

Avery colleague tells DNA story McCarty gives an inside view

The late René J. Dubos, renowned biologist and a colleague of Oswald Avery at The Rockefeller Institute (now The Rockefeller University), describes Avery's role in the pivotal work that uncovered the genetic role of DNA in *The Professor, The Institute, and DNA*. Excerpts from the book, published in 1976 by The Rockefeller University Press, follow.

Avery was a late starter in science.... In 1916, when he was 39 years old, there was nothing in his professional achievements to indicate that, from the age of 40 to the age of 65, he would continuously make major contributions to the biomedical sciences.... He rapidly developed into a creative scientist.... because the Institute Hospital provided an intellectual and human atmosphere that suited his temperament. (p. 69-70)

Avery was a persistent man. Once he became involved in a scientific problem he pursued it doggedly, waiting, if need be, for many years until he saw the way to a solution. He even pretended at times that he enjoyed the failures that are inevitable in scientific life. "Disappointment is my daily bread," he was wont to say. "I thrive on it." (p. 91)

Avery was haunted by the memory of the turmoil that had attended the announcement by him and Heidelberger, exactly 20 years earlier, that polysaccharides, and not proteins, were responsible for the immunological specificity of pneumococcal types. And he anticipated that even greater skepticism would now greet the claim of genetic specificity for deoxyribonucleic acid. For this reason, the manuscript of the paper reporting the claim was sent for publication only after it had been submitted for many months to the critical review and adverse criticism of associates and friends. Furthermore, the conclusions were

presented with several cautionary statements. (p. 144)

...The price of such thoroughness is some loss in the spectacular value of "discovery," and this was precisely the price Avery had to pay. His intellectual puritanism won him the admiration of those who were in direct contact with him, but it prevented him from gaining full recognition of his achievements by the outside world. (p. 153)

Professor Emeritus Maclyn McCarty, a co-author with Oswald Avery and Colin MacLeod of the landmark 1944 paper on DNA, published his memoirs, *The Transforming Principle: Discovering that Genes are Made of DNA* (W.W. Norton & Company) in 1985. Excerpts follow.

It is often pointed out that research in the basic sciences provides the base of new knowledge essential for the development of the applied sciences, including medicine. We are less frequently reminded that the reverse can also occur. Research directed against a specific medical problem has resulted in contributions to fundamental biological knowledge. The most dramatic example of this is the discovery that deoxyribonucleic acid (DNA) is the substance that transmits genetic information. (p. 51)

The first indication that the pneumococcus contained DNA came as something of a surprise. Knowledge of the occurrence and distribution of the nucleic acids in nature had not yet reached the point where one could assume that all living cells contained both RNA and DNA. (p. 109)

The process leading to our serious consideration of DNA as the bearer of transforming activity was surely gradual. Nothing in my memory or in the laboratory notes suggests that there was a moment of sudden revelation, a single experiment that resulted in a flash of insight and reorientation of our thinking. On the contrary, the results of several different experiments and the injection of some new information from outside the laboratory were all involved in the crystallization of the concept. (p. 134)

An amusing episode occurred during this period when Fess [Avery] discussed with me his concerns about the order in which our names should

appear on the paper, a matter that causes more trouble among scientists than the layman might imagine. He said that he wasn't sure whether the names should appear in the order of the length of association with the problem, on the basis of age and seniority, or simply alphabetically. It was not until after he had left me on that occasion that it suddenly hit me that all of the alternatives came to the same result. No matter how you sliced it, it was "Avery, MacLeod, and McCarty." It was fine with me. (p. 167)
