

## SCIENCE AGAINST POLITICS OR THE POLITICIZATION OF SCIENCE? RESEARCH AGENCIES AND THE DEBATE OVER RESEARCH

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“We are not afraid of dismantling privilege and have scientists in the streets, demonstrating and turning in their lab coats and test tubes. I would like to ask these scientists what great discoveries they have made. We will probably find out that they haven’t discovered very much, while so many young researchers are excluded from pursuing careers.”<sup>1</sup> The words are those of Minister for Education, Universities, and Research Letizia Moratti, commenting a few months after loud protests by a large number of Italian scientists against the decision by the government to restructure research agencies. The protest represented an important stage of a phenomenon that was without precedent (not only in Italy) until only a few years ago: the mobilization of scientific researchers. It also was the most salient moment of an elaborate public debate on the problems of scientific research in Italy that carried on throughout 2003. The debate had a number of important implications, touching on issues such as insufficient investment in research; the so-called brain drain, that is, the inability to retain competent researchers, who leave Italy to work in foreign institutes; the growing dissatisfaction of younger generations with established scientific research; and the need to remain internationally competitive in areas of productivity and innovation.

## **The “March of the Test Tubes”: Scientists Take to the Streets**

On 24 January, the Council of Ministers approved the reform of the National Research Council (CNR), the National Astro-physics Institute, the National Institute for Material Physics (INFN), and the Italian Space Agency. The reform restructured the CNR into a limited number of departments that would collect the existing 108 centers into corresponding “macro-areas” of strategic research and provided for the fusion of agencies such as the INFN with the National Research Council. The aim of the reform, according to Minister Moratti, was to introduce greater efficiency into the research agencies and to facilitate their collaboration with universities and private firms. The new CNR would be governed by a president and a council of six members, three of whom would be nominated by the government and one each by the Chamber of Commerce, the Council of University Rectors, and the State-Region Council. The change in the composition of the CNR governing council led to the decision to place it in receivership for the period of transition.

The president of the INFN, Flavio Toigo, immediately tendered his resignation, while the president of the CNR, Lucio Bianco, announced that he would seek recourse through the administrative courts (Tar) against a provision that he held to be illegitimate. The legal action led to a suspension of the measure on 10 February, with Bianco tendering his resignation on 14 May. The opposition spokespersons also waded into the debate. According to Albertina Soliani of the Margherita, the reform “takes dignity away from those who give the best of themselves to research, receiving little pay and little recognition,” while Alfonso Pecoraro Scanio of the Greens spoke of a “premeditated attack on the principle of independent research.”<sup>2</sup> The leader of the DS, Piero Fassino, assured that his party would battle until the end against the government’s decrees, “because research is not a prosthesis for the production system.”<sup>3</sup> There was a strong reaction on the part of famous scientists. Nobel Prize winner Rita Levi Montalcini denounced the “invasion of politics into science,” criticizing the excessive “managerial” slant that the government sought to give to the agencies, as well as the emphasis being placed on production at the expense of basic research. She hoped for a “general strike” by the research community.

According to the scientists who stepped forward, the reform project was a form of occupation, an expropriation by the government of scientific autonomy whose objective was to acquire total control of public research and subjugate it to the interests of private firms.<sup>4</sup> According to Giorgio Salvini, honorary president of the Accademia

dei Lincei, there could be seen “signs that we are heading toward a dictatorship.”<sup>5</sup> For the physicist Carlo Bernardini, it was a case of a “predatory action without precedent in the civilized world.”<sup>6</sup> However, there also was support for the reforms within the scientific community. Enzo Boschi, president of the Geo-physics Institute, Sergio Vetrella, president of the Italian Space Agency, and Fabio Pistella, president of the Institute of Applied Optics (one of those fused with the CNR) all held that the reforms had numerous positive features and that the research community had been involved in their elaboration. Boschi argued that the forces of resistance to the reform were essentially tied to the desire of “some political and scientific lobbies to defend at all costs their privileges.”<sup>7</sup> Some interventions even urged the government to resist the pressures to “sweeten” the reforms, highlighting the problem of inefficiency within Italian research and within the CNR, in particular.<sup>8</sup>

Contrasting views were also found with respect to the strategic orientation of the restructuring. Those opposed accused the minister of privileging applied research at the expense of basic research. Levi Montalcini once again voiced criticism, stressing that “there is talk only of applied research ... putting into the background the most important part: basic research that is not tied to an immediate and direct gain.”<sup>9</sup> On the other hand, supporters of the reforms refuted the claim, partly because the government plan did not divest from basic research and partly because the criticism rested on assumptions that no longer applied. Adriano De Maio, the government trustee for the CNR and the rector of Luiss, a private Roman university, observed that contrasting basic and applied research “is an argument that no longer holds, tied to old positions that have been superseded. They are two activities that are mixed more and more. They are two sides of the same coin.... The only Nobel Prize winner who ever worked in this country was Giulio Natta. He won in 1963 with work on the polymerization of propylene—in effect, plastic, that is, applied research.”<sup>10</sup>

