# IN MEMORIAM

## ROBIN O. GANDY (1919 – 1995)

Robin O. GANDY died unexpectedly and suddenly on 20 November 1995. He was born on 22 September 1919.

Gandy carried out research in several areas of logic, especially recursion theory and its applications to model theory, constructive analysis, infinitesimal analysis, and set theory. His work included such research papers as "Inductive Definitions" (1974), "Basic Functions" (1975), "The Next Admissible Set" (1971) with Jon Barwise and Yiannis Moschovakis, "Set Existence" (1960) with George Kreisel and W. W. Tait, and "A Problem in the Theory of Constructive Orders" (1970) with Robert I. Soare, and his name lives on in the Gandy-Kreisel-Tate Theorem (1960) and Gandy's Theorem. The former states that *for any consistent* $\prod_1^1$ *set of axioms for second-order number theory, if* $a \subseteq \omega$ *is internal to every model T, then a is hyperarithmetic.* The latter states that *for* $\mathbb{A}$ *any admissible set , every* $\sum_+$ *inductive relation on* $\mathbb{A}$ *is* $\sum_1$ *on* $\mathbb{A}$.

With C. M. E. Yates, Gandy edited *Logic Colloquium '96: Proceedings of the Summer School and Colloquium in Mathematical Logic, Manchester, August 1969* (Amsterdam/London, North-Holland, 1971) and served he as one of the organizers of the colloquium along with Hans Hermes, M. H. Löb, Dana Scott, and C. M. E. Yates. He participated actively in the Association for Symbolic Logic, speaking over the course of years at various of its meetings on such topics as "Effective Operations and Recursive Functionals", "The Axiomatic Characterisation of of Generic Sets", "Relations Between Analysis and Set Theory", "Towards a Far-reaching Constructivism" and "Completely Finite Models for Number Theory". His academic home was the Institute of Mathematics at Oxford University.

Gandy's paper "Bertrand Russell, as Mathematician" (*Bulletin of the London Mathematical Society* **5** (1973), 342–348) was of especial interest to historians and philosophers of logic. In this paper, Gandy critically examined the philosophical background, framework, and influence of Russell's contributions to logic, centering in particular around the Russell paradox and the various solutions which Russell offered to deal with the paradox. "Russell," Gandy wrote (p. 342), "had a brilliant, original and fertile mind. He devoted ten years (1900–1910) primarily to work in mathematics and its philosophy. So his actual and lasting contribution appears a poor return on capital inested . . . ."

Gandy blamed Russell's failure to live up to his potential in mathematics on interefernce from consideration of philosophical problems (e.g. the "trivial" paradoxes, in Gandy's quote of Russell), attention to which got in the way of dedication to mathematical work. Russell's philosophical views of mathematicis, Gandy thought, were "not only absurd" but "also stutifying" (p. 346). Gandy summarized his chief point by saying (p. 346) that "Russell realized that for deciding the truth of certain crucial axioms the logic he developed was inadequate. But he remained blind to the moral of this failure: an adequate logic must be based on *mathematical* imagination and knowledge."

## ALFRED L. FOSTER (1904 – 1994)

Alfred L. FOSTER, professor emeritus of mathematics at the University of California at Berkeley, died on 24 December 1994 following complications from surgery the previous Spring. Foster was born in New York City on 13 July 1904. He took a B.S. in 1926 and M.S. in 1927, both at the California Institute of Technology, before going on to Princeton where he earned his Ph.D. in 1931 with a thesis in mathematical logic written under the direction of Alonzo Church, who was just one year older than Foster. Foster spent a year of postgraduate studies at Göttingen and then travelled across the U.S. to California by car for additional study and part-time teaching at Berkeley. In 1934 he took a full-time position at Berkeley, where, with the exception of sabbaticals, he remained until his retirement in 1971.

Early in his career, Foster came to specialize his research in Boolean algebras and Boolean rings, with emphasis in particular on the rôle of duality in Boolean theory. He developed a theory of $n$-ality for certain rings which played an analogous rôle for Boolean rings that $n$-valued logics played for Boolean algebras. Some of this work was carried out in collaboration with his Berekeley colleague Benjamin Bernstein. Foster's work culminated in 1946 with the paper *The theory of Boolean-like rings*.

In their textbook *A course in universal algebra* (New York/ Heidelberg/Berlin, Springer-Verlag, 1981), Stanley Burris and H. P. Sankappanavar wrote (p. 150):

> When Rosenbloom presented his study of the variety of $n$-valued Post algebras in 1942 he proved that all finite members were isomorphic to direct powers of $\mathbf{P}_n$ [$\mathbf{P}_n = \langle \{0, 1, \ldots, n-1\}, \vee, \wedge, ', 0, 1 \rangle$ where $\langle \{0, 1, \ldots, n-1\}, \vee, \wedge, ', 0, 1 \rangle$ is a bounded chain with $0 < n-1 < n-2 < \ldots < 2 < 1$, and $1' = 2$, $2' = 3$, ... $(n-2)' = n-1$, $(n-1)' = 0$, $0' = 1$; see *ibid*, p. 26], just as in the case of Boolean algebras. However he thought that an analysis of the infinite members would prove to be far more complex than the corresponding study of infinite Boolean algebras. Then in 1953 Foster proved that every $n$-valued Post algebra was just a Boolean power of $\mathbf{P}_n$.

Foster came to understand that the then-new area of universal algebra provided a more general setting for his work and was thus more felicitous for further developments of his investigations. He was thereby led to develop the theory of primal algebras, a *primal algebra* being an algebra $\mathfrak{A}$ with a set $A$ in which $A$ is finite but contains more than one element, and every function on $A$ is a polynomial. (One very familiar example of a primal algebra is the two-element Boolean algebra.) In 1953, he showed that the variety generated by a primal algebra has the same basic structure as the variety of Boolean algebras. His two-part paper *Generalized "Boolean" theory of universal algebras* (Mathematische Zeitschrift **58** (1953), 306–336, **59** (1953), 191–199) is the centerpiece of this work. He continued this line of research for the remainder of his career, publishing such papers as *The identities of — and unique subdirect facorization within — classes of universal algebras* (Mathematische Zeitschrift **62** (1955), 171–188) and *An existence theorem for functionally complete universal algebras* (Mathematische Zeitschrift **71** (1959), 69–82). In the 1960s, he also worked with A. F. Pixley of semi-categorical algebras, which are also sometimes called subdirect Stone generators. Foster's result that, for an operator domain $\Omega$ and its algebra [$\Omega$-algebra], *if $\Omega$ is countable, any $\Omega$-algebra which is n-primal for some n must be finite*, has been incorporated as an exercise in P. M. Cohn's *Universal algebra* (Dordrecht/Boston/London, D. Reidel Publishing, 1981, revised ed., p. 179).

*The Editor*