blastocyst similar to that which becomes dormant is a universal feature of the marsupials.

All major groups of vertebrate animals more advanced than the jawless fish have at least some viviparous members, excepting only the birds. There have thus been many evolutions of viviparity so a separate evolution in marsupials is not unlikely on general grounds. The many unique features of marsupial reproductive physiology suggest that viviparity evolved separately in eutherian and marsupial stocks after their derivation from a common oviparous ancestor.

References and Notes

1. F. Wood Jones, *The Mammals of South Australia* (Government Printer, Adelaide, 1923), part 1, p. 80; J. P. Hill, *Phil. Trans. Roy. Soc. London. Ser. B Biol. Sci.* **221**, 45 (1932); R. I. Kean, *N.Z. Forest Serv. Tech. Pap. No. 35* (1961).
2. J. D. Biggers, H. I. Fritz, W. C. D. Hare, R. A. McFeely, *Science* **148**, 1602 (1965).
3. G. B. Sharman, *Aust. J. Zool.* **9**, 38 (1961); P. G. Martin and D. L. Hayman, *Chromosoma* **20**, 290 (1967).
4. J. A. W. Kirsch, *Aust. J. Sci.* **31**, 43 (1968); M. M. Gunson, G. B. Sharman, J. A. Thomson, *ibid.*, p. 40.
5. O. A. Reig, *Invest. Zool. Chil.* **2**, 121 (1955).
6. A. J. McIntosh and G. B. Sharman, *J. Morphol.* **93**, 509 (1953).
7. G. B. Sharman, E. S. Robinson, S. M. Walton, P. J. Berger, *J. Reprod. Fert.*, in press.
8. P. A. Jacobs, in *Advances in Reproductive Physiology*, A. McLaren, Ed. (Logos Press, London, 1966), vol. 1, p. 61.
9. L. B. Russell, *Science* **133**, 1795 (1961).
10. G. A. Hauser, in *Intersexuality*, C. Overzier, Ed. (Academic Press, London, 1963).
11. G. B. Sharman and H. N. Barber, *Heredity* **6**, 345 (1952).
12. P. G. Martin and D. L. Hayman, *Chromosoma* **19**, 159 (1966).
13. D. L. Hayman and P. G. Martin, *Cytogenetics* **4**, 209 (1965).
14. M. F. Lyon, *Advances in Teratology*, D. H. M. Woollam, Ed. (Logos Press, London, 1966), vol. 1, p. 25.
15. D. L. Hayman and P. G. Martin, *Genetics* **52**, 1201 (1965).
16. S. Ohno, J. Jainchill, C. Stenius, *Cytogenetics* **2**, 232 (1963); N. O. Bianchi and J. R. Contreras, *ibid.* **6**, 306 (1967).
17. G. D. Buchanan and E. A. Fraser, *J. Anat.* **53**, 35 (1918).
18. C. G. Hartman, *Smithson. Inst. Annu. Rep.* **1921**, 347 (1922).
19. G. B. Sharman, in *Viewpoints in Biology*, J. D. Carthy and C. L. Duddington, Eds. (Butterworths, London, 1965), vol. 4.
20. C. H. Tyndale-Biscoe, in *Comparative Biology of Reproduction in Mammals*, I. W. Rowlands, Ed. (Academic Press, London, 1966).
21. G. B. Sharman and J. H. Calaby, *CSIRO (Commonw. Sci. Ind. Res. Organ) Wildlife Res.* **9**, 58 (1964).
22. ———, W. E. Poole, in *Comparative Biology of Reproduction in Mammals*, I. W. Rowlands, Ed. (Academic Press, London, 1966).
23. H. C. Reynolds, *Univ. Calif. Publ. Zool.* **52**, 223 (1952).
24. A. G. Lyne and A. M. W. Verhagen, *Growth* **21**, 167 (1957); M. J. Mackerras and R. H. Smith, *Aust. J. Zool.* **8**, 371 (1960); B. J. Marlow, *ibid.* **9**, 203, 1961; G. B. Sharman and P. E. Pilton, *Proc. Zool. Soc. London* **142**, 29 (1964).
