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38. B. Schröder-Gudehus, *Deutsche Wissenschaft und Internationale Zusammenarbeit, 1914–1928* (Dumaret & Golay, Geneva, These No. 172, 1966).
39. E. Rignano, *Nature* **98**, 408 (1917).
40. R. W. Clark, *Einstein: The Life and Times* (World, New York, 1971), pp. 255–64.
41. For a more comprehensive discussion of the response of German science to National Socialism, see Haberer (7, pp. 103–181). Also see K. D. Bracher, W. Sauer, G. Schulz, *Die Nationalzozialistische Machtergreifung* (Westdeutscher, Köln, 1960), pp. 317–20.
42. See Haberer (7, pp. 179–181) for a summary of some of the factors that explain this pattern.
43. See Haberer (7, pp. 163–179) for a critique of the Jungk-Heisenberg thesis. See also R. Jungk, *Brighter than a Thousand Suns* (Harcourt Brace Jovanovich, New York, 1958); W. Heisenberg, *Universitaes* **8**, 337 (April 1953).
44. D. Irving, *The German Atomic Bomb: The History of Nuclear Research in Nazi Germany* (Simon & Schuster, New York, 1967), especially pp. 34–56.
45. For example, K. S. Lynn *et al.*, Eds. *The Professions in America* (Houghton Mifflin, Boston, 1965) (especially E. C. Hughes, pp. 1–14; J. H. Means, pp. 47–69; and J. J. Beer and W. D. Lewis, pp. 110–13). See also the perceptive study of C. L. Gilb, *Hidden Hierarchies: The Professions and Government* (Harper & Row, New York, 1966).
46. For the crisis in the medical profession and the attack upon the medical establishment, see the following: B. Ehrenreich and J. Ehrenreich, *N.Y. Rev. Books* **15**, 14 (12 December 1970); M. J. Michaelson, *Amer. Scholar* **39**, 694 (Autumn 1970); *N.Y. Rev. Books* **16**, 39 (25 February 1971). For a different view, see D. L. Farnsworth, *N. Engl. J. Med.* **282**, 1235 (28 May 1970).
47. D. J. de Solla Price, *Little Science, Big Science* (Columbia Univ. Press, New York, 1963), pp. 1–32.
48. V. Bush, *The Endless Frontier: A Report to the President on a Program for Post-war Scientific Research* (National Science Foundation Reprint, Washington, D.C., 1960), originally issued July 1945, pp. 11–12.
49. For a discussion of this point, see J. Haberer, "Technology and the emerging future: A framework for normative theory," (mimeographed) presented at the annual meeting of the American Political Science Association, Chicago, Ill., 11 September 1971, pp. 1–4.
50. C. P. Snow, *The Two Cultures and a Second Look* (Mentor, New York, 1964), p. 46.
51. Beginning with A. Comte, sociologists recognized this much earlier. M. Weber and K. Mannheim, among others, took this social reality very much into account in their theoretical work. See, for example, B. Barber, in *Sociology Today: Problems and Prospects*, R. K. Merton, L. Broom, L. S. Cottrell, Jr., Eds. (Harper & Row, New York, 1965), vol. 1, pp. 215–223.
52. The acceptance of the partnership doctrine appears to me to be a consistent one in the work of the leading people in the field—notably, in the work of D. K. Price, H. Brooks, A. Weinberg, E. Shils (as editor of *Minerva*).
53. Perhaps this explains the great interest in studying scientists' roles in decision-making, their influence in and access to the political process, particularly on the federal level.
54. D. K. Price, *The Scientific Estate* (Harvard Univ. Press, Cambridge, Mass., 1965), pp. 171, 174, 205–207.
55. V. Bush (*52*) provided the first full-blown expression of the partnership doctrine. However, the idea of partnership has permeated the thinking of the institutional leaders of American science for well over a century. See A. H. Dupree (*13*).
56. Committee on Science and Public Policy, *Federal Support of Basic Research in Institutions of Higher Learning* (National Academy of Sciences, Washington, D.C., 1964), p. 19.
57. Historically, the claim for the autonomy of science has meant the acceptance of a modus operandi in which the two communities refrained from interfering with each other's affairs. This did not preclude occasional government support of scientific activities; nor did it prevent scientists from giving advice or assistance to the state under certain conditions, in time of war for example. However, by and large, the community of science appeared to be an overtly apolitical community that considered affairs of state as an intrusion upon its more important work.
58. The tension between the two is brilliantly elaborated in M. Weber's classic essays "Politics as a vocation" and "Science as a vocation," in *From Max Weber*, H. H. Gerth and C. W. Mills, Eds. (Oxford Univ. Press, New York, 1958), pp. 77–156.
59. Public administration, government service, and science administration are part of the background of most of the leaders in the field.
60. For a defense of middle-range theorizing, see R. K. Merton, in *On Theoretical Sociology* (Free Press, New York, 1967), pp. 39–72; *Social Theory and Structure* (Free Press, New York, 1957), pp. 9–11, 85–117.
61. I have suggested a framework for such a normative theory elsewhere (*49*, pp. 4–12).
62. S. Grundmann, *Wiss. Z. Tech. Univ. Dresden* **14** (No. 3), 799 (1965).