The mobilization against the reform effectively took place on 12 February when a group of researchers symbolically turned in their test tubes, microscopes, lab coats, and books—even a brain in a jar and a pear (“there’s research in agriculture”)—as a sign of protest. Levi Montalcini decided not to take part, “perhaps embarrassed by some of the theatrical aspects,” but she expressed full support for “all those who will take part: I respect them and don’t think their attitude is hostile.”<sup>11</sup> Almost contemporaneously, presidents of some of the research institutes within the CNR, along with other supporters of the reform, including Antonino Zichichi, created the Group for the Strengthening of the National Scientific System to support the changes.

It is worth spending some time discussing the protest by the scientists, as it is a phenomenon that was unheard of in the past but has become more prevalent in recent years. On 5 November 2000, *Il Sole 24 Ore* published an appeal for “freedom in research” by over 1,000 researchers, including Nobel Prize winner Renato Dulbecco. The appeal critiqued the initiatives of then Minister for Agriculture and Forests Alfonso Pecoraro Scaino, which would have denied research funding to researchers who did not reject work on genetically modified organisms.<sup>12</sup> According to the signatories, such a provision would risk having Italian research cut out from one of the most promising sectors of biology and rendering useless past research efforts. The provision was one of a list of restrictive measures imposed by the Italian government that had been criticized by the scientific community: the most important of these was the decision to suspend the commercialization of various types of maize that were genetically modified.<sup>13</sup> The protest by scientists culminated in a loud public demonstration in mid-February 2001 and with their representatives, including Levi Montalcini and Silvio Garattini, meeting members of the government and the opposition. The biologist Edoardo Boncinelli told the news station TG5 that the protesters had three requests: “money, meritocracy, organization.” The debate has continued since then with other, and not infrequent, polemics that have echoed in the foreign scientific press and have included specific issues such as the situation with the CNR. It also has led to other forms of protest by researchers.<sup>14</sup> In addition, the rectors of the Italian universities tendered their resignations at the end of 2002 in protest against cuts to university funding; the cuts were rescinded in early 2003.

It is not difficult to trace elements of the government-opposition dynamic on the future of scientific research in Italy, with the opposition siding with the scientists in 2003 just as they did in 2001. However, there were differences this time around. First, there emerged within the scientific community some voices of support for the government position, both at individual and organizational levels. Second, there was a much more marked attempt to restore an order that was threatened seriously by the mixing of politics and science. However, this attempt to restore order was destined to fail almost from the start, as many who took part assumed positions that were often contradictory: “The CNR? It is nothing but an amusement park ... a self-referential structure that undoubtedly needs to be dismantled.... We must understand that this reform is neither from the left nor the right. It is simply indispensable. I am from the left but so is Adriano De Maio.” This statement was by Maurizio Decina, professor of

telecommunications at the Milan Polytechnic and promoter of a reform of the CNR with Associazione Forum, which gathered “technicians and intellectuals from the reformist left.”<sup>15</sup>

For the most part, issues involving the CNR have always contained a mix of science and politics. For instance, when Lucio Bianco was nominated president of the CNR in 1997, the daily newspaper *La Repubblica* commented on the news with the following:

In Italy, there is a penury of solid, authoritative institutions, those that you want to spell in capital letters, those that don't change with every rustling of opinion polls. One of the few bastions of continuity is the CNR, the National Research Council: it was born Christian Democratic and it will die that way, overcoming any challenge such as the melting away of the Christian Democratic Party. Someone might have thought that the Ulivo, having made the relaunch of scientific research in Italy an electoral battle cry, would have done something to end the dream. But the thought would not have lasted long. When push came to shove, we could see that the fiefdom remained untouched. The nomination of Lucio Bianco, brother of the more famous Gerardo, to the presidency of the CNR is an expression of continuity.<sup>16</sup>

