

Conclusion

Reflecting, Reinventing, and Reconnecting: Networking and Professionalizing in the VAS

As the century in which multidisciplinary state academies of science have “come of age” draws to its close, it is appropriate to evaluate the position of the Virginia Academy of Science. In the late twentieth century, the Virginia Academy is a vastly different institution from the organization established in 1923 by Ivey Lewis and his small coterie of science educators. And, as we have seen, such a transformation is not surprising. For a history of an academy of science is a history of people — a reflection of their personal motives and of the intellectual, social, and political context in which they work and live. As society and its attendant scientific enterprise have changed over the years, so, too, has the Virginia Academy evolved, gradually altering its activities, membership, and structure in attempts to best serve the perceived needs of the men and women from whom interest and support seemed most likely to come. Indeed, it is the Academy’s attempts to capitalize upon its strengths and accept the changes relative to shifting cultural and scientific norms that have characterized its more than three-quarters of a century-long life.

Originally, the founders of the Virginia Academy of Science envisioned an association capable of offering camaraderie, encouraging research, and, perhaps, facilitating and eventually providing a publication outlet. And as Virginia scientists — much like their counterparts in the rest of the south — began the slow process of carving out a professional niche for themselves, they increasingly viewed the Virginia Academy as a necessary vehicle to professional status. During its early years, the Virginia Academy of Science was a reasonably effective, if not always forceful, advocate not only for Virginia scientists but also for science education. For example, within its first two decades, the VAS had

affiliated with the American Association for the Advancement of Science, secured a seat on the policy-making State Education Commission, initiated the Virginia Junior Academy of Science, lobbied on behalf of environmental conservation, provided a forum for presentation of scholarly papers, created a research fund, and established a small publication venue. One need only look at the steady increase in VAS membership from 1923 until World War II — from 135 members to 912 — as evidence of an interest in and perceived need for a statewide, multidisciplinary, scientific organization in the Commonwealth.

With the advent of World War II and the departure of so many male citizens for military duty, membership numbers dipped, hovering around 640. By sponsoring broad, long-term projects focusing less on the individual scientist and more on the larger task of developing science within the state, the Virginia Academy of Science — despite loss of membership — managed to maintain a high level of productivity throughout the war years. Participating in the Southern Association for Science and Industry, promoting the concept behind the Virginia Institute for Scientific Research, and setting the wheels in motion for publication of *The James River Basin—Past, Present, and Future* were all important endeavors the VAS initiated during wartime.

World War II and its aftermath revitalized the economy of Virginia, giving new life to her institutions of higher education — in particular to the area of science. During the late 1940s and early 1950s, hiring more scientists, establishing modern research facilities, and creating rigorous graduate programs became par for the course, especially within the Commonwealth's larger universities. Additionally, both private and public sector industries provided opportunities for scientists to expand their professional activities and horizons. Not surprisingly, given these new levels of economic and social support, Virginia scientists steadily moved into the national professional scene. Within this national context, many Virginia scientists no longer saw the Virginia Academy of Science as one of the primary avenues for their professional advancement.

Though this shift in perception of the organization might at first blush have seemed detrimental to the integrity of the Virginia Academy of Science, the changing attitudes did not act as a roadblock to the Academy's forward movement. Much as it had fifteen years earlier, during the late 1950s the VAS assessed its new situation, redirecting its energy into areas in which it seemingly might best serve its constitu-

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ents. As the Academy moved into the future, the most vital areas of service came to be providing a forum by continuing the annual meetings, publishing the *Virginia Journal of Science*, serving as an advocate for the environment, and supporting science education in the public school systems. The leadership of the VAS appeared to be comfortable with such objectives. Again, in keeping with its earlier patterns of response to social and cultural change, a likely prediction of the years to come is that the Academy will continue to try to meet the professional needs of a group of scientists in a similar manner, with the organization showing a flexible response to changes that will take place inside the Commonwealth's community of scientists.

