

RALPH ERSKINE CLELAND
(1892-1971)

Ralph Erskine Cleland excelled in a wide range of activities and in them exhibited an extraordinarily integrated and consistent personality. Majoring in classics at the University of Pennsylvania, he took science courses only to fulfill requirements, but became interested in botany and won prizes in both botany and Greek. He stayed on to accept a graduate assistantship in botany and, under the supervision of B. M. Davis, presented a doctoral thesis on a red alga and sent it to the publisher the day he was summoned for induction into the army (1917).

Returning from France in the spring of 1919, he was appointed as instructor in botany at Goucher College in Baltimore. During the preceding summer he assisted Davis in research on *Oenothera*, the evening primrose, by investigating the behavior of the chromosomes. This study resulted in a startling discovery that set the course of his whole scientific career: some of the chromosomes did not behave in the normal way that was the underpinning of the newly established chromosome theory of heredity. Normally, at one stage in the preparation for reproduction, chromosomes arrange themselves in pairs and then the two members of each pair move apart and ultimately go into different reproductive cells. Although some of the chromosomes in the *Oenothera* Cleland studied behaved in the normal manner, others regularly arranged themselves end to end in a circle, adjacent chromosomes going into different reproductive cells. Such chromosomal behavior had been sporadically noted previously, but no one had recognized that it occurred regularly for some chromosomes of some organisms.

Cleland appreciated at once that his discovery might be the clue to understanding the already known erratic pattern of heredity in *Oenothera* and thereby to converting the apparent discrepancy with the chromosome theory into one of its strongest supports. There was also the possibility that his discovery might help to explain the sudden large hereditary variations which occurred in *Oenothera* and which had been the main basis of the theory of evolution by large jumps proposed in 1901 by the Dutch

Reprinted from YEAR BOOK OF THE AMERICAN PHILOSOPHICAL SOCIETY, 1971
120-124

Printed in U. S. A.

botanist Hugo de Vries as an alternative to Darwin's theory of evolution by successive, small, virtually imperceptible steps.

With these theoretically important possibilities in mind, Cleland proceeded directly to the heart of the matter, the circles of chromosomes, with elegant comprehensiveness demonstrating both their causes and their effects on patterns of heredity and on the origin of large hereditary variations. His early recognition of the possible importance of his initial discovery was amply and conclusively validated.

After moving from Goucher College to Indiana University in 1938, Cleland foresaw the possibility of using what he had discovered to reconstruct inferentially the evolutionary history of *Oenothera*. He and his co-workers therefore undertook a comprehensive study of the species of *Oenothera* of North America and, to a lesser extent, those of Central and South America. Extending over a quarter of a century, this study confirmed his hypothesis and resulted in a great and unsurpassed classic of evolutionary history.

The whole *Oenothera* story, including the work of all others as well as that of his own group, was summarized in a book *Oenothera, Cytogenetics and Evolution* sent to press shortly before he died. Beautiful, clear, humanely understanding of those who had erred, and highly instructive both scientifically and historically, it is a masterpiece.

Little wonder that he received many honors: three honorary degrees (from Hanover College, University of Pennsylvania, and Indiana University); the first Lewis Prize (1937) of the American Philosophical Society, the Golden Jubilee Merit Citation of the Botanical Society of America; election to the American Academy of Arts and Sciences, the National Academy of Sciences, and the American Philosophical Society; honorary membership in the Genetics Society of Japan, the Botanical Society of Korea, and the Deutsche Botanische Gesellschaft; honorary high office in international botanical and genetic congresses; and election to high office in the Indiana Academy of Sciences, the Botanical Society of America, the Genetics Society of America, the American Society of Naturalists, the American Association for the Advancement of Science, and the American Institute of Biological Sciences (of which he was the first chairman).

To these and other organizations he gave unstintingly a high level of public service. His association with the American Philo-

sophical Society was long and close: elected to membership in 1932 before he was forty, he attended the meetings regularly. He was a councillor, 1964-1965, and vice-president, 1965-1968, and a member of the Committee on Meetings, 1938-1939. As a member of the Committee on Membership for Class II, 1939-1942, and 1953-1955 and its chairman from 1960 until his death, he rendered wise and conscientious service regarding the election of new members.

With comparable devotion, he served as chairman of the Botany Department and dean of the Graduate School at Indiana University and as a very active member (often chairman) of many committees, commissions, and boards of scientific journals, the National Academy of Sciences, the National Research Council, the National Science Foundation, Selective Service, the Asia Foundation, the Pacific Science Board, the Office of Scientific Personnel, the International Union of Biological Societies, and UNESCO. He remained active in public service until his death.

Cleland's brilliant successes in science and the high level and fantastic amount of his public service were due to the same qualities of mind, personality, and character. "His keen mind cut through to the heart of issues" wrote his colleague Hubert C. Heffner, Distinguished Professor of Dramatic Literature. Nobel Laureate, H. J. Muller, said "Whether we have known you chiefly through your work as an outstanding researcher blazing important new trails, as a teacher opening up fascinating views of the living world in process, as an administrator bringing order out of confusion, or through personal contacts, what has made most impression upon us has been the intensely human qualities that permeated through it all." Cleland's successor, M. M. Rhoades, Distinguished Professor of Botany, asserted "I know of no one whom I admire more for his high standards of personal and public morality." With these statements many students, colleagues, and co-workers have heartily agreed.

This remarkable man left for his children (three sons all rising in university careers in science) a fascinating document intended to help them "understand the peculiarities of their dad, why he reacts as he does, what has conditioned him to a pattern of behavior that may often have seemed to them inexplicable, if not slightly embarrassing." He saw the heart of the matter in his family background and upbringing. He came from old Scotch-Irish stock. Like his mother and father, the men of their ancestry

were chiefly ministers or missionaries of the United Presbyterian Church and the women, wives of ministers or missionaries. His parents' home in Philadelphia "became a mecca for visiting ministers or missionaries." Their summers were spent amidst a colony of ministers in the Pennsylvania Dutch country. The characters of his parents—deeply religious, but joyful and fun-loving—and the atmosphere of their home were the sources of his life-long principles and convictions, although he departed from the strictness of their orthodoxy. From this environment and from other early associates and experiences came his abiding interest in and appreciation of geography and nature, the classics and other humanities, music and art, as well as the church. These interests were furthered and supported by his wife, the former Elizabeth Shoyer, a chemist colleague at Goucher. She gave him the great gifts of sympathetic understanding and of freedom to place top priority on his professional activities. Sharing his ideals, she has long been and remains active in varied social services. Together, they made a home of friendly hospitality.

Clear, simple principles guided Cleland through a complex world. Strong convictions led him to definite judgments in the midst of perplexed contemporaries. He took and vigorously defended definite stands regardless of whether he was among the majority or stood alone. He argued forcefully and fought fearlessly for his loyalties, for ideas, for individuals (often without their knowledge), and for groups and organizations, but never for himself or his own personal gain. The key to his character was selfless service, a keen mind, and personal integrity, seasoned with touches of humor and fun that added so much to the pleasure of his company.

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