

**Division of Professional Relations**  
**1155 16th Street, NW**  
**Washington, DC 20036**

DENNIS CHAMOT, *Editor*



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## FROM THE EDITOR . . .

### Report from Kansas City

The Council Committee on Professional Relations has been working on revisions of the Professional Employment Guidelines. The final version for the third edition was approved, with many small changes. This will be submitted to the Council for consideration at the Spring meeting in Seattle, probably to be voted on in Washington at the Fall meeting. This will be a full five years since the second edition was approved in 1978.

The major change is addition of the following language to the chemist section (Terms of Employment): "The chemist will disclose all of his/her inventions to the employer in a timely fashion. The chemist will convey title to all inventions to the employer if: the employer provides space, time, labor, or equipment in pursuit of the invention; or the invention involves a product or process of the employer; or the invention relates directly to the business of the employer."

Similarly, wording is added to the employer section, as follows: "The employer will not assert title to inventions that: were developed on the employee's own time; and did not involve equipment, facilities, supervision, or trade secrets of the employer; and do not relate directly to the business of the employer. The employer will transfer patent rights to the employee when the employer has: no continuing interest in the invention; and a written request with a full disclosure of the invention."

Fine as far as it goes, but except for the final sentence on transfer of inventions of no use to the employer, this is not much different than standard practice now. There is no mention of compensation, as would have been called for by the old Moss Bill (more on this below). But it's a step in the right direction, and might help to eliminate the worst abuses.

The Committee on Economic Status had a full day meeting, as usual. Among the many subjects discussed was the economic status of chemists, naturally. Some interesting data was presented which showed that chemists' salaries have indeed suffered over the past few years (in real terms), but not necessarily any worse than has been the case with other employed professionals. For example, the accompanying table shows the results of a national survey of salaries for employees in larger private establishments. Chemists did better than some, worse than others, but there really isn't that much variation. The single biggest determinant is the general state of the economy.

As for the Council meeting, it is interesting that the biggest controversies, and the most debate, were devoted to two financial issues. One involved the proposal to charge emeriti members for *C&EN*. The main argument in favor was that this is quite expensive (emeriti pay no dues), and that the

Society should at least charge the run-off cost of the magazine. The main argument against the proposal was that *C&EN*, whether we like it or not, is the official organ of the Society and should be sent to all members. Currently, emeriti can elect not to receive the magazine, a policy with which I disagree. The proposal did not get the required two-thirds vote, and failed.

The other issue concerned an increase in the allotment to local sections. This, too, did not get the required two-thirds.

A disturbing part about all of this, and other things besides, is that the Society budget is approaching \$95 million. Most of this is related to the publishing program, particularly Chemical Abstracts. Dues account for less than 10% of the total. Yet every time there is a discussion involving dues, dues supported activities, or allocation of dues income, everything must stand alone, as if nothing else existed. Now, I have been Treasurer of the Society for Occupational Safety and Health

for a few years, and I have dealt with other organizations, and every one of them that I am familiar with, *except ACS*, uses publishing and other activities to relieve pressure on dues. Only ACS seems to think that dues supported activities are only incidental to the "business" of the Society, and that they must fade away if dues income is insufficient to carry them totally. Apparently, some people who should know better are more interested in running a publishing house than a professional society. Their priorities would appear to be backwards.

### Patent Legislation

Many of you have had a strong interest in Federal legislation dealing with the issue of compensation for employed inventors. You may recall that for several years former Rep. John Moss of California introduced a comprehensive bill based on

(continued on page 5)

### Percent increase in average salaries, selected occupations, 1970 to 1982

Occupation	Annual average		
	1970 to 1980	1980 to 1981	1981 to 1982
<b>Professional, administrative, and technical support:</b>			
Accountants.....	7.3	10.0	9.6
Chief accountants.....	7.9	9.5	11.4
Auditors.....	6.6	10.3	9.4
Public accountants.....	—	7.9	6.6
Job analysts.....	7.0	7.6	9.2
Directors of personnel.....	7.8	11.4	9.6
Attorneys.....	7.0	9.8	11.4
Buyers.....	7.0	9.8	9.4
Chemists.....	7.2	9.4	10.4
Engineers.....	7.0	10.9	10.2
Engineering technicians.....	7.2	10.2	9.4
Drafters.....	7.3	10.9	8.4
Computer operators.....	—	—	8.9
Photographers.....	—	—	9.7
<b>Clerical:</b>			
Accounting clerks.....	6.7	9.6	8.9
File clerks.....	6.9	8.0	7.2
Key entry operators.....	7.3	8.2	9.4
Messengers.....	6.7	9.7	6.4
Personnel clerks/assistants.....	—	—	10.2
Secretaries.....	—	—	9.2
Stenographers.....	8.4	12.1	13.8
Typists.....	7.1	10.2	10.1

Source: U.S. Department of Labor, Bureau of Labor Statistics.

