concerns. We did find that the average number of citations to men in AMS was approximately 1.5 times that of those not found in it. We also found, as was to be expected, that the cited authors in the best work were more often found in AMS than those cited in work of lesser quality. To the extent that the AMS does not include the less eminent members of the scientific community our sample of cited authors overrepresents eminent scientists.

13. The extent to which unpublished work is being cited in leading journals is increasing rapidly, at least in physics. Second to articles published in *Physical Review* (American Institute of Physics, New York), private communications are the most-cited source of information in contemporary physics.
14. It would probably be safe to assume that more than 90 percent of the population of physicists have no awards.
15. Inclusion in the scientific elite could be a function of longevity if the bulk of citations went to older scientists. The data do not support this possibility. In fact, the pattern of citations by scientists in various age groups suggests that older scientists tend to cite work by older scientists; younger scientists tend to cite most often the work of other young scientists. More than 50 percent of the cited authors, however, were under 50 years old.
16. The so-called "Cartter" rankings of leading departments of physics were based on evaluations of 86 institutions "that reported the award of one or more doctorates in physics from July 1952 through June 1962." The ratings were based on a scale ranging from 5 (highest) to 1 (lowest). All institutions with a mean ranking greater than 4.0 were called "distinguished." There were nine such physics departments. A. M. Cartter, *An Assessment of Quality in Graduate Education* (American Council on Education, Washington, D.C., 1965).
17. These five articles included, for example, Lee and Yang's now famous paper on parity conservation. Three of the authors turned out to be Nobel prize winners; the others, members of the National Academy of Sciences.
18. Nobel laureates in physics who received their prize between 1950 and 1964 averaged 130 citations to their life's work in the 1965 SCI.
19. R. K. Merton, *Proc. Amer. Phil. Soc.* **105**, 470 (1961).
20. See K. Davis and W. E. Moore, "Some principles of stratification," and, for a critique, M. M. Tumin, "Some principles of stratification: A critical analysis," both reprinted in R. Bendix and S. M. Lipset, Eds., *Class, Status, and Power: Social Stratification in Comparative Perspective* (Free Press, New York, ed. 2, 1966).
21. M. M. Kessler, "Some Statistical Properties of Citations in the Literature of Physics," Report (Massachusetts Institute of Technology, Cambridge, 1962).
22. H. A. Zuckerman, "Nobel laureates in science: Patterns of productivity, collaboration, and authorship," *Amer. Soc. Rev.* **32**, 391 (1967).
23. National Research Council, *Summary Report 1970, Doctorate Recipients from United States Universities* (National Research Council, Washington, D.C., 1971).
24. D. Wolfle and C. V. Kidd, *Science* **173**, 784 (1971).
25. *American Science Manpower 1964: A Report of the National Register of Scientific and Technical Personnel*, NSF-66-29 (National Science Foundation, Washington, D.C., 1966).
26. This research was supported by NSF grant GS 2736 to the Columbia University Program in the Sociology of Science. We thank Dr. Cullen Inman of the American Institute of Physics for making some data available to us.

NEWS AND COMMENT

Scientists in Politics: A Late Entry for Nixon's Group

Just as Scientists for George McGovern moved into the final phase of a year's vigorous, if sporadic, campaign activity last week, President Nixon's reelection committee came up with a counterpart group. In a brief announcement, the Nixon campaign headquarters said that a newly formed, 29-member Science and Engineering Council would work in support of the President, and might even live on after the election "to serve as another link" between the scientific community and the Nixon Administration.

The announcement, and a simultaneous press conference, left unclear precisely what the Nixon group might do to advance the cause of its candidate with only 3 weeks left before election day. There were indications that some members of the committee wondered the same thing themselves, but, even as window dressing for the President's candidacy, the group at least serves to round out the pattern of partisan activity by scientists and engineers in behalf of the presidential candidates that began with the Johnson-Goldwater campaign of 1964.

The Nixon group was put together, with a little prompting from the White House, by William O. Baker, the vice president for research of Bell Telephone Laboratories and a man who has emerged lately as something of a shadow science adviser in the Nixon Administration, and by California industrialist Simon Ramo. Baker, who, with Ramo, is cochairman of the committee, said they began organizing the group several weeks ago and that a small number of its members held an initial meeting on 5 October.