NEWS AND COMMENT

Creationists and Evolutionists: Confrontation in California

A new biology textbook for elementary schools comes in two versions, a national edition and a California edition. The former, to illustrate an account of man's origins, pictures the paleoanthropologist L. S. B. Leakey. In the edition designed to meet the requirements of the California State Board of Education, Leakey is replaced with Michelangelo's Sistine Chapel fresco of the creation of man. The switch of Adam for Leakey accurately symbolizes the two sides of a controversy that has engulfed the teaching of science in California's elementary schools.

The publishers may correctly have inferred a desire on the part of the state board to substitute the Genesis account of man's origins for the version according to Darwin. In fact, the board is asking only for equal time; it wishes science teachers to present evolution and creation as equally plausible explanations of how man came to be. But unlike Solomon's equally even-handed decision to divide the disputed baby, the wisdom of this edict has not been universally apparent. Biology teachers and university scientists in California have belatedly mobilized against what they perceive as a threat to both academic and scientific freedom. The scene has been set for a head-on confrontation between science and religion, from which the reverberations may extend to the several other states in which similar tensions are latent.

Within the next month, the California board of education will adopt a science textbook for elementary schools. Whatever its choice, the matter seems likely to end in the courts, since the evolutionists have threatened to file suit if creation is mentioned and the creationists to sue if it is not. How did the board of education get itself into such a situation?

The story begins a decade ago in Orange County where two housewives, Jean E. Sumrall and Nell J. Segraves, became concerned about the conflict their children perceived between the Bible and the evolutionary account taught in school. They protested to the Orange County school board and were told that the board could teach only what was in the textbooks. With the help of a friend of Mrs. Segraves, Walter E. Lammerts, they set out to persuade the California State Board of Education to change the textbooks.

Lammerts, a fundamentalist with a Ph.D. in genetics from the University of California, is by trade a rose-breeder (the Charlotte Armstrong rose is one of his varieties). In 1963, he became the principal founder of the Creation Research Society, a body that has played an important role in the California textbook affair. The society has two requirements for membership—which, together, make it an unusual association. Applicants must hold master's or Ph.D. degrees in some field of natural science, and they must believe in the literal truth of the Bible. The society's credo states, for

example, that "the account of origins in Genesis is a factual presentation of simple historical truths," that "all basic types of living things, including man, were made by direct creative acts of God during the Creation Week described in Genesis," and that the Noachian flood was "an historic event, worldwide in its extent and effect." The Creation Research Society now boasts 300 full members and 1200 associate members (associates do not possess higher degrees). The society claims it is not a lobbying organization, its activities being devoted exclusively to the publication of a quarterly magazine. Be that as it may, individual members of the society have asked educational authorities in several states to curb or modify the teaching of evolution.