# ACADEMIC AND CORPORATE VALUES AND GOALS— ARE THEY REALLY IN CONFLICT?

Ronald E. Cape  
Chairman of the Board of Directors  
Cetus Corporation  
Berkeley, California

The academic and corporate communities have depended upon one another for many years. Both through sponsored research and training programs and corporate philanthropy, universities have been able to strengthen the quality of both research and teaching and generally do better those things a university is supposed to do. Industry, on the other hand, depends on the universities for a continuing supply of highly trained personnel, not only in the sciences and engineering, but in business as well. It is primarily the fundamental findings of academic scientists which are ultimately developed into commercialized processes and products which eventually benefit society at large. While most university based research is and should be supported by the government and non-profit research foundations, corporations have been supporting academic research for several decades. This is particularly true in chemistry.

Nevertheless, the fact that there is even a symposium of this title (Industrial-Academic Interfacing: A Challenge of the 80's) on the American Chemical Society's meeting agenda would perhaps imply that there is something novel in this symbiotic relationship between academia and industry. To be sure, there has been a new focus of attention towards the important relationship between universities and corporations as a result of the recent "commercialization" of the findings of the biological sciences; the rise of biotechnology corporations, such as Cetus Corporation, has signaled the commercialization of research findings in an area which not long ago was regarded as purely scholarly. But this is not the same thing as the commercialization of the university. I will return to this point.

The pharmaceutical industry, once a rather specialized hybrid between the chemical industry and the clinical research laboratory, has also taken on a new dimension—also exploiting the remarkable advances in both molecular genetics and cell biology. It is not the case that the rise of biotechnology has brought about an unprecedented clash between corporate and scholarly values. While there is clearly a conceptual distinction between the profit motive and the search for the Truth, these values are not, in any significant way, in conflict. Further, the academic-corporate connection has existed for many years in many areas. It is novel only to certain areas of biological research.

A conference held in the spring at Pajaro Dunes, California, in which university presidents and corporate leaders met presumably to discuss their mutual problems, indicated to the public once again that there were, indeed, major problems to be solved. This was followed by a workshop in May sponsored by the Industrial Biotechnology Association, this ACS forum today, and a major conference to be held in December at the University of Pennsylvania. Does it follow from this continuing dialogue that there are, in fact, major problems to be solved? If corporations and universities have been cooperating for many years in both basic and applied research, why are corporate university relations apparently a new issue? Are there aspects of corporate-sponsored research in the biological sciences which are unlike those attending research in polymer chemistry, for example? Is the interest of corporations seriously compromising, as some have suggested, academic freedom and the nature of basic research in universities? We know that university professors are carrying out "commercial" research in their university laboratories. But then, to whom do the results and patents belong? The answers are not as simple as you might think, but these are the easier questions.

More difficult to deal with are the more subtle questions like the following: Is the creative process inhibited because people are afraid to discuss their ideas with each other for fear of betraying proprietary information? Are graduate students deprived of one of the most important parts of their training by being muzzled and told not to talk to their colleagues for fear of giving somebody else a competitive edge in the world of commercial biotechnology? Do university consultants, in fact, spend more of their time with their commercial ties than the university rules would allow? Do they "raid" their publicly supported colleagues' laboratories, offering much more lucrative commercial jobs to the best research technicians? And are their commercial ties breeding division and resentment in their university laboratories and among their university colleagues?