"I could tell by the gleam in his eye that Bill Baker was up to something," observed George Kistiakowsky, Eisenhower's science adviser and an active partisan in the McGovern camp. "He is a very influential man in Washington and perhaps even in the White House," Kistiakowsky needled.

During a news conference at Republican campaign headquarters, Baker emphasized that the advisory council was a purely spontaneous, grass-roots organization. "Independent, self-generated, not an instrumentality of government," was the way he put it.

As it happened, though, a minor gaffe by a campaign worker lent substance to the cynic's view that the council was closely tied to, if not conceived by, White House staff. Stapled to the back of a press release from the campaign staff was an internal memorandum adding the name of Lawrence A. Goldmuntz to the list of council members "per Pagnotta instruction." Frank R. Pagnotta is an administrative aide to Edward E. David, Jr. Until recently, Goldmuntz was the staff man in the White House Office of Science and Technology (which David heads) in charge of civilian technology.

Evidently an ardent Nixon fan, Goldmuntz appeared at the press conference and averred that Nixon was "the first President since Jefferson with a genuine interest in technology." For his part, Pagnotta said he had merely passed some information about Goldmuntz to Baker in response to an inquiry. "We get lots of inquiries," Pagnotta said. "But I don't know anything about any instructions."

The Baker-Ramo committee bears little resemblance to the science advisory group mobilized for Nixon in 1968 by Rear Admiral Lewis L. Strauss, who rounded up a hawkish assemblage heavily weighted with retired military men and conservative alumni of the Manhattan Project. This year's group contains a preponderance of industrial research administrators (17 of 29) mostly from aerospace and electronics corporations along the West Coast and in Texas—all of which only suggests that the makeup of campaign advisory groups probably is determined as much by the social orbits of the chairmen as by the candidates' attitudes toward science and technology.

As in years past, the Republicans

fared less well than the Democrats in rallying Nobel laureates and members of the National Academy of Sciences; the 46-member McGovern advisory group lists six Nobelists to the Nixon committee's two—Willard F. Libby of the University of California, Los Angeles, and physicist Eugene Wigner of Princeton University—but the President's committee partially offsets this disparity with claims to the allegiance of several well-known scientists. Among them are two who were nominally aligned with Hubert Humphrey's campaign in 1968, Gordon J. F. MacDonald and Athelstan Spilhaus. Three of the Nixon committee were active in groups supporting the Goldwater-Miller ticket and the Nixon-Agnew ticket in 1968; they are Libby, physicist Edward Teller, and Henry Eyring, professor of chemistry and former dean of the graduate school at the University of Utah. In addition, the group includes two members of the traditionally apolitical President's Science Advisory Committee—Patrick Haggerty, chairman of the board of Texas Instruments, and Howard Turner, president of the Turner Construction Company in New York City.

In contrast to the industrial-administrative weighting of the Nixon group, the McGovern committee enjoys an opulence of eminent scientists and educators, including Hans Bethe, Nobel laureate and professor of physics at Cornell; Mary I. Bunting, president of Radcliffe; Owen Chamberlain, Nobel laureate and professor of physics at the University of California, Berkeley; Stanford biochemist Carl Djerassi; Harvard Nobelists Edward M. Purcell and George Wald; Harvard chemist George Kistiakowsky; and Albert Szent-Györgyi, Nobel laureate at Woods Hole. The McGovern group also lists among its members Gerard Piel, the publisher of *Scientific American*, and a handful of research executives, including Jacob Goldman, vice president for research of the Xerox Corporation.

In further contrast with the Nixon group, the McGovern committee got its start in the spring of 1971, at a time when the senator was the darkest of dark-horse candidates. The group developed largely at the instigation of a handful of liberal physicists who had been active in the McCarthy and Humphrey campaigns of 1968; prominent within this initial nucleus were George Wald and Aihud Pevsner, a physicist at Johns Hopkins University who had coordinated McCarthy's scientists and engineers. The McGovern group unveiled itself last January in its first and only press conference so far and announced its cochairmen as Herbert York of the University of California at San Diego and Harry Palevsky, a physicist at Brookhaven National Laboratory. Vigdor Teplitz, an M.I.T. physicist, was named secretary-treasurer and has since emerged as the man in charge of day-to-day operations.

