Interview with AMS President Felix Browder

On February 1, 1999, Felix Browder started his term as president of the AMS. In this interview with *Notices* deputy editor and senior writer Allyn Jackson, Browder reflects on some of the important issues facing the AMS and discusses some of the projects he plans to pursue as president. An interview with the past president, Arthur Jaffe, appeared in the February 1999 issue of the *Notices*.

Notices: *In your election statement in the* Notices *you said, "Mathematical research flourishes, and its applications have never been more essential to the survival of civilization as we know it. Yet the institutions that support mathematical research are under unprecedented attack." What did you mean by that?*

Browder: Maybe "attack" is not exactly the word, but I think it reflects, for example, the famous incident at Rochester[1]. Institutions that support mathematics are under great stress; there is no doubt of that. The bulk of mathematical research, even applied mathematical research, is done in academic institutions, and yet mathematics departments are not expanding—in fact, they are contracting. Young mathematicians, even gifted ones, are finding it difficult to get good jobs, and some are finding it difficult to get jobs that are at all reasonable. This is a fact of life which is actually damaging the entire mathematical community.

Another problem is that of maintaining the élan of mathematical research if we don't get a recruitment of a sufficient body of very talented young people. There are relatively few mathematically talented young people of American origin going into mathematics. By "American origin" I mean people who have gotten their undergraduate degrees in the United States. This is a very serious problem for the future of American mathematics. The two international benchmarking surveys, one done by the National Research Council and the other by the National Science Foundation, pointed to the fact that this is the central problem for the future of American mathematics. The only reason we are not having these serious problems now is we're importing graduate students and faculty from other countries. How long we can continue to do this depends on the relative attractiveness of the situation in American academic institutions as compared to other countries. I hesitate to believe that this is a very secure gamble.

Notices: *Why aren't young Americans going into mathematics?*

Browder: There are a number of reasons. First of all, the job market is very bad, and it's perceived as bad, perhaps perceived as worse than it actually is. There is an enormous amount of dissatisfaction and unhappiness, which is expressed often very openly in a public way. You certainly can't object to the truth being told, but it doesn't have a positive influence on people's decisions. Second of all, young people see that there is a certain lack of public esteem not only for mathematics but for science and scholarship. At least until recently there has been a tremendous veneration of the commercial sector, particularly banking and so on. Very talented young people know that people earn much more money in such occupations or in the professions of law and medicine. There is also a much greater sense of peer esteem for money-making than there used to be.

Many young mathematicians face the prospect of an endless series of temporary academic jobs. In such cases they would be well advised to do something else. There is no possibility of having a constructive career as a research mathematician—or having a constructive career, period—in such occupations, and the best thing to do is to find an alternative occupation. There are figures showing a gradual decrease in the percentage of mathematicians going into academic employment and an increase in the percentage going into nonacademic employment. Mathematical training is a very strong preparation for many jobs, assuming that you don't take mathematical training as scholastics and that you don't insist on doing what your specialty may have been.

Notices: *Do you think that attitudes about nonacademic employment are changing?*

Browder: Yes, I think they are changing very drastically, particularly, for example, with respect to jobs in finance, which are now regarded as a very reasonable alternative for many people. Many

[1] *The incident referred to is the attempt by the University of Rochester to abolish its doctoral program in mathematics. The* Notices *carried reporting on the Rochester incident in the March 1996, April 1996, and June 1996 issues.*

young Ph.D.s from very fancy departments—particularly Princeton, I gather—are moving into that realm, and that's fine. I don't particularly advocate it as an alternative to doing research mathematics, but if you don't find a reasonable position in academia, why not? I trust this will continue, despite the present crisis in the whole area of finance. Banks are not going to abandon mathematics. They can't. Their whole system is now geared to mathematically sophisticated activities.