These questions reflect the charges that have been raised within the past year concerning the new academic corporate ties in the area of molecular and cell biology. Are any of these charges valid? Are these new problems that have not been faced before, or do they merely

represent a shift in the traditional ways of doing things within a particular academic discipline? I shall not attempt to assess either the existence of or the magnitude of these various problems in the academic institutions concerned. The mere fact that the questions have been raised suggests that either there is truth to at least some of them, or that there are reasons why the minds of some individuals perceive there to be problems. In either case, it is incumbent upon both the universities and their corporate partners to respond. Coming from a corporation, I have to observe that certain of the problems would appear to be chiefly the concern of the university. For example, in most universities, faculty members have been permitted the traditional one-day-a-week to consult for many years. If, for some reason, a faculty member does not observe his university's guidelines, or those guidelines are unclear, then those are really issues that must be dealt with within the university. Nevertheless, it is in the interests of everyone, including us corporations, that these problems are kept to a minimum, and that our relationships with universities are not only harmonious, but are perceived to be so by all those concerned.

Therefore, rather than discussing or debating the truth, or lack thereof, of the various charges, I would rather like to discuss briefly how at least some of these points of possible contention can be avoided. On the basis of Cetus' experience in negotiating contracts for the support of research in universities, I know it is rather easy to eliminate misunderstanding at the outset and to see that the interests of both institutions are protected. There are some, of course, who have argued that there is an intrinsic conflict of interest in any relationship between academia and a profit-making institution. I suppose it is possible for one to subscribe to a set of values where that would be true. Further examination, however, reveals that at least in the United States the goals for society espoused both by academicians and corporate leaders are more or less the same. What may at first glance appear to be a conflict of interest turns out to be in the final analysis, not a conflict at all, but, in fact, an expression of what was intended in the first place. While there is certainly a cultural value in knowledge, per se, the principal mechanism by which the practical benefits of research are achieved in the United States is through commercial development.

Let me distinguish between two rather different types of arrangements which currently exist between corporations and universities. The most common, and the type in which Cetus engages, includes individual contracts for research awarded to universities by corporate institutions, generally in support of a particular project in the laboratory of a particular scientist. These contracts are generally for relatively modest sums of money, perhaps ranging from \$25,000 a year to rarely more than \$150,000 or \$200,000 a year, and are, therefore, in the same monetary range as the Federal research grant or contract.

The other type of corporate-academic arrangement includes the granting of massive sums of money from a particular company to an entire academic department or to establish a new institute within an academic institution. This is a fundamentally different relationship than exists with support to an individual scientist. Here the strings attached may look more like chains. Examples of this type of arrangement would include the Hoechst \$50 million endowment of the Department of Molecular Biology at Massachusetts General Hospital. This is what I would describe as the "commercialization" of the university. It would also include the funding of research at Harvard and at Washington University in St. Louis by Monsanto, and possibly the establishment of the Whitehead Foundation at MIT, although that is, perhaps, an exception to the rule. Let me first deal with the individual research contract.

At present, universities differ a great deal in the terms they wish to specify in their research contracts. It is critically important that the terms of all such contracts be carefully examined by both university and corporate lawyers, in anticipation of any difficulties which could arise. Some of the trouble that has given rise to the rancor that some of us have heard about undoubtedly stems from a failure to consider these potential problems in advance and to write the research contract accordingly. In the first place, it must be understood that such a contract is not an act of charity from the corporation's point of view. The terms must be sufficiently attractive to both parties to give birth to the relationship. It has been our experience that by sitting down with university counsel, it is rather easy to arrive at a mutually agreeable set of conditions designed to protect the academic freedom of both the faculty and students, to protect proprietary rights of the inventor, and to ensure that the sponsoring corporation will be permitted to commercialize inventions which ensue from the contract in a way which is both fair and reasonable.

The question of patent rights, while sometimes raising a red flag to the uninformed, is one of the easier questions to deal with. The Patent Law passed by the 96th Congress, Public Law 96-517, clearly gives the patent rights of federally-supported research to the institution. The institution may then negotiate a royalty agreement with the original inventor. In general, passage of this law has resulted in higher royalties to the individual scientists. In the case of research sponsored by a corporation, the federal model is generally followed.

That is, the institution in which the research is carried out has the right to patent any invention ensuing from such sponsored research. It at least has the right of first refusal in the event it chooses not to patent the finding. In a few instances, universities permit the sponsored professor to retain the title to any inventions.