The government's position in 2003 was that the reform of the research agencies was a logical consequence of the “Guidelines for Research” approved by the Berlusconi government in 2002. Moratti defended her proposals by reaffirming that “from the moment I assumed office, I have considered the correct allocation of resources the fundamental element to bring efficiency and effectiveness to the education, university, and research system: to increase the quality, productivity, and positive outcomes for the lives of citizens and the competitiveness of the country.... The process of revising the system, which is intimately connected in the three sectors of schools, university, and research, requires a unitary vision.”<sup>17</sup> The need for a comprehensive approach to the problems of scientific research in Italy was recognized by all the actors involved, and few did not find it difficult to criticize the project's objective: increasing the quality, productivity, and returns to the lives of citizens in the country. The problems emerged when trying to put into practice these general intentions. In various ways and with different emphases, the criticisms of scientists and political actors opposed to the reforms were based on three points, elucidated by Edoardo Boncinelli.<sup>18</sup> First and foremost, he cited the decidedly “corporate” nature of the entire initiative, with an exclusive emphasis on the logic of efficiency-effectiveness from which emerged operational models seen to be too

managerial—for some, the result of ingenuousness, while for others, of deliberate strategic choices—and an excessive trust in the private sector.<sup>19</sup> Second, opponents saw the reforms based on an oversimplified conception of the dynamics of research and technological innovation. This was captured by the minister's challenge to researchers to "tell me what you have discovered." This view ignores the large quantity of obscure work that goes into preparing the terrain for the "discovery" and that might be the privileged objective of research policy. This is what Boncinelli meant when he said that "research advances thanks to the best and most original contributions, but also thanks to the support of hundreds and hundreds of consolidation and expansion projects. For these reasons, there needs to be a significant quantity of research: part of this will be of the breakthrough kind, part of it consolidation."<sup>20</sup> Moreover, and this was Boncinelli's third point, the opponents of the reform saw a glaringly apparent contradiction between the programmatic ambitions of the reform on the one hand, and the scarcity of resources made available on the other. This was probably the most serious problem, as it touched not only the CNR and other research agencies but also universities and the entire education system. Looking for funds in the cracks of the budget to hire young researchers who have already made it through the selection process and to give permanent jobs to those on indeterminate contracts in the school system instead of planning for the regular and constant injection of new forces—something which even the president of the Republic, Carlo Azeglio Ciampi, had called for—seemed to be in clear contradiction to the "systemic" approach that Minister Moratti considered indispensable.

Beyond the issues that were the subject of the protests, it is possible to reflect upon the questions that are tied to the transformations in the relationships between science, politics, and public opinion. First, this massive public protest by researchers happened at a time of heightened public sensitivity to science and its application. Issues such as the BSE scare and GMOs, for instance, were partly interpreted by the mass media and the public, at the very least, as examples of the incapacity of scientific experts to provide responses to the needs of society and, at worst, as the direct responsibility of scientists. "This science is scary" is how one national news broadcaster opened an interview with Levi Montalcini on the emergencies mentioned above.

The second point is tied to the way in which we are used to perceiving demonstrations in the street, which have become another item on the media's agenda. In most cases, protests are carried out today not in favor of an ideal but to protect an interest: whether it is

workers on government employment schemes or beef farmers, it is all the same. However, past research has confirmed that in Italy scientists are among the few groups traditionally considered by the public as being “above the fray” in that they are perceived as defenders not of a particular interest but of the common and superior interest of knowledge. More than citizens in other European countries, Italians tend to place a great deal of trust in science and scientists for precisely this reason. More recent research on the perception of science in public opinion, though, presents a changing picture, as increasingly science, too, is seen as having an “interest.”<sup>21</sup> The danger is that scientists may be grouped with others making the normal sorts of claims for particular interests, raising new doubts and concerns (“Now, even scientists want money?” “Why don’t they want to be regulated?” “Do they have something to hide?”).

While the external face of the scientific community guarantees an image, however idealized, of internal consensus, it has proven easy to appear divided in public. In the February 2001 protests, the Greens were able to bring into the streets “environmental” scientists, and the agreement reached with Minister Pecoraro Scaino and Prime Minister Giuliano Amato was revised with the participation of some researchers. In the case of the protests against Minister Moratti, there was quickly formed a front in favor of the reforms. Moreover, researchers’ continuing complaints about the scarce attention given by politics to science and about the public’s hostility run the risk of becoming self-fulfilling prophecies. The constant references to science’s isolation and weakness fuel the situation and could make it worse. Third—and perhaps the most important, complex, and, at the same time, serious aspect of the protests—is that “taking to the streets” is a step from which it is difficult to retreat. Searching for support from public opinion means being ready to keep up the pressure. It means justifying in a timely way the aims of research and their compatibility with those of society and politics. It means, for example, dedicating time and money to the testing of a drug demanded by public outcry, as happened not long ago with the Di Bella case, or changing the definition of AIDS in the face of pressure from activist groups, as happened in the United States.<sup>22</sup> It is difficult to assess whether the recent “exhibitionist” trend represents something good or bad. The fact that it happens more frequently leads to the conclusion that it is destined to become a constitutive element of contemporary science. Nonetheless, it needs to be highlighted that scientists have thus far consciously limited the use of public protests, protecting the autonomy of science and the basis for its functioning.