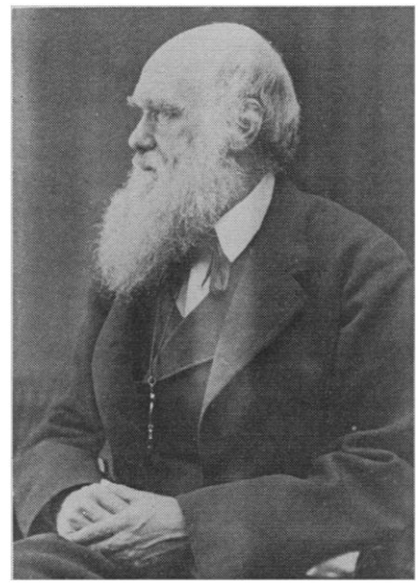
One such state is California, where, in 1963 and subsequent years, Mrs. Sumrall and Mrs. Segraves, who are associate members of the Creation Research Society, petitioned the state board of education to include creation accounts alongside evolution. Six years later, their efforts bore fruit. A set of guidelines for science education programs for kindergarten through grade 12 had been prepared by the state advisory committee on science education. The document, known as the *Science Framework for California Public Schools*, came up for approval before the state board of education in October 1969. The *Framework*'s failure to allude to creation was criticized by two board members, John R. Ford, a San Diego physician and Seventh-Day Adventist, and Thomas G. Harward, personal physician to the then superintendent of public instruction Max Rafferty.

At this point, events took an unusual turn. A private individual, Vernon L. Grose, read a Los Angeles *Times* editorial on the subject and submitted a four-page modification for the *Framework*. When the board met again on 14 November, it excised the passages of the *Framework* dealing with evolution and replaced them with two paragraphs taken from Grose's statement:

> All scientific evidence to date concerning the origin of life implies at least a dualism or the necessity to use several theories to fully explain the relationships between established data points. This dualism is not unique to this field of study, but is also appropriate in other scientific disciplines such as the physics of light.
>
> While the Bible and other philosophic treatises also mention creation, science has independently postulated the various theories of creation. Therefore, creation in scientific terms is not a religious or philosophic belief. Also note that creation and evolutionary theories are not necessarily mutual exclusives. Some of the scientific data (e.g., the regular absence of transitional forms) may be best explained by a creation theory, while other data (e.g., transmutation of species) substantiate a process of evolution.

The committee of scientists who had prepared the *Framework* promptly repudiated the revised version and asked the board of education to reconsider. Much to the surprise of the biological community, the board has not only not reconsidered, but vice president Ford made clear that the science textbooks up for adoption this year would have to conform to the *Framework*.

Biologists have only recently organized to oppose the adoption of such textbooks. The National Association of Biology Teachers (NABT) has gathered a war chest for the legal defense of teachers who may fall foul of the *Framework*, and G. Ledyard Stebbins, a geneticist at the University of California, Davis, has encouraged colleagues there and at other campuses to rally to the defense of evolution and science teaching. Resolutions protesting the board of education's position have been passed by the Commission on Science Education of the AAAS, the American Chemical Society, and the National Academy of Sciences. Meanwhile, the creationists have strengthened their position by the appointment of Grose to the curriculum development and supplemental materials commission, a body that selects textbooks for approval by the board.



Charles Darwin—he may need another Clarence Darrow.

Last week, in preparation for adopting textbooks at its meeting next month, the board of education held a hearing at which witnesses from each side appeared in each other's clothing—the creationists claiming to speak in the name of science, and the evolutionists in the name of both biology and religion. The evolutionist side fielded both a Mormon bishop and the dean of San Francisco's Grace Episcopal Cathedral, who argued the primacy of science over Genesis as strongly as any evolutionist could have wished. The board also heard from delegates of its curriculum commission that the commission had agreed unanimously on three guidelines for ensuring the "neutrality" of science textbooks:

- ► Dogmatism in science be changed to conditional statements;
- ► Science discuss "how" and not "ultimate causes" for origins;
- ► Questions unresolved in science be presented to the students to stimulate interest and inquiry processes.

The commission proposed to make editorial revisions in textbooks in accordance with these guidelines, and expected only a few changes to be necessary. The significance of the changes is not yet clear, but Grose, the commission member in charge of negotiating changes with the publishers, told *Science* last month that, for example, a textbook should not say an animal was adapted to its environment, since that would imply evolution: either the publisher would have to replace "adapted" by a neutral word, Grose said, or he must state that the animal was "either adapted to or designed for" its environment.