Membership numbers illustrate a part of the ever-changing scene within which the Virginia Academy of Science has operated. Consider the following averages: during the 1950s, the Academy's overall membership fluctuated between 973 and 1022; the following decade, between 1114 and 1402; in the 1970s, from 1360 to 1563; during the 1980s, 1121 to 1494; and in the first half of the 1990s, membership remained between 1200 and 1300, with the trend taking a slight upward turn as the decade advanced. Such overall fluctuation is common in academies of science. Members are dropped from the roll for nonpayment of dues, many join the Academy for one year only in order to present a paper, and graduate students and younger scientists often move on to institutions out of the state, shifting their memberships as they go. Given the exponential growth in the number of scientists practicing in Virginia since the 1950s, however, one might have expected the Academy's membership numbers to have reflected a concomitant rise.

Individual memberships are not, of course, the only category within the Virginia Academy. A breakdown of the overall membership shows that business memberships have declined since the early 1970s, from twenty-four in 1970, to nineteen in 1980 to thirteen in 1990. Such a decline is of concern to the Academy. However, in 1995, four new businesses joined, a number sustained through 2000. Student memberships, in contrast to the fluctuation within individual senior members and businesses, have shown a steady increase. Over the past twenty-five years, the number of student memberships has risen consistently. There were sixty-three students in 1973 who held membership in the Academy. One decade later, the number had more than doubled, to 138, and in 1990, the figure had risen to 264. In 1995, the number had gone up to 307, and the projection for future growth is positive. Such a trend is in

keeping with the present objective of the Virginia Academy of Science to encourage and support young scholars.

Business memberships and students have not, however, been the core constituency of the Academy. Much as it has since the 1960s, the VAS continues to draw members primarily from the academic community. In this respect, the VAS is similar to other southern state academies of science. In Virginia, as elsewhere, scientists from industry and government and high-school teachers comprise less than ten percent of the overall membership of the Academy. In commenting on the composition of current membership, Elsa Falls of Randolph-Macon College and President of the VAS from 1994 to 1995, pointed out:

If we look back at recent years and consider where the people instrumental to the operation of the Academy are from, we see that more and more younger people are coming from community colleges and small liberal arts institutions, while only the more senior members come from research universities.¹

Falls continued by remarking that, for the most part, the Academy was not getting the level of support it would like from the major research institutions. Not surprisingly, she said, given the membership statistics, graduate students increasingly are giving the papers in the sections. A cursory look at abstracts from 1985 to 2000, for example, reveals that two authors often are listed. In many cases, one is a graduate student and the other a professor. And the VAS encourages graduate student participation, even offering a "Best Student Paper Award." It appears that, over time, Virginia scientists have come to regard the Academy's annual meeting as a friendly and supportive environment where younger scientists and graduate students might deliver scholarly papers, more established scientists might present a paper to gain priority for work they will soon deliver elsewhere or to offer results of research that is regional in nature, or where research ideas might be exchanged in an interdisciplinary environment.

Over the years, annual meetings have remained a vital activity of the VAS. On the basis of an analysis of abstracts of presentations from each year's annual meeting published in the *Virginia Journal of Science*, on average, Academy members have delivered 230 papers per meeting since the 1960s. The number of sections has risen — from twelve in 1960 to sixteen in 1976 to nineteen in 1995. Thus, while the level of overall presentations has remained relatively consistent over thirty-five

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years, participation in individual sections has declined or allegiance to a section has shifted — for example, from Astronomy, Mathematics, and Physics to Computer Science. While one might assume that the greater number of scientific positions in the state academic institutions would result in greater participation within the discipline-based sections, that obviously has not occurred. This fact is probably a reflection of the inclination of senior scientists to present papers in other forums that have the advantage either of being refereed or are of greater prestige.

The presentation of papers alone has not been the single focus of intellectual activity within meetings of the VAS, for in addition to the regular paper presentations in individual sections, the Virginia Academy of Science has consistently sponsored symposia on a wide variety of topics ranging from “Planning for Technical and Scientific Post High School Education in Virginia” (1965) to a “Symposium on a Museum of Science in Virginia” (1969) to “Biota of the Virginia Barrier Islands” (1990) to “The Toxin-Producing Organism, *Pfiesteria piscicida*: Response Protocols and Monitoring Results in Virginia Waters and Related Studies—1998 (1999). It is worthy of note that these symposia reflect the special interests of the Commonwealth, in contrast to individual papers, where the research focus of the individual scientist and his or her students is on display. The symposia therefore represent a tie between the needs of the state and the services of the Academy.