## Research Funding and the Brain Drain

The mobilization of scientists needs to be interpreted within a broader context than that of the specific protest against the government's decision to reform the research agencies. As mentioned earlier, this protest is included in the growing list of issues tied to research that have become more relevant and visible in recent years. The 2003 demonstrations in which scientists were the protagonists can be seen in this light as a moment of solidification—in a sense, even liberation—of tensions that had been present for some time in research and development issues. For instance, in the early days of 2003, prominence was given to the decision by cardiac surgeon Ignazio Marino to leave the transplant center IMETT in Palermo and return to the United States. His choice was influenced by the persistence of a “diffused reluctance to change and a great ability to defend small and large interests at the expense of the common interest.”<sup>23</sup> The decision was interpreted by some in research circles as yet another case of the expatriation of Italy's best researchers. It was “a sign of further decline of research and of the country in general, which is heading toward a mediocre tertiary sector.”<sup>24</sup> Even President of the Republic Ciampi felt compelled to comment on the event.<sup>25</sup> In 2003, the “brain drain” theme arose more frequently in discussions on research. The stories of researchers “forced” to emigrate to pursue their professions were heard often, including at the demonstrations against the reform of the research agencies. One demonstrator told a journalist: “My daughter Antonella is 32 years old and is a researcher. But she is working in San Diego because she could not find anything in Italy. This is what has become of our youth: emigrants that leave out of desperation. Certainly, it is a brain drain.”<sup>26</sup> The stories could be found among members of the governing majority. Umberto Scapagnini, the mayor of Catania and a member of the European Parliament, as well as Silvio Berlusconi's physician, in expressing some uncertainty over the Moratti reforms told the story of his son. An associate professor in the United States, he asked his father, “What should I do?” to which his father replied, “Stay where you are.”<sup>27</sup>

There is no doubt that the brain drain issue is characterized by a series of elements—not the least of which is the phenomenon of emigration, which has marked the historical memory of the country—that make it particularly salient for the media and public opinion. This helps to explain why the opponents of the Moratti reform often presented their case in relation to the impact it would have on the mobility of researchers. According to Levi Montalcini, as a result of the government's decision, “there will be an increasing number of young



researchers who will flee abroad.” In the meantime, the INFM issued a call for a “mass brain drain” in reaction to the Moratti proposal, “a request for leave and years of sabbatical to continue abroad research that seems impossible in Italy.”<sup>28</sup> Researchers occupied the offices of the INFM in Genoa in the days immediately following the government’s decree, while in Trieste protestors launched forms requesting transfers abroad. “We have worked for years abroad,” affirmed Enzo Di Fabrizio, head of the TASC laboratory in Trieste, “and we came back to Italy thanks to the efficiency of this Institute ... if I were to ask to return to the University of Wisconsin-Madison, they would welcome me with open arms. As they would others.”<sup>29</sup> The first International Conference for Scientists Abroad was held on 10 March, and Levi Montalcini took the opportunity to meet with government members (Foreign Affairs Minister Franco Frattini, Minister for Italians Abroad Mirko Tremaglia, and Minister Moratti). The meeting had the feeling of a sort of cease-fire, even though the Nobel Prize winner pointed out that the reasons for the brain drain were “scarcity of funds, seniority, disinterest [in research] by industry, and a lack of synergy between universities and firms.”<sup>30</sup> Minister Tremaglia used the occasion to announce the establishment of an interactive database to facilitate collaboration between Italian research institutes and Italian scientists abroad. The resonance of the issue was such that by the end of the year, public attention turned to the question of the approximately 1,500 researchers who had been appointed but had yet to assume their positions because of a hiring freeze. Another pressure on the government to find a solution was the possibility that many of these researchers might choose to take positions in foreign institutes.

In this highly tense situation, there was one theme that seemed to unite government and opposition, anti-Moratti “dissidents” and supporters of the reform: the scarcity of research funds in Italy and the need for investment in research to promote economic growth and to increase the country’s competitiveness in the international economy. At the time of the mobilization against the reforms, ample space was given to comments from the European Commission (from President Romano Prodi and Commissioner for Research Philippe Busquin), which expressed concern for the state of research in Italy and, in particular, the scarce resources and integration between research and industry.<sup>31</sup> This interpretation of research in Italy carried some weight and reappeared a few months later when the political agenda was taken up with another issue involving science and technology. This was the decision by the president of the Piedmont regional government to destroy three hundred hectares of non-authorized GMO crops. Once again, researchers, politicians, and even representatives