Until the McGovern bandwagon picked up steam in the primaries earlier this year, the scientists' and engineers' group remained largely a paper organization, the chief manifestation of which was an increasingly long list of names on its letterhead. During the summer, the Cambridge-oriented group functioned as one of 11 policy advisory panels attached to the McGovern staff, and it was the only one to adopt the added role of active campaigner. Products of the summer's work include a position paper on energy policy and background summaries on environmental affairs, transportation, and unemployment in the scientific community. All of these have served as grist for the McGovern speech mill, but so far only the energy paper has been issued in its entirety. (In addition, York and Kistiakowsky, among others, sat on McGovern's national security panel and helped draft a paper presented to the Democratic Platform Committee in June.)

On the Stump

The McGovern group took to the stump early last summer with a direct-mail campaign to scientists and engineers. Seed money donated by letterhead members and their friends added up to about $3,000, enough to send out 25,000 letters bearing a solicitation for money and a leaflet outlining McGovern's positions on such subjects as energy policy, space, transportation, economic conversion, and unemployment. Mailing addresses came from commercially available lists, from mailing lists left over from the McCarthy campaign, and from the subscription lists of such publications as the *Bulletin of Atomic Scientists*.

The resulting donations not only paid for the first mailing, Teplitz says, but enabled the group to send out another 100,000 leaflets in August. Returns from that mailing were parlayed into a third blitz of 150,000 in September, and that helped pay for a final mailing, in the first week of October, of 250,000. Last week Teplitz claimed that donations were pouring into the group's M.I.T. post office box address at the rate of $2,000 a day. At this rate, he said, the last of the organization's $70,000 in bills should be paid within a week. The surplus, bullishly predicted at $15,000 to $30,000, will be turned over to the McGovern campaign.

The Cambridge cadre never equaled the well-oiled and professionally organized machine of scientists and engineers that backed Lyndon Johnson in 1964 with hundreds of radio spots, storefront offices in nearly every state, and a nationwide TV show. This year's effort in behalf of the Democratic candidate is more in keeping with the shoestring character of the larger McGovern campaign. "We're running a cottage industry out of peoples' homes and the backs of their cars," says Teplitz. Consequently, it's hard to know precisely what the national organization consists of. Palevsky says that "hundreds" of scientists and engineers in major urban areas and on campuses across the country have volunteered for campaign work. Some are unpaid staffers in local McGovern offices, while others have set up satellite groups of engineers and scientists for McGovern in such areas as New York; Madison, Wisconsin; and Los Angeles. But their visibility varies, and their effectiveness is hard to gauge.

In any case, no effort has been made —as it was in previous elections—to sign up thousands of "members" in a rank-and-file organization, nor is the McGovern group using prominent scientists to appeal through the general media to the public at large. Palevsky explains that "it's expensive and there's no evidence that it works," and Teplitz adds that "we're aiming simply for three million votes—one and a half million scientists and engineers and their spouses."

Having nearly finished its job, the Cambridge organization is preparing to fold up its mailing lists and dissolve, though not without a fizz. Some of the group's more prominent figures plan a round of speeches at McGovern rallies in the coming weeks. Kistiakowsky, for one, said he was going to spend the weekend at his Cape Cod home polishing what he hoped would be a "rousing" speech for delivery this week in Chicago and Minneapolis.

In a preview of his talk, Kistiakowsky had this to say:

. . . Mr. Nixon has paid only lip service to civilian science and technology. We still have far too many people in the scientific community working in military-related programs. And 'increases' in funds for research really are only recategorizations of funds, taken from one program to build up another. Things that obviously are not basic research are being called that because it sounds better. . . .

From personal observation, I think Senator McGovern has a sincere belief in the need for building a better America with the help of science and technology, and a firm commitment to emphasize civilian R & D. This, Mr. Nixon lacks.

