Social Studies of Science, 5 (1975), 303-29

The Formation of Soviet Research Institutes: A Combination of Revolutionary Innovation and International Borrowing

Loren R. Graham

In the Soviet Union today the term 'scientific research institute' *(nauchno-issledovatel'skii institut)* has a significance and a currency unequalled in any country in Western Europe or the Americas. The prototypical research institute in the Soviet Union is located in the Academy of Sciences of the USSR. Although far outnumbered by the institutes in the ministries and other academies, the institutes of the All-Union Academy of Sciences enjoy the greatest prestige and are usually recognized as representing the ideal model for the organization of scientific research.

In this essay I would like to examine briefly the origin of this model for the organization of scientific research. In doing so I will trace its history back to the pre-revolutionary period, consider the influence of certain foreign models on Russian and Soviet developments, and discuss the uniquely Soviet innovations which were introduced after the Revolution and which reflected the characteristics of the Soviet social and political milieu.

THE INTERNATIONAL BACKGROUND 1900-1917

The first two decades of the twentieth century were a period in which fundamental changes occurred in the organization of scientific research in all the leading industrial nations. It was in this period that the idea of promoting research in specialized institutes, instead of the

Author's address: Department of History, Columbia University, New York, N.Y. 10027, USA.

more conventional university laboratories or the traditional learned academies, began to spread rapidly.

In Germany both industrialists and government leaders promoted central scientific institutes. In the last years of the nineteenth century the Reich had already promoted the Physikalisch-Technische Reichsanstalt, and the excellence of German research based in industrial laboratories, particularly in the chemical and electrical industries, was already internationally known. The movement toward the creation of scientific institutes culminated in Germany in 1911 with the establishment of the Kaiser-Wilhelm Gesellschaft, supported both by industry and the government. Before the outbreak of World War I, institutes for general chemistry, physical and electro-chemistry, and coal research began their activities, while plans for a Kaiser-Wilhelm Institute of Biology were already well advanced. Despite the difficulties of the war and the subsequent inflation, the Kaiser-Wilhelm Society initiated within a relatively short time 37 institutes, of which 33 were in the exact sciences and four in the human sciences.[1] This network of research organizations soon earned a world-wide reputation and played a role in the discussions in Russia, both before and after the Revolution, of the most effective ways of organizing scientific research.

France possessed at the beginning of the century several distinguished research organizations such as the Institut Pasteur, the Collège de France and the Institut de France. However, the need to formulate a national science policy and to organize problem-oriented research institutes on a large scale was not considered to be a pressing problem there, as was also the case in other countries, until early in the twentieth century. In 1901 the Caisse de Recherche was formed to facilitate the financing of scientific research. Furthermore, a law of 1 July 1901, laid the groundwork for the establishment of non-profit trade association research facilities. In subsequent years several dozen research institutes were established in accordance with this law, including institutes in optics, petroleum research, rubber research, and ceramics. During World War I the discussions of scientific research policy took a crucial turn with the establishment in 1914 and 1915 of committees in the Ministry of Education that subsequently merged into the Office national des recherche scientifiques industrielles et des inventions, which is a direct ancestor of the present-day Centre national de la recherche scientifique (CNRS). The CNRS and its predecessor

[1] *OECD Country Reports on the Organisation of Scientific Research: Germany* (Paris, 1963).

organizations promoted research in both theoretical and applied fields; it is today the main initiator and supporter of systematic fundamental research in France.[2]

In the United Kingdom learned societies such as the Royal Society, the Royal Institution, and, more recently, the universities, had promoted scientific research before the turn of the century. The Royal Society had no research institutions of its own, but the Royal Institution possessed laboratories from the date of its founding (1799). The Cavendish Laboratory (1871) at Cambridge University was a particularly eminent example of university science. With a few exceptions, governmental involvement in research did not become active in Britain until 1900, when the National Physical Laboratory was established. In the period from 1900 to World War I several other governmental bodies began to promote research, such as the Development Commission (1909) and the Medical Research Committee (1913). In 1916 the government established the Department of Scientific and Industrial Research (DSIR), which became the dominant body in government science until its replacement in 1965 by several other organizations. During the years after 1900 private industries also initiated many research laboratories and larger research associations.[3]