of producers' associations signaled the problem of the inadequacy of Italian research. According to Augusto Bocchini, president of Confagricoltura, "If Italy does not do research, we will all pay the price for having a monopoly ... only with scientific research will our system avoid decline."<sup>32</sup> An interesting feature of this interpretation is the emphasis put by all actors, including scientists, on the role of research as a key element for growth and competitiveness with other countries. It was the old doctrine of the "goose that lays the golden egg" that Vannever Bush used in the immediate post-World War II period to convince the government of the United States to invest massively in research.<sup>33</sup> What was noticeably absent from the debate, including from the most vehement opponents of the excessive emphasis on applied science and the "corporate" nature of the Moratti reform, was a reference to the cultural and intrinsic value of research and its connection to the country's history. Instead, the key phrases from politicians and researchers, with respect to the state of research as well as the Moratti reform, were: "A reform that condemns us to second division"; "We risk never getting out of the starting gate"; "We risk being at the tail end"; "Let's catch up to Europe." The call, then, was for major investment in research to keep pace with other European and industrialized countries. Media outlets frequently presented tables and figures demonstrating that Italy's investment in research of 1.1 percent of GDP not only trailed countries such as France, Germany, and Britain (who spend between 2 and 2.5 percent of GDP), but also was below the European average of 1.9 percent, as well as that spent in Austria, Belgium, Norway, and Ireland.<sup>34</sup> It was recalled that less than a year earlier, in March 2002, Italy had made a commitment with other European countries in Barcelona to reach a research funding target of 3 percent by 2010.

A closer examination of the question reveals that research funding in Italy is not so simple, nor is it the only aspect of the problem of research. If we examine the share of state funding for research, we find that Italy (at 0.69 percent of GDP) is not that far below the European average (0.77 percent), which is surpassed only by France, Germany, and the Scandinavian countries. As a percentage of GDP, the Italian state spends as much as its British and Norwegian counterparts and a little more than Austria and Belgium. The situation does not change all that much if we look at research funding as a percentage of public spending. Italy (1.36 percent of public spending in 1999) was pretty much at the same level as Denmark, Belgium, Austria, and Sweden, but below that of the Netherlands and France, where it was over 5 percent. So what is at issue? A more detailed analysis of the data reveals the problem to be the limited amount of

research financed or conducted by the private sector. Only in Portugal and Greece does the private sector spend less on and conduct less research. The proportion of total research funding that comes from the private sector in Italy (43 percent) is lower than that in the seemingly obvious cases of Germany and the Scandinavian countries (where the private sector provides 70 percent of research funding), but is also lower than that in Spain, Ireland, and Belgium. The portion of industrial earnings that are spent on research in Italy also is much lower, though it is rising slightly (0.58 percent in 1999, one-third of the total in Belgium and one-fourth of that in Denmark). Italy, then, distinguishes itself not only by the meagerness of its overall research funding but also by the composition of that funding. The defects internal to what is a low level of funding are not so much due to the role of the state but rather to the scarce presence of the private sector, the incapacity of economic and technological growth to generate resources and demand for research, and the relationship between firms and public research institutes. The European Union has introduced a new ranking system that highlights firms that work in high innovation sectors in collaboration with other firms, universities, or public research bodies. Italy ranks last in Europe according to this indicator, with only 10 percent of firms involved in activities of this sort. The figures for the rest of Europe range from 18 percent in Greece to 70 percent in Finland.

In short, little research in Italy is financed and conducted by private firms. This fact becomes all the more important in light of the leveling off of public sector funding for research in Europe, though some countries have seen an incremental increase in the role of the private sector as a result. A good illustration is Finland, which has been able to break the threshold of 3 percent of GDP spent on research by having 71.6 percent of research carried out by the private sector. It is no coincidence that the Barcelona agreement that established the 3 percent target saw it being met with the public sector financing one-third of research and the private sector the remaining two-thirds. This point seems to have been ignored by many of those involved in the debate on Italian research, including Minister Moratti, who had put such an emphasis on links between the spheres of research and production. It was an issue that was picked up only toward the end of 2003, largely instigated by interventions coming from the European level.<sup>35</sup> Clearly, the particular nature of Italian firms is a factor. The strong presence of small and medium-sized businesses was taken into account even by the government's "Guidelines for Research." Nevertheless, international reports on research in Italy never fail to highlight as major limitations not only

the fragmentation and lack of homogeneity in the quality of public sector research but also the lack of co-ordination between research and industrial policies.<sup>36</sup>