25. G. B. Sharman, *J. Endocrinol.* **25**, 375 (1962).
26. M. Lemon and S. Barker, *Aust. J. Exp. Biol. Med. Sci.* **45**, 213 (1967).
27. Analyses kindly supplied by Dr. M. E. Gregory.
28. L. F. Bailey and M. Lemon, *J. Reprod. Fert.* **11**, 473 (1966); M. Lemon and L. F. Bailey, *Aust. J. Exp. Biol. Med. Sci.* **44**, 705 (1966).
29. M. Lemon and W. E. Poole, *Aust. J. Exp. Biol. Med. Sci.* **47**, 283 (1969).
30. J. P. Hill and C. H. O'Donoghue, *Quart. J. Microscop. Sci.* **59**, 133 (1913).
31. G. B. Sharman, *Aust. J. Zool.* **3**, 44 (1955); P. E. Pilton and G. B. Sharman, *J. Endocrinol.* **25**, 119 (1962); C. H. Tyndale-Biscoe, *Aust. J. Zool.* **3**, 162 (1955).
32. C. G. Hartman, *Amer. J. Anat.* **32**, 353 (1923).
33. G. B. Sharman, *Monogr. Biol.* **8**, 332 (1959).
34. C. H. Tyndale-Biscoe, *J. Reprod. Fert.* **6**, 25 (1963).
35. J. C. Merchant and G. B. Sharman, *Aust. J. Zool.* **14**, 593 (1966).
36. C. H. Tyndale-Biscoe, *J. Reprod. Fert.* **6**, 41 (1963).
37. M. Lemon, unpublished results.
38. E. C. Amoroso, *Brit. Med. Bull.* **11**, 117 (1955).
39. G. B. Sharman and P. J. Berger, in *Advances in Reproductvie Physiology*, A. McLaren, Ed. (Logos Press, London, 1969), vol. 4, p. 212.
40. W. E. Poole, personal communication.
41. A. C. Enders, Ed., *Delayed Implantation* (Univ. of Chicago Press, Chicago, 1963).
42. P. J. Berger and G. B. Sharman, *J. Reprod. Fert.* **20**, 201 (1969).
43. T. H. Kirkpatrick, *Queensland J. Agr. Anim. Sci.* **22**, 319 (1965).
44. M. J. Clark and W. E. Poole, *Aust. J. Zool.* **15**, 441 (1967).
45. A. E. Newsome, *ibid.* **12**, 9 (1964).
46. G. B. Sharman and M. J. Clark, *J. Reprod. Fert.* **14**, 129 (1967).
47. P. J. Berger, *Nature* **211**, 435 (1966).
48. ——— and G. B. Sharman, *J. Mammalogy* **50**, 630 (1969).
49. C. H. Tyndale-Biscoe, in *Delayed Implantation*, A. C. Enders, Ed. (Univ. of Chicago Press, Chicago, 1963).
50. G. B. Sharman, *Z. Säugetierk.* **30**, 10 (1965).
51. ———, *Proceedings of the Second International Congress of Endocrinology, London, 1964. Excerpta Medica International Congress Series No. 83*, Selwyn Taylor, Ed. (Excerpta Medica Foundation, Amsterdam, 1965), part 1, p. 669.
52. M. J. Smith and G. B. Sharman, *Aust. J. Biol. Sci.* **22**, 171 (1969).
53. M. J. Smith, thesis, University of Adelaide (1968).
54. D. R. S. Kirby, *J. Reprod. Fert.* **14**, 515 (1967).
55. W. A. Clemens, *Evolution* **22**, 1 (1968).
56. B. H. Slaughter, *Science* **162**, 254 (1968).
57. J. A. Lillegraven, *Univ. Kans. Paleontol. Contrib. Article*, 50 (Vertebrata 12) (1969).
58. R. L. Lewis and B. John, *Int. Rev. Cytol.* **23**, 272 (1968).
59. G. B. Sharman, *Nature* **177**, 941 (1956); R. Matthey, *Chromosoma* **16**, 351 (1965).
60. E. C. Amoroso, *Proc. Roy. Soc. Med.* **61**, 1188 (1968).
61. K. E. Kermack, *Sci. J.* **1**, 66 (1965).
62. C. J. Hill, *Trans. Zool. Soc. London* **25**, 1 (1941).
63. E. J. W. Barrington, *Hormones and Evolution* (English Universities Press, London, 1964), p. 60.