The strategy that has already carried the creationists so near to success is rather more subtle an approach than mounting a frontal attack on evolution. The creationists, although they personally do not believe that evolution occurred, are not asking that Darwin be evicted from the classroom. Nor, as they are sometimes accused of doing, are they trying to put Genesis into the biology books. (On tactical grounds this would be self-defeating because to favor any particular religion would be unconstitutional). Their assertion is that the facts and subject matter explained by the theory of

evolution can equally well be explained by a theory of creation, which, they contend, is a valid and scholarly theory deserving equal attention with evolution in the teaching of science. A second argument is that the theory of evolution favors or implies an atheistic viewpoint and thus discriminates unconstitutionally against Christian children.

Within this general framework, the creationists are not a monolithic association, and certain doctrinal differences are evident beneath the surface. The Creation Research Society includes the hard core of scientist-creationists who advocate the falsity of evolution and the truth of Genesis. Two active members of the society form the staff of the Institute for Creation Research, a teaching and publishing organization attached to the Christian Heritage College in San Diego. Another organization with evangelical, but not fundamentalist, leanings is the American Scientific Affiliation, a 1750-member body devoted to exploring the relationships between science and religion. Lammerts, founder of the Creation Research Society, was a member of the affiliation but quit, he told *Science*, "because it tolerated evolution." This is a major difference between the two

Congress: In Election Turnover, Changes at the Bottom

If the presidential election went to Republican Richard M. Nixon by a vote approaching tidal-wave proportions, the congressional elections produced some tricky cross-tides. The next Congress will be slightly less Democratic and, perhaps, marginally more democratic. The Republicans picked up a dozen seats in the House of Representatives to make the division 244 Democrats and 191 Republicans. In the Senate, Democrats actually added two seats, raising their majority to 14—57 Democrats to 43 Republicans. The Democrats consequently retain the majority on both sides of Capitol Hill and with it the committee chairmanships, the right to appoint a majority of congressional staff, and control of the legislative machinery. On the House side, an element of uncertainty has been added, not so much by the results of the general election, but by the retirement from Congress or defeat in the primaries of an unusually large number—57—of incumbents, both Republican and Democratic. Many of these are long-service members of both parties, and it is possible that the influx of younger members will have a significant impact on the way Congress does its work.

In the constellation of committees that deal with science and the environment, the most obvious change occurs with the replacement of the chairmen of both the House and Senate committees which handle authorizing legislation for the space program. Senator Clinton P. Anderson (D–N.M.), 77, chairman of the Aeronautical and Space Sciences Committee, is retiring after a long congressional career that began in 1941 when he entered the House. The chairman of the House Science and Astronautics Committee, George P. Miller (D–Calif.), 81, was defeated in the primary and leaves Congress after a period of unbroken service in the House that began in 1945.

Anderson, a member of the Senate's unofficial "inner club," has served as chairman of the Joint Committee on Atomic Energy and of the Interior Committee, as well as of the space committee. During the 1950's and early 1960's, Anderson was particularly influential in both civilian and military issues involving atomic energy and was a strong advocate of the development of nuclear power sources. He succeeded to the chairmanship of the Aeronautical and Space Sciences Committee in 1963 and was a consistent though not uncritical backer of the manned space flight program.

Miller took over the chairmanship of the House Science and Astronautics Committee at the end of 1961 and presided over the committee during the buildup for the moon landing. Miller was regarded as a strong advocate of full funding for the space program, but the committee frequently nudged NASA toward tighter management, as in the case of the unmanned space program. Under Miller, the committee manifested a serious interest in nonspace science, particularly through the subcommittee on science, research, and development, headed for much of the 1960's by former Connecticut Congressman Emilio Q. Daddario. The committee was instrumental in shaping the legislation which reorganized the National Science Foundation and moved it toward a greater emphasis on applied research. Miller, genial and well liked in the House, was hardly an autocrat of the committee room, for example, he encouraged initiative on the part of his subcommittee chairmen to a degree which was unusual when he began doing it.