The problem of *how much* is being spent on research is decidedly more complex than has yet been acknowledged in the debate on the reform of research agencies. It is also the case that *how* the funds are being spent has also been ignored. The challenge by Minister Moratti to the rebel researchers (“Tell me what you have discovered”) captures brutally, and perhaps inadvertently, an issue that has become an integral part of the international discussion about research funding, but only recently has been addressed in Italy, that is, the assessment of research.<sup>37</sup> Many of the interventions supporting the government’s reforms went in the direction of more efficiency and caution in the use of available resources. Adriano De Maio stated: “Funds made available in Italy today are used badly ... for many reasons. First among these are bureaucratic delays. But equally important are assessments of projects that are not very thorough and the tendency to give a little to everyone so no one will be disappointed ... an efficient use of available resources would have an indirect benefit: it would allow for a request for an increase in funding.”<sup>38</sup>

On the basis of indicators used by the European Commission (number of scientific publications per capita, number of patents, number of academic citations per capita, number of PhDs in the 25- to 39-year-old range), it is clear that the problem in Italy is not just the quantity of research funding but also the quality of research itself. Italy’s performance level is among the poorest in Europe, ahead only of Spain, Portugal, and Greece.<sup>39</sup> An analysis of the international impact of Italian research reveals similar results.<sup>40</sup> Giving a significant role to the assessment of research implies serious reflection on performance indicators that take into consideration more than the source of funding or the market impact of technological innovation. For instance, one indicator that only marginally entered into the debate on Italian research toward the end of 2003 is an issue that has been of concern at the European level for some years and deserves to be taken as seriously as the brain drain. This refers to the so-called crisis of the scientific vocation, more specifically, the declining enrollment in degree courses in the sciences.<sup>41</sup> Both the causes of this development and the possible measures to remedy it have received little attention in Italy. Finally, if it is true that Italy needs to develop a research culture in which evaluation becomes a normal practice—as is hoped for by many of the interventions in the debate on research—then this culture must be diffused not only among researchers but among policy-makers as well.<sup>42</sup> Along these lines, there is no noticeable gap between

Italy and other countries with respect to assessment procedures and instruments. What distinguishes Italy is the feeble use made of the results of evaluation in decision-making circles and in devising strategies for research and innovation.<sup>43</sup>

## Concluding Remarks

The events linked to the mobilization of a significant part of the scientific community against government measures and, more generally, the discussion in 2003 about the problems confronting research in Italy provide numerous insights into the transformation of political debate and the role of research itself in Italy. There has been an ongoing process, which we may refer to as the “politicization of science,” in which the exposure of scientific issues to the public increasingly occurs as the result of collective activities of scientists and researchers, including demonstrations that receive wide coverage in the media. The problems related to research policy and the governance of technological and scientific innovation seem, for various reasons, less prone to being managed by the traditional links that C. P. Snow called “closed politics.”<sup>44</sup> This refers to negotiations limited to the relationship between policy-makers and scientists, which is characterized by a more or less explicit trade-off involving economic resources and the legitimation of political decisions through scientific expertise.

Among the reasons for this transformation, with implications for the politicization of science, are the increasing presentation and public perception of a scientific community that is divided and fragmented. In general terms, there is a marked tendency for disagreements on substance to emerge between scientists on policy decisions and on issues that interest public opinion. Examples include fissures over the danger to the health of humans and the environment presented by GMOs and the problem of nuclear waste, as in the case of the town of Scanzano, over which Nobel Prize winner Carlo Rubbia and the head of the Institute of Geo-physics, Enzo Boschi, clashed.<sup>45</sup> The first and telling sign of these public divisions came a few years ago with the Di Bella case, which made dramatically clear the difficulties faced by the scientific community in identifying a spokesperson to represent it in the public realm.<sup>46</sup> Disciplinary boundaries also become a source of division in the definition of problems and who has the ability to solve them. Rita Levi Montalcini, commenting on the nomination of Adriano De Maio as the trustee for the CNR, said, “I do not know him personally so I cannot judge him. However, what I can say is that he is an engineer and does not know anything about biology.”<sup>47</sup> Even in the

specific case of the protests, the dominant message that emerges is that the scientific community has not been able to identify a spokesperson and that it has polarized into positions and “parties,” just as in politics. The language of politics entered into the debate as the sides traded labels. Researchers in favor of the reform were identified as the “pro-Moratti front,” “the alliance of the presidents” (of research institutes), or, with a more explicit reference to the language of referenda in Italy, “the Yes side.” Opponents of the reform were often identified as “lobbies.” Andrea Colasio of the Margherita went so far as to draw a World War I analogy in comparing the resignation of Bianco from the CNR to the “Piave front.”<sup>48</sup> Bianco himself called on researchers to take sides, complaining that “there is a part of the scientific community, some of which fills important institutional roles, that limits itself to expressing bewilderment without taking a clear and incisive stand. To them I say this is a losing attitude and will not bear fruit for research in Italy.”<sup>49</sup> Moreover, a significant number of the researchers who criticized the reform emphasized not so much its content or the possible consequences for research but the decision-making procedures that produced it. They saw it as “anti-democratic” and “imposed from above,” with the actors involved not having been sufficiently consulted. It is worth noting that there were two distinct positions opposing the reform. One was opposed primarily to the reform of the CNR, while the second defended the autonomy of the single research agencies against fusion with the CNR. For instance, Tullio Regge attacked the decision to bring the autonomous and efficient INFM under the CNR, which he held to be “a notoriously and intensely bureaucratic agency.”<sup>50</sup>