64. Some of the results reported here were obtained through support from the Australian Research Grants Committee for research on the biology of arid-zone marsupials.

NEWS AND COMMENT

Psychology: Apprehension over a New Communications System

Dissension has arisen in the American Psychological Association (APA) over a multimillion dollar plan to establish a "national information system for psychology." The plan would supplement the existing psychology journals with a computerized system for distributing unedited manuscripts on a rapid-fire basis. Proponents of the new system see it as an imaginative effort to cope with problems arising from the rapid growth of the scientific literature. But critics charge that a "cabal" at APA headquarters, operating in relative secrecy, is rushing pell-mell into a radical change without taking adequate care to ensure that the quality of scientific communication remains high.

The internal squabbles of an organization are generally of interest only to its members, but the fracas at APA seems worth examining on two counts. For one thing, the problems besetting the psychology literature are similar to the problems faced in virtually all scientific disciplines, so the APA's experience may have widespread relevance. For another thing, the dispute at APA stems partly from a deep feeling of distrust between some psychologists in the field and the central office staff. This is a malady that strikes many organizations that become large enough to establish bureaucracies with an inertia and mind of their own. "The engineers and technicians have moved in and are pushing aside the psychologists," complains Jane Loevinger, a gadfly who is a research associate at Washington University and a member of the APA's policy and planning board. "They want to do their thing rather than our thing. It's upside down."

The proposed information system has been designed under a $960,000 "program definition" grant from the National Science Foundation (NSF). The system would be comprehensive and would seek to improve the entire range of scientific communications. It would include, among other things, a system for computerized bibliographic control and information retrieval; a system for exchanging informal communications, such as memos, letters and research

notes; and a system for distributing tape cassettes and films. But the most controversial aspect of the plan is probably an "early dissemination" scheme which would bypass the usual cumbersome editing and refereeing system used by the journals. Instead of waiting for an article to be accepted and published in a journal, subscribers to this "early warning" system would get lists of unedited manuscripts and copies of the unedited manuscripts in areas of interest to them. Some psychologists apparently want such unedited manuscripts, but others fear the system will become, as one said, "a vast sewer carrying garbage from one scientist to another."

Many fears concerning the new system stem from lack of information about just what the APA really proposes to do. The APA has prepared lengthy documents requesting NSF support, but these are not generally available, even to the heads of important APA committees and the editors of journals. Moreover, the documents are vague or ambiguous on certain controversial issues, such as what will happen to the existing journals. Thus far the APA, which has been working on the plans for more than 2 years, has not published a single explanation of the project in its house organ, the *American Psychologist*. An article is currently being prepared, but it is not expected to appear before April at the earliest.

"I don't think they should throw around millions of dollars without letting the members know what's going on," says Loevinger, who claims the central office of APA has played down objections to the plan and has frustrated her efforts to alert the membership to the dangers she sees. "These things have been suppressed," she complains. "There's no way to get to the membership without going through the central office and that's where the cabal is."

Objections to the handling of the project have also been expressed by the chairmen of all five of the APA's standing boards. James J. Jenkins, professor of psychology at the University of Minnesota and chairman of the board of scientific affairs, has warned that the project "is out of the control of monitors and thus in danger of committing serious errors with respect to endangering our communication system and becoming a research fiasco at the same time." And all five chairmen have requested that a vote on proposed bylaw changes involving the project be postponed until the membership has been thoroughly informed.

