

This Week's Citation Classic

Amen R D. A model of seed dormancy. *Bot. Rev.* 34:1-31, 1968.
[Dept. Biol., Wake Forest Univ., Winston-Salem, NC]

This paper reviewed experimental work on seed dormancy, analyzed these data for their commonalities, and then integrated them into a comprehensive model of dormancy as a form of arrested development. The formulated model postulated a hormonal inhibitor-promotor mechanism of control for suspended growth and developmental arrest in plant embryos. [The SC[®] indicates that this paper has been cited over 125 times since 1968.]

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"The very first paper that I published was a review of my field —seed physiology.¹ I was surprised and delighted by the hundreds of reprint requests I received for that paper. Subsequently, I published a handful of research reports, none of which was overly popular as judged from the number of reprint requests and citations. I then envisioned another and more daring review (the review herein commented on), one in which I would speculate on mechanisms and attempt a synthesis of data and ideas in the form of a theory.

"In this paper I codified the terminology and concepts of seed dormancy and then formulated a mechanistic theory of dormancy, hopefully one which would be universally applicable. Well, the paper was graciously published by The New York Botanic Garden, and it proved immensely successful. Again, I was overwhelmed and gratified by its popularity. Within a year of publication I had received over a thousand reprint requests — having over-modestly ordered but several hundred reprints. Aside from the numerous citations of this paper in research reports, I am particularly pleased by its being extensively cited in textbooks and advanced treatises. I am especially

complimented by such broadly based appraisals as Sussex's: 'A different approach to the study of dormancy is to consider it as a specific developmental pathway that can be subdivided into a sequence of stages. This has been done for seed dormancy by Amen (1968) who recognized four stages: induction, maintenance, triggering, and germination. Consideration of schemes such as these suggest that each stage will be subject to its own regulatory controls, and that these will be ultimately gene controlled. Thus, dormancy can now be seen not simply as a phase of arrested growth, but as a genetically determined sequence of developmental events.'² This citation came ten years later.

"The general recognition of my theoretic review led directly to an invitation by A.A. Khan of Cornell to prepare a chapter for an advanced treatise that he edited.³ One successful review seemed to lead to still another — generating far more recognition for me than any and all of my research reports.

"As to reasons for the extensive citing of this paper, I believe that busy teachers and researchers prefer to read generalized accounts over specialized accounts of a topic, particularly if the account contains something novel. Also, I believe that new conceptual schemes help teachers and researchers to better, organize their knowledge and/or interpret their data. In this regard, I believe that theoretic papers are not only more justified, but are becoming more popular in biology than they have been in the last few decades.

"One unusual aspect to publishing this paper is the fact that it is the only paper of mine that was initially *too* short. Upon submitting the manuscript the editor asked me to double its length —commonly one is asked to considerably shorten the length of a manuscript.

"This theoretical paper was my *pièce de résistance* as none of my previous or subsequent papers has equaled it in citation popularity. Maybe this is because since my school days I had always envisioned publishing a paper in the prestigious *Botanical Review* and therefore took particular pains in preparing the paper. I am most pleased to offer this commentary on it."

1. Amen R D. The concept of seed dormancy. *Amer. Sci.* 51:408-24, 1963.
2. Sussex I M. Dormancy and development. (Clutter M E, ed.) *Dormancy and developmental arrest*. New York: Academic Press, 1978. p. 297-301.
3. Amen R D & Jann R C. What is germination? (Khan A A, ed.) *The physiology and biochemistry of seed dormancy and germination*. Amsterdam: North-Holland, 1977. p. 7-28.