Anderson's successor is expected to be Senator Stuart Symington (D–Mo.). Symington is also a member of the Armed Services and the Foreign Relations committees, as well as the Joint Committee on Atomic Energy. A one-time Secretary of the Air Force, he is knowledgeable in space and aeronautical matters and has the reputation of being an advocate of airpower and of military capability in space, although his opposition on the ABM issue is thought to represent a significant refinement of his views. He voted to restore funds to the SST.

Miller's successor would appear to be Representative Olin E. Teague (D–Texas). Teague is chairman of the Veterans Affairs Committee, but is expected to give up the post for the chairmanship of the space committee. The one condition under which Teague is thought likely to pass up the space committee post is if the disappearance of Majority Leader Hale Boggs (D–La.) on a plane flight in Alaska results in a serious contest for Democratic leadership posts. Teague is regarded as a possible candidate in such a contest. On the space committee Teague is chairman of the subcommittee on manned space flight. Next in line for chairmanship of the full committee is Representative Ken Hechler (D–W.Va.), now chairman of the subcommittee on aeronautics and space technology.

On the environmental front, a significant factor is the defeat in the primaries of Wayne N. Aspinall (D–Colo.), chairman of the House Committee on Interior and Insular Affairs. Aspinall, 76, has been chairman of the committee since 1959 and currently heads the

organizations. The affiliation has played no formal role in the California textbook affair except insofar as Grose, a leading creationist on the curriculum commission, is one of its members.

Grose, an engineer with an aerospace background, is vice president of the Tustin Institute of Technology, a Santa Barbara firm specializing in management education. He is not a member of the Creation Research Society, and he considers the Institute of Creation Research staff to be not fully scientific in their selection of the evidence. Grose describes evolution theory and creation as "the case for chance" and "the case for design." His views seem to be shared in part by aerospace acquaintances of his such as Wernher von Braun and Apollo astronauts Jim Irwin and Edgar D. Mitchell. Grose accepts some measure of evolution, but his chief concern is with origins, a subject on which he wishes science to be "absolutely silent." In an interview, Grose said he was concerned that "schoolchildren, brought up to believe there is a God, are now told in the name of science that God has conclusively been shown to be out of the picture. I want that to be withdrawn and a neutral or pro-theistic account to be given." If a child raises

May Be More Important than Changes at the Top

Interior Committee's subcommittee on environment. During the last decade, Aspinall has been a frequent target of criticism from environmentalist groups. Primarily at issue has been Aspinall's views on the management of public lands. His critics claim that in legislating multiple use of public lands he has favored private interests in mining, oil production, grazing, and lumbering at the expense of environmental values. Aspinall's record is by no means unmixed. He can take major credit for legislation expanding and improving federal parks and preserving wilderness and wild rivers. By the standards of even a decade ago he would have been considered a strong conservationist. But it seems true that he is not attuned to current concepts of making the use of federal land part of a strategy for the total environment. Furthermore, Aspinall is known as a chairman who has dominated his committee and been a tough and astute manager of legislation, and this has led environmentalists to see him as personally responsible for some of their frustrations.

The Interior committee chairmanship is due to pass to Representative James A. Haley (D–Fla.). Now 73, Haley will begin his ninth term in Congress in January. He has been serving as chairman of the subcommittee on Indian affairs and has established no strong image, either positive or negative, on environmental matters. Haley represents the Sarasota area, where, it is worth noting, a fairly strong, bipartisan, politically savvy environmentalist movement exists. Observers expect Haley to be less the dominant chairman than Aspinall and to give more latitude to subcommittee chairmen and committee members.

The Democrat who unseated Aspinall in the primary, Alan Merson, a professor at the University of Denver Law School, was defeated in last week's election by Republican James P. Johnson.

Also not returning to the House are three other incumbent congressmen who, with Aspinall, environmentalists listed as being among a "dirty dozen" legislators who were regarded as having compiled unfavorable records on environmental issues. Representative Walter S. Baring (D–Nev.), a member of the Interior committee and chairman of its subcommittee on public lands, was defeated in the primary. Representatives Earle Cabell (D–Texas), a member of the Science and Astronautics Committee, and Sherman P. Lloyd (R–Utah) were defeated in the general election.