This same linkage appears in the *Virginia Journal of Science*, another visible indication of the staying power of the Virginia Academy of Science in changing times. In addition to issuing an annual directory and publishing the proceedings of the annual meeting, the *Journal* publishes articles that are generally regional in nature. As Golde Holtzman stated in March 1997: “The *Virginia Journal of Science* is a worthy publication, especially for biologists and naturalists describing local flora and fauna.”² The *Journal* also publishes articles treating aspects of the nature of science and of science education. Articles of this type have ranged from Michael Bentley’s “On the Teaching of Origins” (1981) to Ertle Thompson’s “Federalism and Its Impact on NSF Grants and the Training of Teachers” (1983) to Alvin Pettus’s “Perceptions of Science: Changes Needed” (1992).

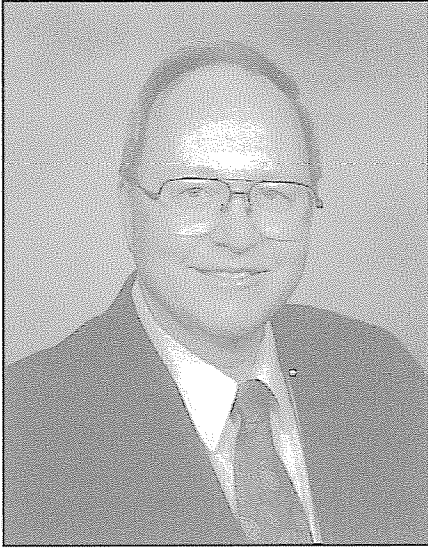
In recent years, the publication of the *Journal* — while still requiring an enormous amount of work — has been smooth, causing little concern among the leadership of the Virginia Academy of Science. In

part, this can be attributed to three factors. First, Virginia scientists have recognized the value of supporting a regional publication that does not attempt to compete with national journals. A second factor is the thirteen-year (and continuing) editorship of James Martin — a major accomplishment in continuity, considering that Martin was appointed as the tenth editor in twenty-five years. And third, advances in desktop publishing have removed the need for numerous steps in the printing process, making it easier to keep the *Journal* on schedule and lowering publication costs.

While the purpose of the annual meeting and the *Journal* is to serve directly the members of the Academy, the Virginia Academy of Science works directly with the people of Virginia through its service orientation. A primary objective of the VAS throughout its history, and especially after World War II, has been environmental advocacy. In many respects, the Academy has been successful in this task, from drawing attention to the plight of Seashore State Park at Virginia Beach in the late 1950s and early 1960s, to the lobbying for a variety of different “eco-causes” during the 1970s. The 1970s as well brought the Academy to public notice when it served as the Advisory Committee to Governor Godwin throughout the Kepone crisis, while in the 1990s the VAS served as watchdog in the WISTAR rabies vaccine trials.

Not all of the Academy’s efforts in the service of the Old Dominion have had the impact the Academy desired, usually because of implementation difficulties within the Academy itself. The Great Dismal Swamp project was initiated in 1952 with two goals in mind: first, to introduce the citizens to the natural wonders of the state and, second, to educate the public as to the vital importance of the swamp to the region’s ecosystem. More than twenty years later, the Virginia Academy of Science shelved the project — the unfortunate victim of often unforeseeable administrative problems within the Academy. Such cases remind us that the VAS is a volunteer organization and its successes are often the result of the vigor and staying power of individual members.

It is in the area of science education, however, that the Virginia Academy of Science arguably has made and continues to make its most important contribution to the Commonwealth. Given the analyses of the woeful condition of public school science education in the latter decades of the twentieth century, the VAS has made efforts in an important area where there has been and continues to be a real need. For more than twenty-five years, the Academy has offered a Visiting Scien-



Gerald R. Taylor, Jr., James Madison University, served as president of the Academy (1991–1992), was selected as a Fellow in 1995, and, as director of the Visiting Scientists Program, promoted the web-based Virginia Science Resource Network.

tists Program through which, free of charge, secondary-school teachers may request scientists to come to their classrooms to discuss a wide range of issues. Public contact with professional scientists throughout the Commonwealth may be further facilitated by the web-based VSRN (<http://www.smv.org/VSRN/>) that has evolved from the partnership between VAS and SMV.