Most university contracts permit the corporate sponsor to review any research results, particularly those prepared for publication, for a fixed period of time to determine whether patents should be sought for any inventions. The period of time is generally thirty days. If the corporate sponsor decides something is patentable, this period may usually be extended for perhaps another sixty days while the university attorneys file for patents. After that period, the results may be freely published in the open literature. The 30-day review period is generally not considered an inordinate delay of communication of the results. Most often, even before a manuscript is prepared, there will be communication between the scientist, the corporate sponsor and university patent counsel so that patents may be filed at the same time a manuscript is ready for submission for publication, in which case there is no delay. This protects the professional competitive position of the scientist and allows inventions to be protected. Of course, in order for this arrangement to provide a benefit to the corporate sponsor, the one provision that is insisted upon is exclusive licensing rights. After a patent is filed, the corporation has a fixed period of time in which to decide whether it wishes to obtain a license. The university generally limits the period for which a license may be held. Typically, this limitation may be five years from the date of first sale of a commercial product, or eight years from the issuance of the patent, but this could change if the "useful" life of a patent is extended for pharmaceuticals by proposed patent legislation. For these rights the university is paid a royalty, the terms of which are worked out to be mutually agreeable between the institution and the corporation. Thus, not only is the academic scientist supported in research, but the university benefits as well, particularly if a product is commercially successful.

The protection of proprietary rights is an issue that certainly concerns the corporations. It is also a matter of importance to the institution, where it can be rather difficult for a faculty member to remember, in the course of talking to students or colleagues, whether a certain bit of information is somebody else's property. This is clearly something which has to be spelled out in detail before research is undertaken. In order to protect the patentability of an invention outside the United States, it is legally important that patentable results not be communicated publicly before a patent is filed (a one-year period of grace exists under U.S. patent law). And, of course, there is always the concern that somebody might steal your invention.

Universities tend to be rather sensitive on the issue of access to proprietary information. Most prefer that the project be set up in such a way that graduate students and postdoctoral fellows not have access to or work on what is

considered confidential research data. They feel, and I agree with them, that this would greatly inhibit an important part of the learning process where the free exchange of ideas and the critique of each other's work is not only a way of learning but a way of learning how to be creative. Principal investigators and a specific number of paid research assistants may have access to such data, but it is the primary responsibility of the principal investigator to protect proprietary information. This responsibility must be clearly understood and assumed by the principal investigator before he accepts research funds under these conditions. Certainly, not every scientist wishes to be in this position, and that, of course, is their choice. For those who do, however, it is important that the project involving proprietary data be in no way confusable with any of the other projects being conducted in that person's laboratory.

Of course, we wish to cooperate fully with university policies for protecting their graduate students and research fellows. In principle, this matter can be dealt with easily. In practice, one hears stories that it does not work as nicely as this. I would have to say, however, that in such cases it probably reflects a failure of the sponsoring company, the university and the principal investigator to thoroughly understand ahead of time the terms and implications of the contract they were signing. There is no reason why these problems cannot be avoided.

These, then, are the principal stumbling blocks which appear to be the source of much of the criticism of corporate ties to academia. It may simply be the inexperience of those in the biological sciences, for one certainly hears relatively little about such problems in the area of chemistry or solid state physics. It may simply be that this is a process which is in its infancy in biological sciences, and that after a period of maturation these problems, or the perception of such problems, will disappear.

There are, of course, certain facts accompanying the rise of commercial biotechnology which have attracted a great deal of attention. Following a few hyped press releases, investors seemed more than eager to pour millions of dollars into the new biotechnology companies. Genentech made history when its highly coveted stock rose from \$35 to \$89 a share in twenty minutes of trading. The phenomena of instant millionaires and the awarding of a Nobel Prize to a Harvard scientist (Wally Gilbert) who had just "gone commercial" were unprecedented in other areas of science, and were certainly big news. There seems to be a somewhat blackened aura surrounding those who have forsaken the white robes of academic purity for the lure of money. Somehow, it is worse than if one were in business from the start. But the "fallen angel" image is purely one of perception rather than fact. The university is no more the bastion of morality than the corporation is a font of immorality.