In the United States the most interesting developments were in the private sector. In particular, industry was beginning to realize that the promotion of research could be a commercially profitable venture. Following the lead of the German chemical industries of the late nineteenth century, American firms at the beginning of this century began to develop permanent commercial laboratories that soon attracted attention throughout the world as another variant in the trend toward new loci for research establishments. The first American company to establish such an independent laboratory for research was General Electric in 1900. Other companies rapidly followed suit: du Pont de Nemours in 1902; Corning Glass Works, 1908; Eastman Kodak Company, 1912; and US Rubber in 1913.[4] By 1915 the United States possessed about one hundred industrial research laboratories.

The emergence of private philanthropic foundations in the United States in the early twentieth century was an event which had great

---

[2] *OECD Country Reports on the Organisation of Scientific Research: France* (Paris, 1964), 27 and *passim.*

[3] *OECD Country Reports on the Organisation of Scientific Research: United Kingdom* (Paris, 1966).

[4] *OECD Country Reports on the Organisation of Scientific Research: United States* (Paris, 1963), 13 and *passim.*

significance for the support of research, both in the universities and in emerging private non-profit research institutes. By 1915 there were already 27 private foundations in the United States, including the Carnegie Corporation (1911) and the Rockefeller Foundation (1913).[5] One of the characteristics of research in the Soviet Union would be the absence of such foundations, but in the last years of the Russian Empire several similar organizations emerged. After the Revolution, and the elimination of private capital, these organizations disappeared, and it became necessary to fulfil their functions in other ways.

THE IMPERIAL PRECEDENTS 1900-17

Although scientific research in Imperial Russia lagged behind the advanced countries of the West, it had by 1900 already proven its abilities through the outstanding work of a series of brilliant investigators, including such international figures as D. I. Mendeleev, N. I. Lobachevskii and P. L. Chebyshev; furthermore, in the period 1900-17 almost all of the organizational tendencies displayed in Western countries, including the efforts to form complex research institutes, also appeared in Russia. Because of its particular cultural, economic and political history, however, these Russian developments occurred in forms that were not identical with their Western counterparts.

In the first years of this century, scientific research in Russia was carried on within three different institutional frameworks: (a) the higher educational institutions, including the universities (ten in 1914) and the specialized higher schools in technological fields; (b) the Imperial Academy of Sciences, founded in 1725; (c) ministerial institutions promoting research in a few areas of national interest, such as geology, hydrography and agriculture.

The relative influence of the different sectors reflected the characteristics of Russia's historical development. Industrial research was largely lacking in pre-revolutionary Russia, a result of the fact that Russia derived both its technology and much of its industrial capital from the West. Foreign investors saw little reason to promote research in the industries which they financed in Russia, and even the native Russian capitalists were usually content to obtain necessary innovations from the West.

---

[5] *Ibid.*, 14.

On the other hand, university science bloomed in late Imperial Russia as talented researchers brought back to their homeland the methods and topics of research which they learned in their studies in Western Europe, particularly in the German universities. By 1900 Russian science was clearly becoming more and more centred in the universities, as it was in Western Europe. But even by this late date the competition in science between the universities and the older learned academies that had been resolved in favour of the universities decades before in Western Europe still continued in Russia. The Imperial Academy of Sciences in 1900 still insisted on the reality of its official title as 'the most important learned estate *(soslovie)* of the Russian Empire'.[6] Unquestionably, the Academy was being gradually outdistanced by the universities in science, but in the first decades of this century several able spokesmen of the Academy seized upon the development of the new forms of research institutes in the West as a potential means of reviving the Academy and restoring its traditional pre-eminence in science. Although the tsarist government refused to approve the more ambitious of these projects, apparently on both financial and political grounds, it nonetheless favoured the more conservative Academy over the universities, which by the end of the nineteenth century had become centres of radical activity directed toward the downfall of the autocracy.