Through the Science Education Committee, the VAS has faithfully fought for the highest of pedagogical standards among the region's high-school science teachers. In addition, the committee has lobbied for a rigorous, up-to-date science curriculum, and from time-to-time has been involved in battles over textbooks, over what should be taught and how, funding for new educational technologies, and support for hands-on experiences to accompany book-based learning in the middle and elementary schools. At its annual meeting, the Academy has long supported a Science Education Section in which pedagogical techniques might be discussed as well as other ways of stimulating an interest in science. Beginning with its first symposium in 1965 — "Planning for Technical and Scientific Post High-School Education in Virginia" — the VAS has sponsored numerous symposia designed to address issues of quality in science education. In 1975, the Virginia Academy of Science co-sponsored its first Annual State Science Teacher's Conference, an activity which continues into the new century. As important as these

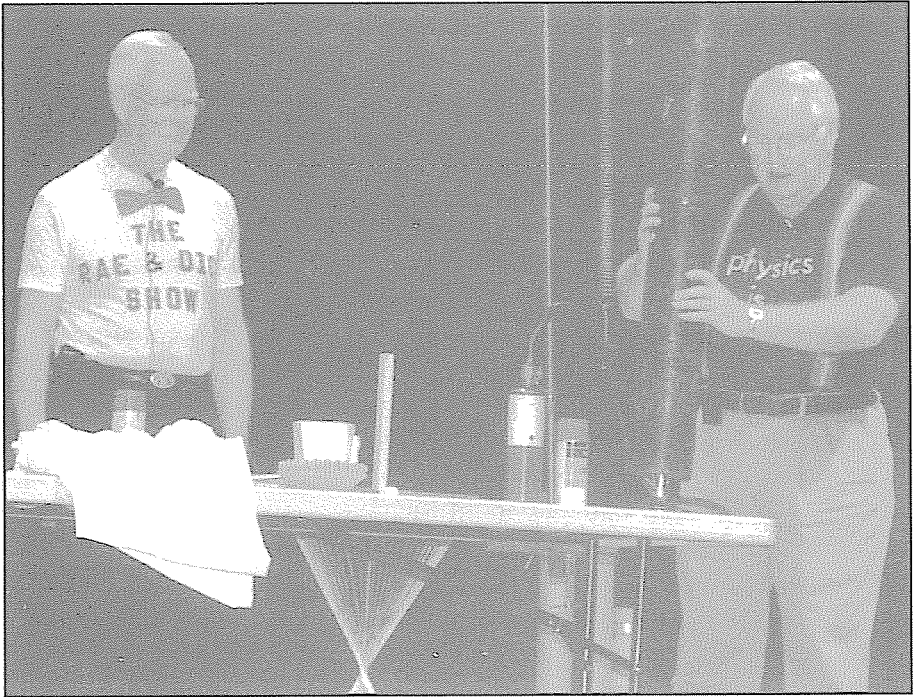
efforts have been, however, they are overshadowed by the Virginia Junior Academy of Science.

For more than half a century, the VAS has sponsored the Virginia Junior Academy of Science. Instituted to stimulate scientific awareness among Virginia's junior-high and high-school students, the VJAS has grown into an extraordinary volunteer endeavor. In 1991, long-time VJAS Director Dean Decker estimated that the Junior Academy required on average 15,000 volunteer hours per year — including all judges, committee members, teachers, and readers. In addition, the director of the VJAS donates about 1000 hours per year. This commitment of time and energy has been greeted with tremendous enthusiasm among young Virginians, who throng to the annual Junior Academy meeting in ever-increasing numbers and whose excitement over the research they do and the results they present is obvious to the most casual observer.

Given this level of support on the part of the members of the Academy, it is not surprising that from the early 1980s on, the VJAS grew remarkably. This growth is amply testified to by the numbers of papers submitted and presented and by the number of overall attendees. Consider Table 6.2 (page 300), which covers activity through 2001.