Frequently found in the media reports of the protest was the assimilation of research issues with others on the political agenda. When asked about the possibility of parliamentary opposition to the decrees, Levi Montalcini responded, “Not likely! The Cirami law passed, as did that on accounting fraud and on the rogatories. This will also be approved.”<sup>51</sup> This mixing of issues was quickly picked up and strengthened by the political realm; an Ulivo exponent claimed: “We will take to the streets for research just like we did for justice issues.”<sup>52</sup> The obviously political character of the initiative was highlighted by the president of the CNR, who said, “I have to thank Silvio Berlusconi. It hasn’t been since the questions of Trento and Trieste, when I was 13 years old, that I have taken part in a political protest.”<sup>53</sup> The identification of opinion leaders by the press was based not only on the role they played in the scientific community but also on their connection to political leaders, as was the case with Umberto Scapagnini, the “prime minister’s physician.”<sup>54</sup> What makes these features interesting

is that they are in clear contrast to the image that had until recently been cultivated of a “depoliticized” science, capable of governing itself and shunning typical political clashes, which it judged to be degrading in comparison to those in science.<sup>55</sup> According to the physicist Carlo Bernardini, it was “unworthy hands” that tried to use politics to handle research. He added: “I don’t like to protest and I don’t like movements that take to the streets. But when it’s needed, it’s necessary.”<sup>56</sup> The same attempt to place the protest on a frame of “science against politics” was inevitably invalidated by the divisions and polarization mentioned earlier.

Finally, in denouncing the “invasion of politics into science” and calling for their own decision-making autonomy on research matters, scientists unwittingly revealed the increasing permeability of the boundaries between the two spheres and the characterization of the problems of research as entirely “political” issues. This process was matched by the proliferation of intrinsically techno-scientific issues that were brought to the attention of political debate and decision-making, often leading to the mobilization of citizens. This was demonstrated by the destruction of GMO crops in Piedmont, which was an important event in 2003.<sup>57</sup>

That these pressures are converging does not mean they are any less riddled by contradictions. In fact, the politicization of science has made the resolution of issues such as GMOs and nuclear waste sites increasingly difficult for those in power, as it has led to cases of decision-making impasse. Leaving aside any individual issues that might emerge in the future, it is on these questions that the future of research policy in Italy will hinge. The events of 2003 have removed any illusion that it is possible to separate politics and research.

— *Translated by Lynn Mastellotto*

## Notes

1. F. Foresta Martin, *Corriere della Sera*, 5 April 2003.
2. V. Piccolillo, *Corriere della Sera*, 2 February 2003.
3. C. di Giorgio, *La Repubblica*, 25 January 2003.
4. Ibid.
5. Ibid.
6. C. di Giorgio, *La Repubblica*, 31 January 2003.
7. *Corriere della Sera*, 31 January 2003.
8. F. Giavazzi, *Corriere della Sera*, 3 February 2003.
9. V. Piccolillo, *Corriere della Sera*, 2 February 2003.
10. L. Salvia, *Corriere della Sera*, 2 February 2003.
11. F. Foresta Martin, *Corriere della Sera*, 12 February 2003.
12. [http://www.ilsole24ore.com/cultura/liberta\\_ricerca/appello\\_0511.htm](http://www.ilsole24ore.com/cultura/liberta_ricerca/appello_0511.htm)
13. A more detailed account can be found in A. Meldolesi, *Organismi Geneticamente Modificati. Storia di un dibattito truccato* (Torino: Einaudi, 2001).
14. For instance, see the supplement to the Sunday edition of *Sole 24 Ore*, 18 March 2001. A series of articles by Giovanni Bignami, Luca and Francesco Cavalli Sforza, and Cinzia Caporale appealed to the different political alignments in the midst of an election campaign to address issues related to research in Italy. In September 2002, after *La Repubblica* published reports of the proposed reform of the Ministry for Education, Universities, and Research, there was a new appeal by researchers that was published on the Web site of the journal *Le Scienze*, <http://www.lescienze.it>.
15. A. Arachi, *Corriere della Sera*, 4 February 2003.
16. A. Cianciullo, *La Repubblica*, 22 March 1997.
17. L. Moratti, *Corriere della Sera*, 4 February 2003.
18. E. Boncinelli, *Corriere della Sera*, 25 January 2003.
19. "Experience shows that if there is more public research, there also is more private research." Ibid.
20. Ibid.
21. M. Bucchi, F. Neresini, and G. Pellegrini, *Biotechnologie: democrazia e governance dell'innovazione. Terzo Rapporto su Opinione Pubblica e Biotechnologie in Italia*, 2003, <http://www.observanet.it>.
22. See, for instance, D. Epstein, *Impure Science: AIDS, Activism and the Politics of Knowledge* (Berkeley: University of California Press, 1996).
23. <http://www.repubblica.it> (accessed 3 January 2003).
24. Ibid.
25. Ibid.
26. C. Di Giorgio and G. Mola, *La Repubblica*, 13 February 2003.
27. F. Cavallaro, *Corriere della Sera*, 4 February 2003.
28. C. Di Giorgio, *La Repubblica*, 31 January 2003.
29. F. Foresta Martin, *Corriere della Sera*, 30 January 2003.
30. F. Foresta Martin, *Corriere della Sera*, 11 February 2003.
31. V. Piccolillo, *Corriere della Sera*, 2 February 2003; F. Foresta Martin, *Corriere della Sera*, 6 February 2003.
32. *La Stampaweb*, 14 August 2003, <http://www.lastampa.it/speciali/ambiente/articoli/0803>.
33. V. Bush, *Science: The Endless Frontier* (Washington, DC: Government Printing Office, 1945).



