

would have been only a few earth radii from the earth about a billion years ago. There is no geological evidence for such a dramatic situation. A complete reconstruction of the history of the earth-moon system is possible only with knowledge of paleotides. Lacking that, calculations must be made on the basis of plausible paleobathymetry models that are based on plate-tectonic reconstructions. The preliminary calculations suggest that tidal friction may have been much less in the past, thus pointing the way toward resolution of the lunar catastrophe issue.

Several chapters discuss the promise and pitfalls of biological clocks. With suitable care, various fossil organisms can be used to determine the number of days in the month and in the year. There is even the possibility that tidal amplitudes can be estimated from growth-rhythm data.

The final chapter, a nice review of Precambrian geology and hydrology by J. D. A. Piper, suggests the nature of the geological constraints on tidal dissipation.

This book is worthy of sitting beside Munk and MacDonald's classic monograph *The Rotation of the Earth*.

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A Hormone with Many Effects

Comparative Endocrinology of Prolactin. D. M. ENSOR. Chapman and Hall, London, and Halsted (Wiley), New York, 1978. x, 310 pp., illus. \$45.

Ten years ago an understanding of the evolution of the diverse effects of prolactin seemed almost within our grasp. Attempts were made to identify a common factor in the hormone's effects in the different vertebrate classes. These attempts have met with only limited success; prolactin has a range of biological activity that exceeds that of any other known hormone.

Now that the results of much more work are available, it is time to review them and to think again. Ensor's book is invaluable for its compilation and condensation of an impressive amount of material. The references alone occupy 66 pages. The book starts with an all-too-brief evolutionary overview, and then the parade of prolactin's effects is marched past. We see the hormone in action in fishes, amphibians, reptiles, birds, and mammals; a whole chapter is devoted to

prolactin in primates. A short section on receptors and cellular mechanisms brings up the rear. The variety is fascinating, and the range of information most impressive. However, there is much more work to be done, since important questions remain unanswered. The evolutionary origin of prolactin's diverse effects is still unclear, and we do not know whether it will be possible to find a common denominator for all the hormone's actions.

Comparative endocrine studies are often viewed through the wrong end of the evolutionary telescope. Although endocrinologists have searched among the lower vertebrates for effects of hormones that have already been described in mammals—we find, for example, that prolactin stimulates "milk" production from the pigeon crop sac and the production of a mucus to feed the young in some fishes—the procedure has often been reversed in studies with prolactin. The osmoregulatory function of prolactin in fish was known before traces of such activity were looked for and found in mammals. The hormone's role in osmoregulation evolved early, and Ensor's own researches have contributed to our understanding of this function. Perhaps it is here that we should look to find the original *raison d'être* of prolactin, and an activity that must have been continually modified during vertebrate evolution. But there are other possibilities: circadian patterns have been described for quite diverse actions of the hormone from fish to mammals. Does it play some basic role in such rhythmic activities?

Ensor's book may not have all the answers, but it will be a great help to those who continue to search.

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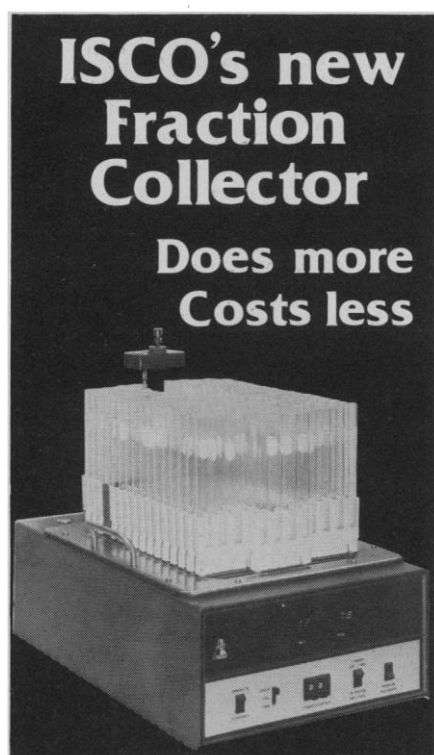
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