On average, the Junior Academy has selected about forty-five percent of papers submitted for presentation at the Annual Meeting. In 1987, Ertle Thompson of the Science Education Committee conducted an informal, written survey at the Virginia Junior Academy of Science's sponsors' meeting in which he asked those present, among other things, to estimate the percentage of student papers that they turned down prior to selecting the papers to be submitted to the VJAS for consideration. The average was eighty-five percent. From these data, Dean Decker estimated that, during the late 1980s, more than 18,000 students were involved in some level of the Junior Academy process.

Given this large number of students, there is a sense in which these statistics are misleading. For despite the seemingly high level of participation, only about seventeen percent of the schools in the Commonwealth currently are affiliated with the Virginia Junior Academy of Science — more or less the same as the twenty-percent affiliation in the 1950s. Participation from the southwest corner and southside region of the state is notably lacking — a phenomenon attributable to various factors, from geographic isolation to smaller class size to the educational level of many adults of these regions. Whatever the causes for this lack of participation, the VAS has been concerned for some time



Ever mindful of how the physical world stimulates student interest, Drs. D. Rae Carpenter, Jr. (left) and Richard Minnix (right) present “The Dick and Rae Physics Demo Show” as the VJAS Jeffers Memorial Lecture, P3-Phabulous Physics Phenomena, at the annual meeting at James Madison University (2001). Both physicists served on the faculty at Virginia Military Institute, have contributed significantly to the education of students throughout the Commonwealth, and have been active leaders in the Virginia Academy of Science.

and has considered various ways in which it might reach these students.

For the past seven years, the Virginia Academy of Science has discussed the concept of regionalization as a way of increasing the accessibility of the Junior Academy to all geographic areas of the Commonwealth, particularly those areas where low participation is typical. If regionalization were to occur, Dean Decker said in March 1995, about 200,000 more students would be involved in the VJAS. Given the effort that would go into regionalizing the VJAS — primarily doubling the already considerable volunteer force and enrolling community colleges

and smaller colleges to donate their space and time — it is not likely that the concept of regionalization will become reality any time soon.

The VJAS meets immediately prior to the Senior Academy's annual meeting. In 1995, the Junior Academy offered thirty-seven topic sections, up from twelve in 1981. The winner of each topic section presents his or her paper in the corresponding section of the Senior Academy. This presentation is of great value to the students, as it offers them contact with the professional scientists who make up their audiences. Additionally, awards recognizing outstanding research in a wide variety of areas are given annually. In 1995, nineteen awards, all with monetary value, were presented. For example, the Frances and Sydney Lewis Award bestows \$13,000 over four years for the best effort by a student in grades nine through twelve in the field of environmental science. Another award provides two students and two alternates with the opportunity to present their papers at the American Junior Academy of Science that is held annually at the national AAAS meeting. Yet another gift comes from a company: in honor of its past chair, William W. Berry, Virginia Power presented shares of common stock, which in later years has been awarded as a savings bond, to the winner of the best engineering paper.

While one does not want to minimize the impact of the awards themselves to the young student winners, the most important aspect of the VJAS is its potential influence on the future lives of the participants. For the majority of students, the Junior Academy of Science broadens and strengthens their understanding of and commitment to science. Others, however, go into careers that are tied to the early experiences they enjoyed through the Virginia Junior Academy of Science. Indeed, Dean Decker estimates that one in every five Junior Academy members enters a scientific profession. All told, the VJAS contributes to a citizenry carrying a public understanding of science and an interest in the natural and physical worlds — an important legacy as America enters the twenty-first century in which science and technology are likely to drive the economic and probably the socio-political machinery of state. In many respects, then, the Virginia Junior Academy of Science has become the most important outreach arm of the Virginia Academy of Science and, many feel, its primary focus. The Junior Academy's importance and success is such that it is not uncommon to hear an Academy member refer to the relationship between the VAS and the VJAS as a classic case of the tail wagging the dog. In this situation, however, given

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the solid professional footing on which Virginia scientists appear to find themselves and the state's chronic weaknesses in science education, the Academy's highly effective support of young people is both necessary and desirable.