Meanwhile, two key APA staffers—Philip J. Siegmann, director of *Psychological Abstracts*, and Belver C. Griffith, director of an information exchange project—were forced to resign last year after repeated friction over the new communications project.

The attacks on the proposed new system are considered unjustified by Kenneth B. Little, executive officer of the APA, and Harold P. Van Cott, director of the APA's Office of Communication Management and Development (OCMD), which is administering the project. In a joint interview with *Science* they expressed the belief that "anything new tends to upset people," particularly people who are not well-informed on all the details of the proposed project. They stressed that the project had been approved by the appropriate APA boards and committees, including the board of directors.

Distinguished Backing

The project has been under the policy guidance of an "Ad Hoc Committee on Communications," which was established by the APA's board of directors and which has included some of the most prominent names in the APA. The committee's original chairman was George A. Miller, professor of psychology at Rockefeller University and immediate past president of the APA. Miller recently resigned and was succeeded by Arthur Brayfield, former executive officer of the APA, who is now chairman of psychology at the Claremont graduate school in California. Also on the committee is Kenneth E. Clark, dean of the college of arts and science at the University of Rochester, who is past president of an APA foundation.

The committee meets only quarterly, so day-to-day handling of the project has fallen to the newly-created OCMD, headed by Van Cott. The OCMD now has 59 staffers—about half the APA's total staff. The project, according to critic Jenkins, "has the implicit power to consume the organization itself . . . it may soon begin to direct the APA instead of vice-versa."

The idea for the new system seems to have grown out of an earlier APA project, conducted during most of the 1960's, which involved determining the means by which scientific information is spread. The weaknesses discovered by that survey led some of the key participants, including Brayfield, to propose development of a new information system. A planning grant was obtained in 1968 from NSF, which has thus far sunk about $960,000 into the project. Now the APA is requesting another $2.4 million to start putting the system into operation. The APA plans to request $5.5 million in all from NSF over a 5-year period, and additional NSF funds might be needed thereafter, but the system would eventually become self-sustaining.

The new information system seeks to overcome some very real problems in scientific communication. One is the glut of information. The number of "core journals" in psychology doubled during the 1960's, from 112 to 226, while the number of psychological abstracts more than doubled, from 8532 in 1960 to 19,586 in 1968. Another problem, related to the first, is the time lag between submission of a manuscript and its publication in a journal. The delay now ranges from several months to a year or more. A third problem is economic. Editorial and publication costs have been rising while readership for any given journal article is generally low. The result is that it is very expensive to reach a particular reader with a particular journal article he is interested in. A fourth problem—one which is particularly severe for the discipline of psychology—is that the journals are aimed primarily at researchers, while the bulk of the APA members are engaged in nonresearch activities, such as clinical practice or teaching or administration.

As Little sees it, information needs have changed drastically in recent years, but the journal as a medium of communication has remained essentially unchanged for some 200 or 300 years. "The system creaks and groans and it doesn't get the job done," he says.

The proposed national information system would have two modes of publication—an "early alert" mode in which unedited manuscripts would be made available to subscribers within 60 days after submission to the APA; and an "archival mode" in which higher quality manuscripts would be published after undergoing editorial processing. Under the "early alert" mode, users could provide the APA with a description of their interests and the APA would then send them virtually all manuscripts in their area of interest shortly after the manuscripts are received. The user could also order the unedited manuscripts he wants from an "early alert catalogue" containing abstracts prepared by authors. In either case, the APA would act essentially as a distributor and would send out virtually all

manuscripts received without having them refereed or otherwise judging their quality. One goal is to cut the time lag between completion of an article and its publication. Another is to lessen the searching and screening time required for users to locate relevant articles.

The archival mode would preserve high-quality manuscripts in printed form through "annals" which would cover specific subject matter areas, such as sensation and perception, or the psychology of learning. The decision on which articles to include in the annals would be based partly on the response of users who received the manuscript during the early alert stage, and partly on the judgment of editors and referees. ("A popularity contest," some critics snort).