Cabell was slated to become one of six House members of a congressional board which will oversee the newly approved congressional Office of Technology Assessment (OTA) (*Science*, 6 October). Two other prospective members of the board who also were thought to be in danger in last week's election won their races. They were Representative John W. Davis (D–Ga.), chairman of the House Science and Astronautics Committee's subcommittee on science, research, and development, and Mike McCormack (D–Wash.), who was formerly a chemist at the AEC installation in Richland (*Science*, 30 July 1971).

The OTA board lost another member-designate in the defeat last week of Senator Gordon Allott (R–Colo.). Allott is a member of the Senate Interior and Insular Affairs Committee and Appropriations Committee. Some observers feel that Allott's support of a proposal for public financing of the next Olympic winter games near Denver, which Colorado voters rejected, was at least a minor factor in his defeat by antiwar Democrat Floyd K. Haskell.

With the retirement of Representative Alton Lennon (D–N.C.), marine science loses an effective friend. Lennon has been chairman of the Merchant Marine and Fisheries Committee's subcommittee on oceanography and a member of its subcommittee on fisheries and wildlife conservation. He was a proponent of a "wet NASA" for marine sciences (*Science*, 16 July 1971) and has been interested in research and environmental protection programs for coastal zones.

The most notable change of all should be the replacement of the retiring William Colmer, 82, a vintage Mississippi conservative, by Ray Madden (D–Ind.), 80, a New Deal vintage liberal, as chairman of the House Rules Committee. The Rules Committee, however, is not the overall legislative arbiter it was even a few years ago. A fair guess is that changes at the bottom in the House will be more important than changes at the top. This is because the unusually large number of incoming members are relatively young. As a matter of fact, the ideological center of gravity in the House—as defined in conventional liberal-conservative terms—seems unlikely to shift much. And the effect of the influx is likely to be less on legislation, at least at the start, than on the way the institution operates. For the new members look like ready reinforcements for the already significant group of impatient younger members who are unwilling to ride the long, slow escalator of seniority to influence in Congress.—JOHN WALSH

questions about the creator posited in the creation theory, the teacher should reply that science knows nothing for or against a creator. Science has overstepped its limits by treating of first causes, science has been "oversold in Western culture as the sole repository of objective truth." Grose believes the change in science teaching he is helping to bring about "will be a change that ranks with when we ceased to believe the earth was flat."

Another spokesman for the creationist side is Duane T. Gish, a former member of the research staff of the Upjohn pharmaceutical company and now vice president of the Institute for Creation Research. Gish is one of the creationists' chief theoreticians, his specialty being to show how paleontology disproves evolution. "The historical record inscribed in the rocks literally cries, 'Creation!' " was how Gish put it to a meeting of the NABT in San Francisco last month. Gish is a persuasive speaker, and the organizers of the NABT meeting, possibly not entirely certain of their members' allegiance to evolution, arranged for the chairman of the session to reply to the talks given by Gish and another creationist, John N. Moore of Michigan State University. The thrust of Gish's attack on evolution was directed toward the gaps he perceives in the fossil record. One such gap, he pointed out to the biology teachers, is that "not a single, indisputable fossil has ever been found in Precambrian rocks" while rocks of the following geological period contain every one of the major invertebrate forms of life, a circumstance that clearly contradicts the "evolution model" and is in full agreement with the predictions of the creation model. "We creationists are scientists," says Gish. "We are looking at the same data, but we offer two models."

Gish, like other creationists, compares the present teaching of evolution to a "Scopes trial in reverse," in that evolution is now the only theory allowed to be taught. "The authoritarianism of the medieval church has been replaced by the authoritarianism of rationalistic materialism." He hints of legal action if the board of education rules against the creationists, citing the suit brought by Mexican-Americans against social science textbooks they disliked. (The suit went up to the California Supreme Court and lost.) Creationists, he feels, are a persecuted minority. "It was an affront to the blacks to force them to the back of the bus, but we can't even get on the bus."