Yet other examples of outreach — the branches of the Virginia Museum of Natural History and the Science Museum of Virginia — are highly visible accomplishments of the Virginia Academy of Science. Their creation traces back to action from as early as 1933. The final push that established the Science Museum of Virginia was the result of the efforts of a number of players, particularly Academy members Rae Carpenter and Roscoe Hughes. The assertive and determined leadership of these men was essential to the birth of the Museum. Of particular mention is their skill in marshaling the members of the VAS to provide the necessary political support for the project. To this day, the Science Museum names as its founder Roscoe Hughes. In 1995 alone, 350,000 people of all ages visited the Museum, while approximately eight outreach programs served 150,000 more people. And teacher-training programs sponsored by the Museum have raised the quality of science education for countless students.

A final area where an analysis of the VAS at the turn of the century is appropriate lies in the area of finance. Although the Virginia Academy of Science works within strict financial parameters, as do all state academies of science, it is in excellent fiscal shape. Currently, Academy assets are administered by its Trust Committee, which holds mutual funds of common stocks for a variety of purposes: General, Research, VJAS Endowment, Bethel Scholarship, Fellows, and Legacy 75. On December 31, 2000, assets totaled \$885,344, up from \$408,368 at the end of 1995 and \$153,379 at the end of 1990. For the decade, this change amounts to an annual rise of 19.2%.³ Except in the case of an occasional external grant, the Academy is completely self-sufficient, maintaining operations without subsidy from any other institution or from the state. While this financial stability exceeds that of other southern state academies of science, the financial holdings of the Academy are still modest in comparison to other state pedagogic and scientific agencies or institutions. Consequently, with the exception of initiatives involving the Junior Academy of Science, the VAS does not show any signs of expanding its current programs and operations. This caution with regard to fiscal matters is, indeed, typical of the Virginia approach to expendi-

ture, which manifests itself in, for example, the Commonwealth's constitutional mandate to present and to remain within balanced budgets.

The remaining question to be addressed, then, is not whether the Virginia Academy of Science will continue to try to meet the professional needs of Virginia scientists, to promote scientific inquiry within the state, and to help form the expectations that citizens should hold for science in the region. Indeed, if the organization's long history is any indicator, the Academy will continue to pursue these goals. Rather, the question is whether the association's past methods for achieving its institutional goals will continue to be effective in the changing environment of the early twenty-first century. Throughout its history, the VAS has undertaken its initiatives via what long-time member Rae Carpenter refers to as the "Old Boys' Network" or the "extended family of the Academy." In a recent interview, Carpenter reminisced:

We were very much a family. Our ties ran deep and strong. Not only were real families represented through the generations — such as mine, the Gilmores, the Murrays, and the Robesons, but also academic families. The Old Boy Network was very much alive in Virginia. Many high-school teachers and devoted Academy members such as Vera Remsburg were taught by George Jeffers at Farmville and were known throughout the state as Jeff's girls, while those studying biology for their doctoral degrees under Horton Hobbs at UVA were known as Hobbs' boys. When we got our degrees, our major professors would call around to their cronies at other departments, or visit at the VAS annual meetings and say: "Hey I've got a biologist or a physicist who needs a job. Who needs a biologist? Who needs a physicist?" And that was the family job search.⁴

Until recently, Carpenter continued, the presence of the "Old Boy Network" was pervasive. Politicians and devoted Academy members Senator Lloyd C. Bird and Secretary of Commerce Maurice Rowe created many linkages between the Academy and the state government. Ed Harlow, Rudolph Gladding, Arthur Burke, Blanton Bruner, and H. Rupert Hanmer, to name a few — all long-time members of the Academy — were at the highest levels of corporate management in Virginia and brought the monetary and administrative support of their respective businesses to the VAS. Frank Kizer, State Science Supervisor for

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many years, was the mentor of Joe Exline, his successor; both were members of the VAS and fully supportive of the Academy's long-standing commitment to raising the standards of science education. In this "extended family", then, well-placed members and friends of the Academy mobilized both personal and institutional resources to support the work of the organization and its position within the larger political and economic competition for resources and standing.