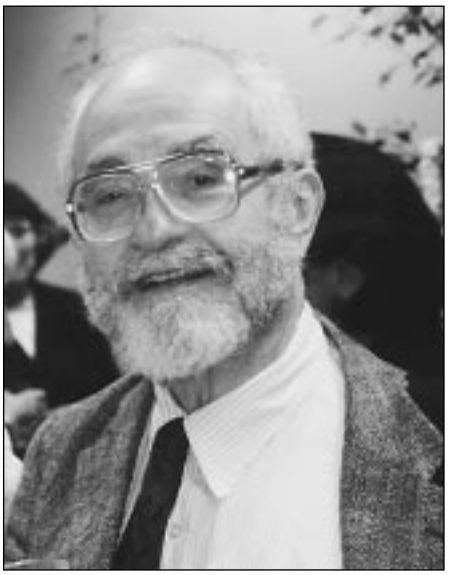
Notices: *Have young people's attitudes been affected by talk about abolishing tenure?*

Browder: Yes. And I'm very much against abolishing tenure, because essentially what you are abolishing is the central nucleus, the whole idea of intellectual responsibility and independence. Having been a university administrator myself, as vice president at Rutgers, and a keen observer of the administrative atmosphere around me, I wouldn't trust the future of intellectual activity of universities to administrators—I mean the people who actually run the universities from the top down and especially boards of trustees, who often don't know very much about academic activities and don't always sympathize with traditional academic values.

I wasn't directly and personally involved in talking to the administrators at Rochester, but I read the internal documents. I had the strong impression that this was the beginning of a process by which they would simply abolish all intellectual activities at Rochester, period. At the same time, they said they wanted to get better students and have better training in science. There were massive contradictions. I think Rochester was a very important incident in waking up the American mathematical community from its pipe dream that somehow, automatically, the routine process of academic administration would always take their concerns seriously. It was very important to make an appropriate response to that, and I think that Arthur Jaffe in particular, who orchestrated the response, should be given a high degree of commendation for his efforts. It was very important symbolically, and administrators all over the country noticed. It was a Rubicon that somebody was trying to cross, and if this had been allowed to pass unchallenged, it would have been a major catastrophe not only for American mathematics but for the whole notion of intellectual competence in American academia. Mathematicians were only the scapegoats for everybody else, and a lot of people realized this. It's one of the reasons Arthur was able to get such strong support from people in physics, chemistry, economics, and so on.

Notices: *What can the AMS do in the area of graduate education?*

Browder: Mathematics over the last fifty years has become highly specialized, and unfortunately the specialties are so divorced from each other that sometimes they don't have the appropriate degree of mutual understanding and interaction. This is a very serious question that concerns graduate education. Everybody is conscious of it, but nobody knows what to do about it. We are training people following the principle enunciated by Carl Becker, who said that a specialist is one who knows more and more about less and less until he knows everything about nothing. Unfortunately, this is a principle which, in order to survive, people have to practice.



AMS president Felix Browder

Nobody besides the AMS is going to be concerned with graduate education in mathematics, and certainly the AMS should pay attention to it. And it does, to some degree. But it's very difficult, because everybody is a self-proclaimed expert on graduate education. Different departments have different styles, different ways of doing things, and you can't prescribe to them. But you can say that they ought to make an effort to make sure that everybody has a broad background of knowledge of both pure and applied mathematics. And—this is perhaps the most utopian prescription, and I don't know a single department in the country that is doing this—they ought to make some effort to have their students learn something on an informal basis about the history of mathematics. Without a sense of where you come from, you have no sense of where you're going. The question of perspective depends on one's sense of the past.

I think there is a growing realization in the mathematical community that specialization and insularity are big problems. For example, I am on the Task Force on Membership for the Society, a group commissioned by Arthur Jaffe. One thing to come out of some surveys done for the Task Force is the need to emphasize the perspectives of mathematical research in the future and try to focus attention on certain major areas of activity, major problems. This is something I and others are trying to do through, for example, the AMS meeting in the summer of the year 2000. I was rather surprised to see this coming out so strongly in the surveys and in people's comments, which were not, as far as I know, related to the year 2000 meeting. We have to bring the attention of both the mathematical community and the external publics—other scientific disciplines, as well as the intellectual public and the general public—to the fact that mathematics is an enterprise with enormous perspectives, in terms of its own objectives and its im-

pact on other forms of knowledge. There has been an enormous growth in the practical importance of mathematics in the world, as represented by the computer revolution and the necessity of analysis of complex systems, which are everywhere around us. We see this in the genome project, in the mathematics of finance, in the enormous growth in mathematical sophistication and interaction in all the realms of theoretical physics, or even practical physics for that matter. What we have to emphasize is that these are not just applications of known mathematics. They are enormous growing points for mathematics.