The creationists' demands for equal time in the science classes have stirred considerable anxiety among scientists of other persuasions. The now evidently serious pursuit of a creationist line by the California board of education is only one factor. The wounds of the time when the teaching of evolution was forbidden have only recently been healed. Few have not heard of the Scopes trial of 1925 at Dayton, Tennessee, when defense counsel Clarence Darrow made a laughing stock of William Jennings Bryan and the fundamentalist cause; it is sometimes forgotten that Scopes lost. The teaching of evolution is still not on the solidest of grounds in Tennessee. According to a poll of Dayton high school students conducted in September 1972, 75 percent believe that life originated in the way described in Genesis rather than as Darwin tells it. The last anti-evolution law in the United States was taken off the statute books in 1970, but it had not for long been a dead letter. Until the appearance in 1965 of the Biological Sciences Curriculum Study (BSCS) textbooks developed at the University of Colorado, commercial publishers were often afraid to put out textbooks that made more than disguised references to evolution.

Scopes and Lysenko

In the context of recent history, the threat posed by the creationists to the teaching of evolution looms considerably larger than the relative cognitive strengths of the two concepts might suggest. It may be thought excessive to compare the California situation with the Scopes trial (in the sense that evolution has to fight to be heard) or with the Lysenko affair (nonscientists dictating the content of science), but this is true to the feeling of many of those involved in combating the board of education's course. The general position adopted by the evolutionists is that "creation theory" does not possess the characteristics of a scientific hypothesis and therefore has no place in a science curriculum. Religious accounts of creation "are statements that one may choose to believe, but if he does, this is a matter of faith, because such statements are not subject to study or verification by the procedures of science," states a resolution passed by the AAAS commission on science education. The creationists, of course, claim to propose creation as a scientific, not a religious, concept. "We are not interested in having the Bible or any other religious account included in the textbooks, so why do you object to having creation theory stated?," Lammerts asked Bentley Glass at last month's NABT meeting. Glass, a past president of the NABT, replied that he had no objection to including alternative theories if these were phrased in terms susceptible to validation and to falsifiability, but creation theory had not been formulated in this way. Evolutionists at the NABT meeting also denied that religious beliefs were threatened by evolution. "My belief in God is a faith, not demonstrable or falsifiable by scientific evidence," said Glass. And William V. Mayer, director of the BSCS, claimed that "biology texts do not challenge or contradict religious beliefs and deliberately avoid such implications."

The question of whether biology texts contradict religious beliefs is probably important to an understanding of the creationist movement. Since the time of Voltaire, most religious creeds have learned to coexist with science by waiving rights to any territory claimed by science. This is why the National Academy of Sciences could pass a resolution last month stating that "Religion and science are . . . separate and mutually exclusive realms of human thought." But fundamentalists have not waived their claims to explaining the origins of life. For them, there is a conflict between the scientific and biblical versions of creation. And the creationists, although they have deliberately avoided advertising the fact, are most of them fundamentalists. The two mainsprings of their movement seem to be desires to assert their own view of the world and to protect their children's beliefs from being eroded at school.

The latter motive was the original spark that kindled the present debate in California. It also underlay the founding of the Bible-Science Association, an organization based in Caldwell, Idaho, which publishes the *Bible-Science Newsletter* (paid circulation 23,000). The association was founded by a Lutheran pastor, Walter Lang, because in ministering to students at the College of Idaho he found they were losing their faith, mainly as a result of evolution. Similar motivations have concerned Mr. and Mrs. Mel Gabler, of Longview, Texas, whose representations before the Texas board of education have been instrumental, they claim, in getting two BSCS science textbooks knocked off the ap-

proved list. The Texas board has also required all textbooks mentioning evolution to include in their preface a statement warning that evolution is presented as a theory, not a fact. (J. B. Golden, director of textbooks, explains that the Gablers were able to use an appeals procedure adopted by the school board in the early 1960's. "It's a good old democratic procedure—it's worked very nicely," he says.)