While references to "Old Boy" systems carry with them a pejorative flavor in today's politically-correct environment, there is another way to look at this set of relationships. Viewed from this other perspective, the Virginia Academy of Science may be seen as the center of a large web of negotiations. From the interaction between two members of its executive committee to the lobbying of the General Assembly for a state museum of science to the response to a controversial decision by the Governor to cut funding for research or science education, the concerted influence of the negotiators was brought to bear for the Academy's purposes — purposes that supported the interests not only of academic and professional scientists but also of science itself within the public arena. Additionally, all such negotiations contributed to the continued healthy existence of the Virginia Academy of Science as well as to its level of apparent power — or lack thereof — within the Commonwealth. At its foundation, then, the Virginia Academy is, to use the terminology of science studies scholars Bruno Latour and Michel Callon, a "network of people and things" — resources — held together by their interaction. Latour suggests that the effectiveness of such networks is predicated both on the political or social power of the individual participants and on the freedom of these players to act on behalf of the group when mobilized.

Regardless of what model we employ to understand the workings of associations — the "extended family" or the Latourian network of people and things — for the Virginia Academy of Science to function effectively, three components must be present. First, a portion of members must hold consequential positions and possess both the discretion and the willingness to make decisions critical to the status of the Academy. Second, the members within the network must have access to sought-after resources. And third, the Academy as a network must have the ability to affect the larger community's decisions at both the local and at the state level concerning questions critical to the operation of the Academy.

Until recently, the Virginia Academy of Science through personal negotiations was able to position itself at the center of a solid web of influence. Members of the VAS enjoyed sufficient stature either within academia or within the social structure of the greater Commonwealth to assure the effectiveness of each component of the network. However, current trends within the Commonwealth and, even more important, trends within the larger world of academia and science, do not suggest that the Academy membership will be able to continue to meet these requirements. First and foremost, senior members of the VAS must have solid, professional standing within the world of their academic peers. That is, as a group, they must be respected as scientists if they are to exert influence within the Commonwealth's colleges and universities or to have any impact on the body politic in those matters affecting science, science education, or environmental concerns on which the VAS has chosen to focus.

If the weakening of the web were simply a question of loss of clout on the part of individual members, then the Academy could continue conceivably to operate as it has in the past, working to recruit regular members with high prestige. Because of the shared scientific enterprise and the common environment, these people could be expected to cooperate with one another in maintaining the network set in place by their forebears in the VAS. This is not the situation, however. Personal ties of the sort described by Carpenter are no longer sufficient to "win the day." Science, academia, the Commonwealth itself have become sites of fierce competition, and in this competitive environment, impersonal rules have taken over the prerogatives of individuals. For example, the department chair, who once might have taken into the junior faculty a candidate on the recommendation of a colleague, is no longer in a position to be so "arbitrary". There are at least two reasons for this situation. One is the dominance of the rules. Theoretically, no position within the Commonwealth's academic institutions may be filled without going through a set of elaborate procedures designed to shake the institutions loose from the very methods of selecting people that supported the extended family — or the Latourian network — of the VAS. Second, each institution — each department — is driven to produce research and students. If it does not, a department will lose funding or, worse, its very existence. As a consequence, department chairs must take the most productive individual available on the market, and various departments have differing models of productivity that cause them to see

junior faculty through very narrow lenses indeed. These two forces, the dominance of the rules and the definition of productivity, establish a situation in which the people who once made up the human part of the network lose cohesive force.

Resource allocation presents a very similar scenario. Once again, impersonal rules govern the distribution of resources throughout the Old Dominion, particularly among universities and colleges, where formulae produced by the State Council of Higher Education in Virginia can come down like the wolf on the fold when a department regarded by its institution as important is judged by the formulae to be of questionable value. Resources — from equipment to salaries — are determined by these rules. In this scenario there is, of course, always present the ability of the historically powerful state institutions to jump over these formulae. The University of Virginia, for example, is often able to affect its own funding, but the fact remains that the resources accessible to the network through which the VAS has worked are controlled by institutional forces that are generally beyond the ability of the present Academy to affect. To a very large extent, the fiscal resources that once funded the scientific enterprise of the Commonwealth are hard for any Virginian to influence, since they flow largely from federal dollars. Consequently, while Virginia's scientists may be uncertain of their status, so too are the power brokers in academic institutions and supporting organizations such as state academies of science across the nation. Status is everywhere in doubt.