Mathematics does no good by trying to pretend it is insulated from these things, because these are where the vital areas of activity are. And this is not surprising. It's a reversion to what has been true in the past. It was just a short period of about twenty or thirty years in which mathematicians had the delusion that mathematics could be totally separated from other fields of human knowledge and activity.

Another point that came out of the Task Force surveys is that we have to pay greater attention than in the past to a very explicit role for the AMS, and mathematicians in general, in trying to influence policies on subjects related to the mathematical and scientific interests in Washington. People don't realize that this is exactly what has been attempted in the last two years, particularly under Arthur Jaffe, and I think it is starting to be successful. Perhaps the most important contribution that Jaffe has made is to point out that when you try to influence policy in Washington, you can't do it by just representing mathematical interests. You have to try to join forces with other scientific fields—particularly with physics and chemistry, but also the biological sciences and engineering. This involves an attention to common interests, which are often at a certain distance from mathematical concerns.

The common interest is to see science promoted and scientific research acknowledged as a major contributing factor in national growth. We are now in a very good position as far as congressional attitudes are concerned, and it's very likely that budgets for scientific research will increase. There is a question of exactly how such increases can be organized, and that gets into rather difficult problems. My view is that this is not a matter the AMS should take positions on. For example, increases in the number of individual grants, versus larger grants, versus new institutes, versus postdoctoral fellowships—I don't think the AMS should take positions on these things. We can speak to the value of all these things and try to get a consensus, but we should not take controversial positions which divide the community.

Notices: *You mentioned the AMS meeting in August of the year 2000. You have been deeply involved in the planning for this meeting.*[2]

Browder: This meeting will be a central part of my mission as AMS president; it was a central part of my mission before I became president. The function of this meeting is to focus the attention of the AMS and the international mathematical community on the major problems and prospects for achievement in mathematics in terms of the development of fields of mathematics and in terms of its applications to other major areas of the sciences and to practical areas such as the computer and finance. The meeting will cover a very broad range. We will have talks about algebraic number theory and the Riemann hypothesis on one side, and on the other side applications to fundamental physics, high-energy physics, condensed matter physics, biology, and last, but certainly not the least, computer science and computational science. The Mathfest meeting of the MAA in 2000 will be held the week preceding the AMS meeting, and I am told it may well be held at UCLA, though that hasn't been formally decided yet. We are planning to hold some joint activities with the MAA.

Notices: *Is the AMS meeting part of the World Mathematical Year 2000 that is being organized by the International Mathematical Union?*

Browder: Yes, the IMU has designated the meeting as part of World Mathematical Year 2000. This touches on an important point. Although the AMS is an American-run society based in the U.S., we are trying very hard to broaden the involvement of non-American mathematicians. One-third of the membership is outside the U.S., after all. It's really an international mathematical society, although some of the leading figures of the European Mathematical Society, including my dear friend Jean-Pierre Bourguignon, might quarrel with the description! But fundamentally we should have in mind the interests of the international mathematical community, not just of the American mathematical community. The AMS is the richest society, the biggest society, the most active society. No other mathematical society is a major mathematical publisher. We have a major responsibility to the international mathematical community, and we ought to recognize it—and we have begun to recognize it, for example, by having international meetings. There is a common interest of the mathematical community, national and international, and mathematicians should take actions which further this common interest. If we can do that—promote the vitality and quality of mathematical research and education—then we will have done what we need to do.

[2]*For further information about this meeting, see the article, "AMS Meeting in August 2000" in this issue of the* Notices.