Evolutionists claim to see the creationist movement as a closely coordinated, nationwide campaign supported by rich and powerful backers. "This is an organized and well-financed campaign," Mayer told the NABT meeting, his evidence being the time and effort devoted by creationists to their activities. "It seems evident the Seventh-Day Adventists and the Creation Research Society have embarked upon a plan to exert considerable pressure," says W. Earl Sams, a consultant at the California Department of Education. On the other hand, creationists claim that their societies are supported only by subscriptions, that their members act only as individuals, and that there is no organized campaign. Whatever the truth, creationists have certainly been active in several states. The Bible-Science Association, whose newsletter is intended to popularize the scientific writings of the Creation Research Society and others, has already established branch chapters in ten towns across the country. The aim of the chapters is to hold seminars and "work towards getting creationism into the schools." Members of the Creation Research Society have approached state boards of education in Louisiana, Indiana, Tennessee, Florida, and Michigan. The Gablers in Texas turned their attention to science textbooks (they had previously worked on history books) at the suggestion of Thomas G. Barnes, a physics professor at the University of Texas, El Paso, and a member of the Creation Research Society. The anti-evolution suit filed in Washington, D.C., this August is a separate development. The plaintiff, William Willoughby, religious editor of the Washington *Star & Daily News*, is not a member of the Creation Research Society. His suit, which he says was filed in the interest of the 40 million evangelical Christians in the United States, requests that the BSCS books be withdrawn and that the National Science Foundation, which spent $7 million in developing them, spend a like amount on research into creation theory.

Whatever the merits of the creationists' particular beliefs, their concern to safeguard the religious heritage of their children is legitimate, as is the concern of biologists to be alone in determining the content of biology classes. The respective interests may be reconcilable, though past wounds are not the only obstacle to agreement. The antagonists on each side probably present a more serious threat to the other than they realize. Biology teachers are probably more persuasive than they would like to admit. And the lobbying activities of creationists open the door for any other sectarian interest, religious or political, to get science textbooks altered to their liking. Having espoused the creationist cause from the start, the California state board will be hard put to find a solution that satisfies both sides.—NICHOLAS WADE

Politics of the Ocean: View from the Inside

It was April of 1970, and Washington's small marine science community was in a quandary. More than a year had passed since an advisory commission appointed by former President Lyndon Johnson had strongly urged the creation of a National Oceanic and Atmospheric Administration (NOAA). Now the dream of a "wet NASA" or of anything faintly resembling a new superagency for the oceans was rapidly evaporating. President Nixon's interest in marine affairs had dwindled precipitously after his election, his budget bureau opposed such an agency, and worst of all, his advisory committee on government reorganization—the secretive Ash Council—also had the deep six in mind for NOAA.

What the marine science community sorely needed, Edward Wenk writes in his new book, *The Politics of the Ocean*,* was a champion. And who should find himself cast in the unlikely role of the man who bailed out NOAA? According to Wenk, it was the former attorney general, John N. Mitchell, whose prior and subsequent interest in oceans and the atmosphere seems to have been limited mainly to swimming and breathing.

"Time and tactics to refloat the grounded NOAA were both running out," Wenk writes. "But one possibility appeared when Senator [Ernest F.] Hollings realized that he had access to one of the most powerful figures in the Administration, and one to whom the President regularly turned for advice."

Hollings, it should be explained, is chairman of the Senate subcommittee on oceans and the atmosphere, and he and a number of others in Congress had been working hard for several years to establish a focal agency for marine science and technology. Hollings had special access to Mitchell, as the senator belatedly realized one Sunday morning in April, partly because he sits on the appropriations subcommittee that dispenses money to the Justice Department, partly because he and Mitchell had known each other for years, and mostly because Mitchell owed the senator—a Democrat from South Carolina—a considerable favor. At the attorney general's personal request, Hollings had joined the fight to confirm President Nixon's unpopular Supreme Court nominee, South Carolinian Clement Haynesworth.

A few days later, the senator cashed in his chips in a conversation with Mitchell. Wenk, as the executive director of a White House advisory council on marine affairs, attended. So did John Whitaker, a geologist who serves the President's Domestic Council as the chief staff man for science and environmental affairs.

Wenk recalls that Mitchell initially balked at the idea of recommending to the President a new cabinet-level agen-

* E. Wenk, Jr., *The Politics of the Ocean* (Univ. of Washington Press, Seattle, 1972), 590 pp.; $14.95.