The status of the Virginia Academy of Science itself has been a function both of the aggregate prestige and influence of its individual members and the ways in which the Academy's organizational leadership has chosen to deploy that clout. Here too, the future of the Academy does not seem bright. It is not simply a question of the absence of first-rank senior scientists within the power structure of the Academy — although, of course, that represents a potential problem. But the fact is that for many societal and economic reasons, regional organizations cannot hold a position of exclusive authority or access within the state. For example, very active within Virginia have been both the Chesapeake Bay Foundation (CBF), based in Maryland, the Environmental Defense Fund (EDF), and People for the Ethical Treatment of Animals (PETA). A question concerning the natural environment or of animal rights can hardly be raised before these non-regional groups have come forward with positions and courses of action. Not only is a state-based

group like the VAS of reduced influence in this new interconnected world, but also the slow-moving response that is a necessary condition for academic scientists whose main interest lies in their professional lives makes little impact, at least in the public eye.

This is not only the age of "downsizing", to which academic institutions in Virginia have already been subject, but also of "global information exchange" as well. The watchword for the day is "market forces", and the conservative, political machine that now operates so smoothly in Virginia is committed to abiding by the market's rule. If the Commonwealth could buy expertise in environmental design more cheaply from Japan, or if it could import Distance Learning from California or Massachusetts for less money than paying home-grown professors, for example, it would violate the laws of the market and incense the electorate if it failed to do so. Those who live by the sword die by the sword.

The somewhat old-fashioned networking methods of the Virginia Academy of Science do not comport well with these more raw and impersonal conditions. Not only is there a problem with the road-blocks thrown-up by rule making, but also, oddly enough, the Academy has failed to take advantage of some of the technological resources that are most widely used within the general profession of science for modern networking. For example, until 1997, the Academy had neither a viable homepage nor a listserv. And, a significant percentage of the membership had stated that they did not see the need for such tools.

Networking and organization-building are also among the bag of tricks that public relations experts can supply. Yet here, too, with the exception of a minor campaign in the early 1990s to raise money for the directorship of the Virginia Junior Academy of Science, public relations efforts on behalf of the Academy have been almost non-existent. In Chapters Five and Six, I presented the Virginia Academy's idea of building membership as one in which everyone in Council was asked "to bring one friend to the next annual meeting. . . or to publicize the *Virginia Scientists*." It is clear from discussions with the senior members that they do not feel comfortable with more aggressive methods of attracting members. I take no position here regarding the ethical character of the current recruiting practices of the Academy. It is, however, my opinion that if the Virginia Academy of Science is to compete in the twenty-first century as more than a comfortable club for aging faculty and science practitioners, it must develop a more realistic assessment of the conditions in which it now finds itself, and it must develop new

approaches to help it survive and grow in these conditions. Surely the threatening atmosphere of the nineties will eventually ameliorate; surely the reliance on institutional rules and formulae as substitutes for personalized decision-making will shift. But for the VAS to be there when the times become more promising, the organization must make it through the current atmosphere with a strong membership base and a claim on resources with which it can build a new network.

A starting place for the reassessment that I regard as imperative might be to set up a team consisting of science studies analysts, public relations professionals, and experienced electronic network providers. All of these people could actually come from universities: from science studies programs, from schools of business, from departments of computer engineering or electrical engineering. This team might take the analysis I offer herein as a starting point, and, using their own analyses and talents, construct a strategy that would allow the Virginia Academy to move into the next century in a position of surety, if not power.

For more than seventy-five years, the leadership of the Virginia Academy of Science has worked hard in support of education, of the environment, of the Commonwealth and its multiple communities. I believe that there is a place for a state academy of science, and there is a role, and there is a need for a neutral, informed and informing body of scientists who support education, the need of the body politic for analysis and advice, and of human beings for support and nurture in their professional lives. The Virginia Academy of Science can and should fill those needs. But to do so, it must change. There could be no better time for the VAS, with its internal cohesion and its record of perseverance, to take stock, to take up the challenge, and to come up with plans for the new day.

Endnotes

¹ Elsa Falls to Charlotte Webb, Phone interview, March 27, 1997, Ashland, Virginia.

² Golde Holtzman to Charlotte Webb, Email interview, March 27, 1997.

³ Annual reports to Council by Trust Committee: 1990, 1995, 2000.

⁴ Rae Carpenter to Charlotte Webb, Personal interview III, May 8, 1997, Lexington, Virginia.

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