

Ernest Aubrey Ball, Biological Sciences: Irvine

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1909-1997

Professor of Biology, Emeritus

More than half a century ago, long before the culture *in vitro* of plant tissues became routine, and at a time when what is now known as biotechnology was not even a concept, Ernest A. Ball excised *Nasturtium* and *Tropaeolum* shoot tips and grew them in a test tube. He excised the shoot tips with scalpels made of razor blade corners spot welded onto sewing needles which could be inserted into wooden holders. Ball was interested in the growth of plant meristems which are located in shoot tips. The growth of a meristem *in situ* cannot be observed. Therefore, to see how the meristems grew he excised them, grew the explants *in vitro* and placed his culture vessels on glass or plastic platforms with culture vessels holders which could be rotated. Several holders were driven by one electric motor through several pulleys and levers. Rotation speed was regulated by rheostats. The system was amazing in its complexity and awe-inspiring in its ingenuity. Ball surrounded his culture vessels with a battery of Bolex movie cameras which photographed the tissues. Electronic controls were unknown at the time; Ball designed an ingenious system of levels which operated his system. He even rigged the wind-up Bolex cameras to be driven electrically. To see how the meristems grew, he studied the films.

Ball published his meristem culture findings in 1946 and instantly became one of the most prominent botanists of his era. Ernie continued to carry out research and added to his initial findings, but he was a basic scientist and paid limited if any attention to the practical implications of his work. Others used his findings to develop practical methods, but failed to cite him. As a result, few knew or became aware of the fact that he was the "father" (or "uncle") of plant propagation through tissue culture (micropropagation).

Ernest Aubrey Ball was born on 22 December 1909 in (probably Chikasha) Oklahoma where he also went to high school. After short periods at Los Angeles City College (1931-1933) and the University of California, Los Angeles (1933-1934), Ball attended the University of Oklahoma (1935-1937) and received a B.S. in botany. He stayed there for an additional year (1937-1938) earning an M.S. in the same field. After that, Ball undertook graduate studies at the University of California, Berkeley (1938-1941) where he earned his doctorate.

From Berkeley, Ball went to Yale University (1941-1942), Carnegie Institution in Washington (1942-1943), Harvard University (1943-1946) and North Carolina State University (1946-1928) where he rose from Assistant Professor to full Professor. Along the way he married his wife, Carol.

In 1968, Ball came to UCI and stayed until 1977 when he moved to Santa Cruz to

continue his work on the tissue culture of redwoods. Ernest Ball died in September of 1997 (the official separation date on the University form is 08 September 1997).

While at UCI, Ball continued to work on plant tissue culture and managed to grow many plants from meristems or other tissue explants. By culturing different parts of *Dimorphotheca* inflorescences he managed to obtain tissues which produced only anthocyanins or only chlorophyll. The former would have been very useful for studies of anthocyanin synthesis. He and one of us (Arditti) isolated and identified the anthocyanins, but other projects drew our attention and we dropped this line of research. The green callus could have been used for micropropagation, but we were not interested in that. After that, we worked on taro and orchid micropropagation and developed methods for the orchids *Cattleya*, *Dendrobium*, and *Phalaenopsis* as well as taro cultivars. His contributions to these projects were major. He was also an example of a tireless, careful, and dedicated, even if sometimes stern, worker for a great many undergraduate research students. Our last joint project was on tissue culture of redwood. We developed different interests at that point and Ernie alone continued with the redwood work. He succeeded and received attention and some prominence for it. Indeed, Ernie's efforts live on in the redwood grove on the east side of Bridge Road. This grove of redwoods represents plants "born" and cultivated in tissue culture by Ernie which are now well on their way to becoming towering. With every passing year, we will remain indebted to Ernie for this beautiful legacy. If the University lasts as long as Ernie's legacy (perhaps 4,000 years or so) we will all be lucky indeed.

Joseph Arditti J. Lawrence Marsh