34. OECD, *Science, Technology and Industry Scoreboard* (Paris: OECD, 2002); European Commission, *Toward a European Research Area: Science, Technology and Innovation—Key Figures* (Luxembourg: European Commission, 2003).
35. See the statement by Romano Prodi, *Corriere della Sera*, 19 November 2003.
36. OECD, *Country Report: Italy* (Paris: OECD, 2000), <http://www.oecd.org>.
37. See E. Ormala, "Science, Technology and Innovation Policy in Finland," in *Research and Innovation Policies in the New Global Economy: An International Comparative Analysis*, ed. P. Laredo and P. Mustar (Cheltenham: Elgar, 2001); for Italy, see F. Cesaroni et al., "L'allocation delle risorse per la scienza, effetti di breve e lungo termine sulla produttività degli scienziati," in *Il sistema della ricerca pubblica in Italia*, ed. A. Bonaccorsi (Milan: Franco Angeli, 2003), 227–256.
38. L. Salvia, *Corriere della Sera*, 2 February 2003.
39. <http://www.cordis.lu/rtd2002/indicators>
40. Rapporto CRUI su dati ISI, 2002, <http://www.crui.it>.
41. See, for example, A. Panebianco, *Corriere della Sera*, 22 September 2003; G. G. Vecchi, *Corriere della Sera*, 12 October 2003.
42. F. Foresta Martin, *Corriere della Sera*, 5 April 2003.
43. See, for example, M. Bucchi, V. Papponetti, and M. Scanu, *The Evaluation of Scientific Research as a Policy Design Tool: Mapping Approaches across a Set of Case Studies*, Working Paper, Fondazione Eni Enrico Mattei, forthcoming.
44. Charles P. Snow, *Science and Government* (Cambridge, MA: Harvard University Press, 1960; trans. *Scienza e Governo* (Torino: Einaudi, 1966).
45. F. Foresta Martin, *Corriere della Sera*, 27 November 2003.
46. M. Bucchi, "La provetta trasparente. A proposito del caso Di Bella," *Il Mulino*, no. 1 (2003): 90–99.
47. C. Di Giorgio, *La Repubblica*, 2 February 2003.
48. C. Di Giorgio, *La Repubblica*, 14 May 2003.
49. *Ibid.*
50. T. Regge, *La Repubblica*, 1 February 2003.
51. L. Salvia, *Corriere della Sera*, 2 February 2003.
52. *Ibid.*
53. C. Di Giorgio and G. Mola, *La Repubblica*, 13 February 2003.
54. F. Cavallaro, *Corriere della Sera*, 4 February 2003.
55. On the tendency by the media to give a political slant to scientific debates, pitting opposing sides, see J. W. Dearing, "Newspaper Coverage of Maverick Science: Creating Controversy through Balancing," *Public Understanding of Science*, no. 4 (1995): 341–361.
56. C. Di Giorgio, *La Repubblica*, 1 February 2003.
57. See, for example, M. Bucchi, "La democrazia alla prova della scienza," *Il Mulino*, no. 6 (2003): 1050–1057.