What would happen to the existing journals remains unclear. Van Cott says that when he prepared the NSF proposal he thought the annals would ultimately replace the existing journals. But the latest thinking is that the journals will be retained, perhaps reoriented, and improved. The annals, then, would become a sort of superjournal, containing the very finest material published in journals or elsewhere, and undergoing more stringent refereeing than the current journals.

Some critics of the APA project have attacked aspects of the proposed system itself. Loevinger, for example, suggests that the system, by dispensing virtually every manuscript received, will increase the glut of literature rather than solve that problem. She also says the system, by bypassing referees, will allow the distribution of misinformation, such as papers that contain either sheer numerical errors or more subtle errors of logic or experimental design.

But most critics have concentrated their fire on the way the project is being run rather than on its substance, largely because details of the system are not widely known. In a letter written at the direction of the board of scientific affairs, Jenkins expressed fears that the psychologists who are supposed to be running the project have lost control of it and that "decisions are being made by the technical personnel who are in effect taking over the project." He wrote: "We do not see the guidance of wise, scientifically experienced investigators who are presumably those who know something about the kinds of gains and losses that are involved from the point of view of the scientist in the operation of a scientific communication system."

Executive officer Little attributes most of the objections to misunderstandings caused by "a breakdown in communications." He says critics see the new system as "an attack on something sanctified—the journals," even though, in his opinion, it is not. He also believes some of the critics are miffed because "they were not consulted."

Little acknowledges that the new system will increase the total glut of literature, but he says that from the individual's point of view, the glut will be decreased, since an individual will deal, for the most part, only with articles in his area of interest. Neither Little nor Van Cott expect the quality of scientific communication to decline drastically. The APA is already operating an experimental "early alert" system involving 1000 subscribers. "We anticipated a huge flood of junk," Van Cott says. "We expected that anyone with an old term paper in his drawer would send it to us. But we've had a problem getting enough manuscripts. And the quality has not been low." Still, Van Cott acknowledges it's "too early to tell" how the system will work. "If we get a flood of junk, we'll raise the gate," he said.

Van Cott says surveys reveal that many psychologists would actually prefer to receive unedited manuscripts. This group includes people willing to sacrifice quality for speed of transmission, and people who believe the existing editorial review process screens out material they want. Such screened material includes negative results, results based on a small number of subjects, articles about ideas or methods rather than about empirical investigations, and articles that the journal editor rejects because of some personal bias.

Van Cott insists that none of the ideas proposed by the APA is "really that radical." He says similar ideas have been talked about, and in most cases implemented, by various journals or scientific organizations around the country. The most unique thing about the APA proposal, he believes, is its effort to approach the entire spectrum of scientific communications on a comprehensive basis. The APA proposal is undoubtedly an ambitious and well-meant effort to cope with worsening communications problems. Thus it seems especially ironic that controversy over the proposal should be exacerbated by a "breakdown in communications" within the APA itself.

—PHILIP M. BOFFEY

European Notes

France: Putting Scientists into Its Embassies

Paris. France is building a strong corps of scientific and technical representatives at its major embassies throughout the world. At present it probably ranks just behind the United States in the number of posts to which such specialists are assigned—(13 as compared to 18). However, while the U.S. program is currently in a state of money-saving contraction, the French are opening new posts and enlarging the staffs at several existing ones.

The French program can be traced back to the specialized technical missions assigned to a few key embassies in the early post-World War II days. But over the past 2 years this aspect of diplomatic coverage has rapidly grown from a narrowly defined, fairly low-level function to one of broad jurisdiction and high status in the embassy hierarchy. Thus, the French scientific representatives are accorded the diplomatic rank of counsellor in the major embassies, signifying a major department or function in the embassy. Their American counterparts, with the exception of the incumbent at the U.S. embassy in Paris, who holds the rank of counsellor, have the lesser title of attaché.

Last June a reorganization within the French Ministry of Foreign Affairs pulled together the formerly sprawling field of scientific and technical representation into a single Office of Scientific Affairs. The counsellors come under this office administratively, but their main channel of reporting