
In Memoriam

In Remembrance: Denis Alan Trevor New, M.A., Ph.D., D.Sc.

INTRODUCTION

Denis New, better known as D.A.T. New to Americans, was not an active member of the Teratology Society. However, his many contributions to the fields of embryology and teratology were important to a significant proportion of Teratology Society members. The first sentence in his obituary in the Fitzwilliam College Alumni periodical reads as follows: "Denis New was born on April 14, 1929 in Eltham, Southeast London, and was educated at Eltham School."

I would have begun his obituary with the statement: "Denis New, who was an outstanding member of the faculty of Cambridge University, died unexpectedly on November 21, 2009. He was a tireless, productive, and innovative scientist who made major contributions to the fields of embryology, teratology, and developmental toxicology. He was a gentle, respectful human being whom all his colleagues admired and all his trainees and students wanted to emulate. He was also an outstanding scientist."

Following his graduation from Eltham, Denis spent a year at Imperial College, London, before doing National Service in the Royal Army Educational Corps, and he then "took up an Open Scholarship to St. John's College, Oxford, where he gained a First in Zoology." He obtained his Ph.D. at University College, London, and remained there as a Research Assistant under Professor Abercrombie. It was at this institution that he expanded his interest in development. In the early 1950s he was interested in utilizing the chick embryo for some of his research interests, but the research necessitated having the embryo developing outside the egg. In 1955 he published the paper "A New Technique for the Cultivation of the Chick Embryo *in vivo*" (New, 1955). Other investigators had attempted to grow the chick embryos on clots and other synthetic nutrients, but Denis decided that when he removed the embryo he would also remove the intact vitelline membrane that allowed the embryo to be successfully nourished. He never refuted or acknowledged that the "New" in the title was a double entendre. There was a side benefit from this research, because as a student, he was able to utilize some of the unused eggs for his own sustenance. Before his interest and publications concerning the chick embryo he published an article in 1953 his first publication, which was the study of the larval stages of the

nematode *Rhabditis pellio*. In 1957 he was appointed Lecturer in Zoology at the University College of the West Indies, Jamaica. It was at this institution that he expanded his interest in development.

Denis came to Cambridge in 1961 as a member of the Strangeways Research Laboratory. In 1964 he was elected to a Fellowship at Fitzwilliam, and in 1967 he was appointed University Lecturer in Physiology. The laboratory had a famous director, Colon Russell Austin, who was the co-discoverer of capacitation in 1951 along with M. C. Chang. Everyone in the Physiologic Laboratories referred to him as "Bunny" Austin, the name of a very famous Australian tennis player. The only thing the two men had in common is that they were both Australian. (I thought that maybe he did his research with rabbits, but this is not so, and he was not an accomplished tennis pro.)

Denis was appointed the editor of the *Journal of Embryology and Experimental Morphology* from 1969–74 and was a Visiting Fellow at various American universities and a guest lecturer at several universities in the United States, continental Europe, and Japan. He supervised several generations of Fitzwilliam zoology students.

Denis's second area of interest was music: a keen pianist himself, holding a diploma from the Royal Academy of Music in London, he not only performed at College concerts but constantly encouraged the development of musical talent among undergraduates and graduates alike.

My first contact with the New family was on the evening I arrived in Cambridge. I had arrived in the winter of 1971 on a cloudy afternoon. The first thing that most Americans on sabbatical do is rent a car. Cambridge is a small town, and the streets are crowded. My first purchase was a bicycle. That evening I was invited for dinner at the News' home, and it was the first time I used the bike for an extended ride. It was uncomfortable at first because I had purchased a woman's bicycle because it was the least expensive bicycle available. It was a warm and friendly evening until Denis reminded me that in our correspondence he had asked me if I played an instrument and I had responded, "Yes, the violin."

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Dr. New

That evening after dinner he handed me a violin, an instrument that I had not played for 20 years. It was not such a bad musical evening. I only say that because it could have been worse. I also found out that evening that I had "lucked out." Denis was a wonderful human being, kind and patient. His family, consisting of June, his wife, and daughters, Helen and Laura, were lovely as well. Because it was Friday evening, I was not scheduled to appear in the laboratory until Monday morning. On the weekend I was initiated into Cambridge life by being dunked in one of the streams on campus while punting.

On Monday I arrived at the laboratory at 7:30 AM, but no one was there. I found out that most of the scientists arrived before the morning tea break, but then they might work until 6:00 PM. On our first day together Denis and I planned our experiments. I had brought lyophilized sheep ant-rat yolk sac serum, a very potent teratogenic agent that we were going to use in our experiments. Two days later Denis set up his Rube Goldberg apparatus for culturing a single embryo. It was a trapezoid series of glass tubing filled with rat serum, a pump to circulate and oxygenate the serum, and a small bubble in the tubing to house the embryo on a tiny platform. You could learn a great deal from observing the development of one embryo, but I would have to remain at Cambridge for two years to accomplish the experiments that we had planned.

I said to Denis, "Did you ever think of using roller culture tubes?" He said that he did, but he felt that he could not oxygenate the embryos sufficiently. I explained that we used roller tubes for culturing tissues of a much larger mass than a few embryos and had no trouble oxygenating the tissue by gassing the tubes once or twice every 24 hours. Denis then proceeded to take a box from

the shelf. It contained one gross of culture tubes that he had ordered more than six months before, but had not used, because he thought it would not succeed. Within two weeks we had the embryo culture system with roller tubes working perfectly. By the time I left Cambridge after the 1971 Wimbledon tennis matches we had submitted our results to the *Journal of Embryology and Experimental Morphology* (New and Brent 1972). In 1978 Denis published his important manuscript on whole-embryo culture (New 1978). We had argued as to whose name should be placed first on our joint publication. He wanted my name first, I wanted his name first. I won because I already had more publications, and, besides, I had seniority: I was two years older.

Denis was very active in university affairs as well as having Fitzwilliam College responsibilities. This allowed the rest of the Physiologic Laboratory faculty to spend more of their time on their own research, so when Denis would attend morning or afternoon tea he was admired and appreciated and given the utmost respect. When other faculty members had questions that were brought to him, he would schedule a meeting to discuss the question. Bob Edwards was involved in the *in vitro* fertilization and implantation project that eventually resulted in the conception of the first *in vitro* baby (Step toe and Edwards). Edwards, the embryologist, was concerned that all the manipulation and environmental changes that are part of the procedure would increase the risk for congenital malformations. I explained that at that stage of pregnancy the embryo was the least vulnerable and very resilient. Edwards had never heard of the "all or none phenomenon."

I made many wonderful observations of Denis's character. I will just mention one characteristic: Whenever the laboratory met as a group, Denis treated the faculty, technicians, research assistants, and animal caretakers as equals. He paid tribute to all of their efforts, emphasizing that everyone was important for the success of the laboratory.

Denis New was an outstanding scientist and a compassionate, sensitive human being who endeared himself to all his colleagues, peers, and friends. His scientific contributions were immense. He was well known for the development of the embryo culture technique, but he made many other scientific contributions. He was a superb musician and made music an important part of his and his family's lives. In his retirement years he enjoyed his avocations, his relationship with his lovely wife and their children and grandchildren, who of course will miss him the most.

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