John Spangler Nicholas (1895-1963) [1]


John Spangler Nicholas [5], an American biologist, was born on 10 March 1895 in Allegheny, Pennsylvania. He was the only child of Elizabeth Ellen Spangler [6], a teacher, and Samuel Trauger Nicholas [7], a Lutheran minister. Nicholas held myriad administrative positions throughout his life and his contributions to biology spanned several sub-disciplines, but his most notable accomplishments were in the field of embryology [8].

Born and raised in Pennsylvania, Nicholas’s early education took place at several different schools throughout the state as the family moved according to the demands of his father’s profession. After high school, he enrolled in Pennsylvania College (now Gettysburg College) in 1912, intending to pursue medicine despite his parents’ hopes that he would follow in his father’s ministerial footsteps. During college, his interests shifted toward biology, and he received his BS in 1916 and his MS the following year. After finishing his graduate work at Pennsylvania College, Nicholas continued his education at Yale University [8], where he studied under Ross Harrison. His first stint at Yale was short-lived, however, because he enlisted in the Army Medical Corps [10] in 1918. Assigned to the Vaccine Department of the Army Medical School in Washington, DC, Nicholas researched ways to improve the vaccine for typhoid fever until his discharge from the Army in 1919.

Upon leaving the Army, Nicholas immediately returned to Yale to pursue his PhD in zoology. The year 1921 was significant for Nicholas both academically and personally—he received his PhD from Yale and married Helen Benton Brown. Nicholas taught anatomy at the University of Pittsburgh [11] for five years before returning to Yale in 1926, where he remained on the faculty in several capacities until his retirement in 1963. Nicholas’s academic career saw a succession of academic appointments: he was elected Sterling Professor of Zoology in 1939, was Chairman of the Department of Zoology from 1946–1956, and served as Master of Trumbull College from 1945 until he retired. He also served in numerous other administrative capacities, from editor of several biological journals—he was Managing Editor of the Journal of Experimental Zoology [12]—to member and sometimes officer of 15 different professional societies, including the American Philosophical Society [13], the American Association for the Advancement of Science [14], and the National Academy of Sciences [15]. In addition, he served as adviser and consultant to a few government agencies, including the National Research Council [16], and was partially responsible for the establishment of the American Institute of Biological Sciences [17] in 1948. Perhaps his most important governmental contribution was his assistance in shaping the World War II policies governing the utilization of the nation’s scientific human resources.

Despite his constant involvement in various other areas of society, Nicholas maintained a steady work rate in his embryological research. His experimental studies utilized numerous species of fish [18], amphibians [19], and mammals and spanned several academic disciplines including endocrinology [20], reproductive physiology, and neurology [21]. Some of his early work was concerned with the asymmetrical development of amphibian limbs. He built upon the foundation laid by his mentor, Harrison, who had established by means of experimental grafting [22] on salamander [23] larvae that a limb bud’s orientation (left or right) develops as a result of its location within the embryo during certain spans in the developmental process. Nicholas narrowed the scope of this discovery, isolating the slender sliver of tissue encircling the limb bud responsible for the orientational programming.

Nicholas’s neurological research also utilized amphibian embryos and larvae, this time to track the development of the nervous system. His experimental staining of amphibian eggs pinpointed endodermic movements taking place before gastrulation [24], which was earlier than previously thought. In addition, Nicholas established the method of removing the horny covering of teleost fish [18] eggs, allowing much closer investigation and much more interactive experimentation on the eggs.

Nicholas's experimental embryological study of mammalian ova (conducted mostly in rats) was perhaps his most important and lasting accomplishment in the field. He essentially discovered the flexibility and plasticity of mammalian embryological development through his successful transplantation of single, 2-cell blastomeres into foster mothers, where they developed in utero to the egg [25] cylinder stage. These experiments allowed for the expansion of the principles of induction [26] and progressive differentiation [27], previously applied only to lower vertebrates, to the development of higher vertebrates.

John Spangler Nicholas [5] died on 11 September 1963 in New Haven, Connecticut. He was a textbook jack-of-all-trades, participating actively in the spheres of government, science, and academia. He was an editor, adviser, consultant, and member of numerous societies and organizations, but he stayed true to his roots as a biologist. His research was largely experimental, and his list of scientific works includes over 135 publications. Though he served in myriad capacities and his presence was felt across several disciplines, he is remembered most for the embryological work that was his pride and passion.