im Seiland-Gebiete. *Vid.-Akad. Skr. Mat.-Nat. Kl. 1927,* **8,** 123 pp.

(1928) Professor V. M. Goldschmidt's krystallstrukturarbeider og deres betydning for teknologien. *Naturen,* **52,** 277–288.

(1928) Zur Genesis der Pegmatite im Urgebirge. II. Ein syntektischer Gesteinkomplex aus dem südlichsten Norwegen. *Chem. Erde,* **4,** 95–136.

(1929) Uber den monoklinen Natronfeldspat. *Z. Kristallogr.* **69,** 476-481.

(1929) Some new immersion melts of high refraction. *Amer. Mineral.* **14,** 258–261.

(1930) (with R. A. Daly) Dolerites associated with the Karroo system, South Africa. *Geol. Mag.* **67,** 97–110.

(1930) (with H. Berman) Neue optische Daten wenig bekannter Minerale (Die Einbettungsmethode). *Chem. Erde,* **5,** 21–42.
(1931) Crystallization of pyroxenes from basalts. *Amer. Mineral.* **16,** 195–208.
(1931) (with E. Posnjak) The spinel structure: An example of variate atom equipoints. *J. Washington Acad. Sci.* **21,** 255–258.
(1931) Permanent changes in the optical orientation of feldspars exposed to heat. *Norsk Geol. Tidsskr.* **12,** 57–72.
(1932) The cristobalite structures: II. Low-cristobalite. *Amer. J. Sci.* **24,** 97–110.
(1934) Polymorphic phenomena and crystal structure. *Amer. J. Sci.* **27,** 273–286.
(1934) (with R. Balk) Chloritoid from Dutchess County, New York. *Amer. Mineral.* **19,** 345–350.
(1934) (with J. D. H. Donnay, G. Tunell) Various modes of attack in crystallographic investigation. *Amer. Mineral.* **19,** 437–458.
(1936) Henry Stephens Washington (Memorial). *Min. Petr. Mitt.* **47,** 371–372.
(1936) The crystallization process of basalt (A supplement and a reply). *Amer. J. Sci.* **31,** 321–351.
(1938) Feldspar equilibria and their implication, I. *Norsk Geol. Tidsskr.* **17,** 177–190.
(1939) Geomorphology of Vest-Agder Fjord-land. *Norsk Geogr. Tidsskr.* **7,** 291–304.
(1942) Craters and fissure eruptions at Myvatn in Iceland. *Norsk Geogr. Tidsskr.* **9,** 58–81.
(1945) Studies on the igneous rock complex of the Oslo region. II. Systematic petrography of the plutonic rocks. *Vid. Akad. Skr. Mat.-Nat. Kl. 1944,* **9,** 1–144.
(1947) (with Chr. Oftedahl) High-temperature plagioclase in the Oslo igneous rocks. *Trans. Amer. Geophys. Union,* **28,** 102–104.
(1947) On the geochemical cycle of fluorine. *J. Geol.* **55,** 420–426.
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(1960) (with J. A. Dons) Precambrian of Southern Norway. *In,* O. Holtedahl, Ed., Geology of Norway. *Norges Geol. Undersökelse,* **208,** 6–67.
(1960) (with J. A. W. Bugge) Precambrian gneisses and granites of the Skagerak coastal area, South Norway. *Guide to excursion No. A8. XXI. International Geol. Congr. Norden 1960, Norges Geol. Undersökelse* **212 f,** 1–35.
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(1962) The feldspar geologic thermometers. *Norsk Geol. Tidsskr.* **42,** 330–339.
(1966) (with I. B. Ramberg) The Fen circular complex. *In,* O. F. Tuttle and J. Gittins, Eds., *Carbonatites,* pp. 225–257.
(1967) (with S. B. Smithson) The Precambrian Holum granite, South Norway. *Norsk Geol. Tidsskr.* **47,** 21–55.
(1968) The geochemical evolution of continental rocks. A model. *In,* L. H. Ahrens, Ed., *Origin and Distribution of the Elements,* pp. 587–597.
(1971) Granulites. Results of a discussion. Comment. *Neues Jahrb. Mineral. Mh.* **3,** 98–99.

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