I would now like to briefly touch upon the larger institutional arrangements, such as the Hoechst/Massachusetts General arrangement, whereby an entire department may be subject to a contractual arrangement with a corporation. The difficulty I see in such an arrange-

ment is that it can have the effect of isolating perhaps an entire research unit from the rest of the academic institution. It is possible that all investigators supported by a particular company in a particular department—which may include the entire department—may be privy to the same confidential information. Certainly, the institutional type of arrangement relieves the difficulty of scientists talking among themselves in the corridors of a given department. But it could have a greatly inhibiting effect on discussing their work outside of the department. This may not be in the best interests of the university, particularly where one of the chief responsibilities of an academic institution is to educate students. Having read the contract establishing the Hoechst support of the Department of Molecular Biology at Massachusetts General, it is clear that anyone who wishes to be a part of that department would have to accept the terms demanded by Hoechst. That is, individual scientists no longer have the freedom to determine how to run their own laboratory or how to support their own research. To some, it may be a blessing that they no longer have to go through the time-consuming hassle of applying for Federal grants and then not being sure that they will receive one. However, they may also pay a price, which may be too dear for those who cherish the freedom to make their own choices.

With this somewhat pragmatic introduction, I would, for the remainder of my talk, like to deal with some of the larger issues generated by the so-called academic-industrial complex. One of the questions raised is the matter of free communication among scientists as being an important element in the creative process. The open exchange of ideas is, to be sure, essential to good research. Not only is this true of the communication of scientific findings in legitimate professional journals and scientific meetings, but of the kind of informal give-and-take that takes place among colleagues and their students.

If proprietary information is being discussed, however, then clearly it cannot be freely communicated. In order to protect patent rights abroad, only after a patent is filed can the information be freely discussed even in a legitimate scientific forum. One certainly might expect this type of reticence on the part of a corporate employee. It is a little disturbing, however, even from the corporate point of view, if university scientists feel reluctant to talk to the extent where this creative give-and-take is truly inhibited. Of course, the patent laws are designed to get inventions into the public domain as soon as possible. In the United States, one may file a patent up to a year *after* disclosure. But because patent rights abroad are forfeited if there is *any* prior disclosure, this well-intentioned provision of U.S. law is, for all practical purposes, irrelevant. This patent situation, then, does entail a certain delay. Just as scientists at one time would not talk about something that was still in progress in their laboratory purely because they were afraid their intellectual property or their

ideas might be stolen, we find the same principle taking place when there is money at stake. The behavior of scientists in either case is not so different.

At present, I have not seen this phenomenon as a serious problem. To be sure, however, it *has* inhibited the discussion in certain aspects of molecular biology. It is, perhaps, for this reason that the commercial component of university research should never be allowed to increase past a relatively small fraction of the total—say, ten percent. Most science certainly should be open for free discussion, particularly basic science. As long as the corporate extent of academic funding remains small, and is directed primarily toward applications, I do not believe that one is likely to see any serious degree of inhibition of the open exchange of ideas.

This brings me to a second point. Some have argued that now that basic science is being commercialized, the corporations indeed have an obligation to support basic research, not simply research leading directly to a product and a proprietary position for the company, but basic research in general. In principle, I would agree that this is appropriate to some degree. However, again I must say that responsibility for supporting basic research should not be considered solely that of private industry. In fact, I would consider it to remain the province of national governments. The knowledge flowing from research should be considered a national asset. Where appropriate, of course, this should be translated into useful products and services to the benefit of the population. In many instances it will simply remain the building blocks for future achievements. I expect that federal support for basic science will continue to remain by far the largest single funding entity—and that is as it should be. However, as the biotechnology industry becomes established, and as it brings its products to market and begins to show a profit, it is entirely appropriate that perhaps a corporate funding foundation be established in order to provide research funds for the universities.

An additional issue which has been suggested as a serious problem is that of the brain drain. Companies generally offer higher salaries than universities. To what extent are the best minds, who would normally seek professorships and careers in academic research and teaching, being lured away by the greater financial rewards of the biotechnology companies? Well, perhaps that criticism could have been raised with respect to chemistry two or three decades ago. Obviously, many able people chose to go the industrial route. Nevertheless, there seems to have been no paucity of brilliant chemistry professors. There is no doubt that many highly able people are being drawn to what is in some ways a more attractive research environment in some of the corporations. There no longer seems to be a stigma attached to those who leave universities to take jobs with corporations, suggesting that they just weren't good enough for a professorship and had to settle for less. Particularly for

