References and Notes

1. These brief comments apply to the condition of economic statistics since 1956. Between 1938 and 1956, statistics on the physical output of individual industries were not published at all in the Soviet Union, with a few minor exceptions.
2. The National Bureau of Economic Research is a nonprofit organization engaged in economic research, with its main offices in New York. Arthur F. Burns of Columbia University is president, and Solomon Fabricant of New York University is director of research.
3. The phenomenon of compounding makes the average annual growth rates diverge less percentagewise than the multiples of growth for the longer spans.
4. The general opinion of American specialists in Soviet studies seems to be that Soviet industrial production was about a third of the American level in 1955, which is considerably higher than the estimate given here [see, for example, *Soviet Economic Growth: A Comparison with the United States* (Joint Economic Committee, Washington, D.C., 1957), p. 11]. I can only say that I have not been able to reproduce the conventional estimate by direct calculations.

Walter D. Bonner, Scholar, Chemist, Gifted Teacher

Walter Daniel Bonner, late professor and head of chemistry at the University of Utah at Salt Lake City, was born on 27 October 1878 in the town of Osceola, Nebraska. He was the oldest of eight children of a father of Scottish-American descent (via Pennsylvania and Ohio) who had been educated for the Presbyterian ministry. The father, wearied by a three-year diet of Greek and Latin, turned instead to cabinet-making and carpentry, at which he was adept. Bonner's mother was of New England ancestry and was relatively unschooled but could play the piano and sing with real ability. When young Walter was nine years old, his parents moved permanently to a farm, a step which never proved financially rewarding. From the age of nine until he reached his majority, Walter worked on this farm or hired out as a farm hand, and during the winter months he attended small country schools. It may be said that he was influenced on the side of scholarly pursuits and manual skills, mainly by his father, and in his love for and ability in music by his mother. The Bonner ancestry is liberally sprinkled with competent millers and engineers.

Because of the economic necessity for doing farm work, Walter was unable to begin high school until he was 21, when he entered Nebraska Wesleyan University and its associated preparatory school. Being compelled to support himself at Wesleyan, he did janitor work, at night, and carpentering, at which he excelled, during the summer vacations. His food during school terms often consisted of cooked oatmeal only. Stimulation to take up chemistry came from a young professor, F. J. Alway, who had studied organic chemistry in Germany. With Alway, Bonner published three papers on organic chemistry; he was elected to Phi Beta Kappa and received the B.S. degree in 1906. At Wesleyan University he met Miss Grace Gaylord, also a student of chemistry, whom he married in 1909.

Persuaded by Alway, Bonner applied for and received a fellowship at Princeton where he studied under G. A. Hulett who, being of a more modern and farsighted temperament, soon convinced Bonner that physical chemistry was the more fundamental subject to pursue. With Hulett he published his now classic quantitative work on constant boiling hydrochloric acid solutions. The powers that be at Princeton were allegedly displeased by Bonner's change to physical chemistry, and it became apparent to both him and Hulett that he should settle for an M.A. in 1908 and go on to the University of Toronto, Canada. There he worked under the already prominent Professor W. Lash Miller on phase rule studies and received his Ph.D. in 1911, as well as appointments as lecturer and then assistant professor at Queens University.

Walter Bonner was born, raised, and educated and he worked in a comparatively serene but remarkably significant period in the history of science and mathematics, and he was acutely aware of this. The physical sciences and mathematics advanced amazingly along quantitative and fundamental paths as well as in depth and breadth of philosophical understanding.

Such was the background and spirit of science when Professor Bonner was asked to join the faculty of the University of Utah and assume the headship of the chemistry department in 1915. There was one other member of the chemistry staff, newly appointed Professor Elton Quinn; later Thomas B. Brighton and still later a professor of physics, Orin Tugman, were appointed. Work leading to the bachelor's degree could be given, but at first no further. The science building was attractive and rugged but the research facilities were meager. Both Bonner and Quinn were artists at glass blowing, and they made apparatus, did the teaching, and encouraged the undergraduates to embark on such researches as were then possible. There was a gentlemanly but stern dean (and professor of mathematics) who resisted all efforts to encourage research and advanced graduate work at the University, but through Bonner's patient insistence, and some delphic magic, more and more research on the part of seniors and master's candidates was done.

The stipends of the early graduate assistants were painfully small, as this writer can testify, and on numerous occasions Mrs. Bonner graciously provided hospitality. The monumental result of Bonner's more than 30 years of teaching, research, and encouragement was, besides many significant scientific papers and a book, over a hundred men who went on to advanced graduate work in chemistry and physics at other universities and colleges, and some two hundred more who went into medicine. Largely through his efforts such scholars as A. A. Noyes of Pasadena, Joel Hildebrand and G. N. Lewis of Berkeley, and others, lectured on occasions at the University. He never had a secretary.

Bonner was a man of even temper, warmth, and pleasant persistence. He was versed in literature of both ancient and modern origin, and well informed on current events and their significance. Though never sanctimonious or formally religious, he could quote the Holy Writ to good effect when he deemed it appropriate. His family counted six sons, all of whom went on to advanced degrees in the physical or biological sciences, and one daughter.

Here then is the account of a scholarly man and notable teacher who did splendidly, often under extremely adverse circumstances. He passed away on 4 January 1956 in New Haven, Connecticut.

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