The message of the Republican Science and Engineering Council seemed approximately the same, with the names reversed. "Our view is that the Nixon record is superb," Goldmuntz said. Baker reiterated the Administration's claim to have increased federal funding for R & D on domestic problems by 65 percent in the last 4 years "or about four times the general price increase" during that time. "At the same time," Baker said in a statement, "the Administration has maintained a sufficient military R & D program and begun to capitalize on our past investments in space."

What differences, he was asked, existed between the candidates on matters of science and technology? Baker replied that basic objectives seemed much the same, but that "their ways of getting there are different."

On the bread-and-butter issue, Baker was asked why the White House had terminated its widely advertised program of some 400 internships for unemployed scientists and engineers. He said that "it was canceled because it was so successful. . . . During the summer there was a drastic turnaround in unemployment," a point the McGovern group heartily disputes. Did that mean the problem had been solved? "Well," Baker replied, "for the man who's unemployed I guess there is still an unemployment problem."

The council seemed undecided as to how it would communicate its message, although Baker said that it stood ready to serve the campaign staff by advising on any technical issue that might crop up—perhaps by writing position papers. After the election, he said, the group might continue as a "public interest" link between the Administration (presumably Republican) and the scientific community.

Some observers suggest that the council's main purpose is defensive, that it would rush into the breach in the event McGovern succeeded in raising an issue of science or technology. Clyde Cowan, for one, a member of the council and a professor of physics at Catholic University in Washington, D.C., disagreed. "It's more than that," he insisted during a conversation. "We're supposed to be a collecting point for ideas from the scientific community." What kind of ideas? Cowan replied that the council has forwarded for the President's consideration a proposal to set up a study committee to examine the feasibility of damming the Bering Strait as a means of controlling the climate of North America and Siberia. The idea hasn't popped up yet in the President's campaign speeches, but if it does, his Science and Engineering Council can take full credit.

—ROBERT GILLETTE

Medicine at Michigan State (IV): Osteopaths and Allopaths

The presence on the same campus of two schools of medicine, one training M.D.'s and the other doctors of osteopathy (D.O.'s), would seem to guarantee a sibling rivalry along the lines of Cain and Abel. Osteopaths and allopaths—the latter are the majority party in Western medicine—have a century-long history of mutual hostility. At Michigan State University (MSU), however, the apparent misalliance seems to be working. In part this can be attributed to the fact that state legislators have made it clear that they would smile on the enterprise only if the two schools cooperated wholeheartedly (*Science*, 22 September). But, in addition, there is the mildly iconoclastic atmosphere at MSU which is hospitable to innovation. And at the personal level, witnesses in the legislature and the university say the necessary note of bonhomie has been set by the two deans, Andrew D. Hunt, Jr., of the College of Human Medicine and Myron S. Magen of the College of Osteopathic Medicine.

Hunt came to MSU from the Stanford medical school's ambulatory care program. At Stanford he had become particularly interested in making behavioral and social sciences a more meaningful part of medical education, and innovations in the MSU program testify to this interest. As for the issue of accepting a school of osteopathic medicine as an institutional equal, Hunt says the mandate for it was clear when the legislature passed the proposal by the largest bipartisan vote of that year. According to Hunt, John A. Hannah, MSU's president at the time, "saw it could be managed as a separate college," and Hunt worked with the faculty of the College of Human Medicine to accept it. Hunt says he saw it as a "social opportunity." The Hunt style is low-key, and he gives the faculty most of the credit for the accommodation, noting that perhaps a key action came when the psychiatry department voted unanimously to be jointly administered by the two schools.

One practical reason perhaps why there has been little fraternal infighting is that everyone is too busy. The College of Human Medicine has been fully engaged in organizing a clinical education program using far-flung community facilities (*Science*, 20 October). The school has also been going through the usual problems of developing a curriculum compounded by the ascent from a 2-year to a 4-year program.

The challenges faced by the College of Osteopathic Medicine (COM) are of a different order. MSU's COM is the first college of osteopathic medicine to receive full state support and to operate on a university campus. As a result, many things are expected of it and it is suspected of a lot of things. The COM will be called on not only to train D.O.'s and specialists, but to im-