the young postdoc who faces stiff competition for a position and a research grant, this might be the best way to advance one's career and make some money besides. Still, the academic positions don't seem to be hurting for capable people. The field still remains highly competitive. There are clearly those who don't care to compromise their freedom to pursue any problem they wish, and certainly anyone joining a corporation has to do that to some degree. It is fortunate if the area of your interest just happens to also be an area of corporate interest. Still, one is dependent upon the markets and the shifts of the commercial winds. There is not absolute security in corporate science any more than there is in academic science. Some would prefer the freedom of academia, and, fortunately, some genuinely love teaching. As long as there is federal support for research and there are universities, I would be very surprised to see a lowering of quality of academic faculties due to the drain into corporations. These are clearly two kinds of institutions for which our scientific resources are adequate to fill the needs of both.

Some scholars continue to raise the matter of justice. They point out that the findings upon which the biotechnology industry has based its products have come largely from federally-supported research. Should not, they argue, the public then have the right to use any developments that ensue from this research? To that I respond, "Of course, that is what commercialization is all about." For these findings to become available to enhance the quality of human life depends absolutely on a strong industry and its ability to develop and produce the products of medicine, chemistry and agriculture enabled by the new biology.

To conclude, let me just say that the survival of a nascent exciting industry, such as biotechnology, is intimately dependent upon a continuum of scientific creativity. It is only as a result of strong universities that this creativity can continue. We are absolutely dependent upon our relations with universities—more so, probably, than are universities dependent upon our survival. Yet it is clearly in both of our interests to see that science is translated where possible into benefits for mankind. Close cooperation with academia is the key to ensuring that there will be a fresh supply of new science, and that any benefits resulting from such research will be made available as quickly as possible. Universities are also the source of trained people which ultimately staff and become scientists in our biotechnical companies. Just as the universities provide chemists for the chemical industry, and chemical engineers, so must they provide cell biologists, molecular biologists, microbiologists, etc. It is, therefore, clearly in our interests to see that universities remain strong. Only the best, most creative minds can make an innovative technology, such as ours, succeed.

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*Presented at DPR Symposium on Industrial-Academic Interfacing: A Challenge of the '80s, Kansas City, Mo., Sept. 14, 1982*

### DPR Membership Application

I am a member of the American Chemical Society. Enclosed is \$4 to cover dues through December 31, 1983.

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## FROM THE EDITOR . . .

*Continued*

the West German model for dealing with this. These various bills never went anywhere. This year, at the suggestion of the AFL-CIO, Rep. Robert Kastenmeier, chairman of the House Subcommittee on Courts, Civil Liberties and the Administration of Justice, the committee which deals with patent matters, introduced the old Moss Bill, as HR 6635. A hearing was held last summer, major progress in the historical development of this legislation, but nothing more will be done this year. It would be useful if you wrote to Rep. Kastenmeier (Washington, D.C. 20515) and expressed interest, so that we can move forward next year.

I might add that ACS submitted a short statement, indicating that no legislation was needed. We have disagreed with that position before.

### Content

The major article in this issue is taken from one of the talks presented at the DPR *Symposium on Industrial-Academic Interfacing: A Challenge of the 80's*. This was an extremely interesting day long program, organized and chaired by Dennis Runser. I don't agree with everything Ronald Cape says, but I think the paper is interesting, coming as it does from one of the leaders in industrial recombinant DNA research. The field has grown very rapidly, and has had more than its share of controversy regarding the interactions and proper roles of companies and academic institutions.

We would like to publish the full symposium. Dr. Runser has been actively seeking a publisher, but as of this writing, I don't know how successful he will be.

### Membership

I am very happy to be able to report that our official membership count was 576 on July 1. We will keep both of our Councilors for next year. Those of you who helped increase our membership deserve, and are hereby extended, a big thank you.

However, if you think this will permit you to skip the commercial this time, I'm afraid I have some additional comments. As you may know, the number of Councilors each Division is entitled to is determined by a formula. Divisions with fewer than 500 members get one Councilor, those above 1200 get four Councilors, and those in between get three or two. There are some additional considerations which permit the juggling of those limits. At the Kansas City meeting, the upper limit was raised to 1300, which doesn't affect us at all. But there was an earlier rumor that the lower limit might be raised to 600, which means we would have lost one Councilor. We are safe for next year, but time marches on. We still need more members. Thanks very much for past help; let's keep plugging for additional members.

- Dennis Chamot