Thus Russia entered the twentieth century with an Academy of Sciences that, in contrast to its largely honorific counterparts in Western Europe, still insisted on its ebbing scientific hegemony. With the emergence of new loci of research in Western Europe and North America in the new centralized research institutes a primary question would be whether the Russian equivalent organizations would be integrated into the Academy system or organized outside it. The debates over this question started before the Revolution and continued long after it.

Since in this essay the main attention will be centred on the post-revolutionary period, it is not possible to discuss in detail the numerous efforts that Russian scientists made before 1917 to establish a new framework for scientific research. Recent Soviet scholarship has shown quite clearly that in the same years that new organizations such as the Kaiser-Wilhelm Society arose in Western Europe a debate, both public and private, broke out in Russia concerning the need for the

---

[6] 'Ustav imperatorskoi sanktpeterburgskoi akademii nauk', *Istoriia akademii nauk,* II (Moscow-Leningrad, 1964), 687.

creation of a network of scientific research institutes.[7]

In the years between 1909 and 1917 groups of scholars in Russia presented five different major projects which included, among other reforms of education and science, calls for the establishment of national research institutes. All but the last failed in terms of their larger ambitions; the last – the effort during World War I to organize research on the basis of an organ of the Academy of Sciences – succeeded in the sense that its activities were subsequently approved by the new Bolshevik government and then transformed. Two of the five projects would have placed the new institutes within the Imperial Academy of Sciences, or at least would have relied on the Academy for the administration of the institutes, while the other three would have created an autonomous network. One of the organizations promoting the reforms – the Ledentsov Society, a philanthropic organization – was compared by several Russian scholars to the Kaiser-Wilhelm Society, although it is clear that there were very real differences between the two organizations in their financing, administrative principles, and, in particular, in their relations to the government. Prominent leaders of another of the reform movements – the Society of the Moscow Scientific Institute – often looked to the Royal Institution of Great Britain as an example, since they preferred a model that was more independent from the government than the Kaiser-Wilhelm Institutes.

The most successful of the efforts to reorganize Russian science before the Revolution was the one already mentioned that began during World War I, continued through the Revolution into the 1920s, and served as one of the most important models for the evolution of research bodies within the Soviet framework. This organization was the Commission for the Study of Natural Productive Forces (KEPS), an integral part of the Academy of Sciences. In 1915 a group of members of the Academy suggested that a committee be formed to serve as a technological advisory body on war needs.[8] The activities of KEPS

---

[7] M. S. Bastrakova, 'Organizatsionnye tendentsii russkoi nauki v nachale XX v.,' in *Organizatsiia nauchnoi deiatel nosti* (Moscow, 1968), 171. Bastrakova's article (150-86) is one of the most valuable for an overview of the organization of Russian science in the early twentieth century. See also Alexander Vucinich, *Science in Russian Culture, 1861-1917* (Stanford: Stanford University Press, 1970).

[8] The new advisory body was suggested by Academicians A. P. Karpinskii, B. B. Golitsyn, V. I. Vernadskii, N. S. Kurnakov and N. N. Andursov. Letter to the author from N. A. Figurovskii, Director, Institute of the History of Natural Sciences and Technology, Academy of Sciences (Moscow, June 1961).

soon went far beyond this original rather restricted conception. KEPS was of signal importance in turning the Academy away, at least partially, from its previous preoccupation with fundamental research, in creating a closer link between the Academy and national economic and strategic concerns, and in introducing concepts of coordination and planning into the Academy's approach to research. Throughout World War I and afterward KEPS promoted the exploitation by Russian industry of previously unknown or unutilized natural resources. One of the most active leaders of KEPS was V. I. Vernadskii, the outstanding geologist, who attempted several times to organize reforms in Russian science reflecting both national needs and the trends in other nations. Even before the Revolution Vernadskii used KEPS as an instrument for attempting to implement what the other reforms had failed to bring about: the creation of a network of national research laboratories.[9]

EARLY SOVIET REFORMS OF RESEARCH INSTITUTES 1917-25

The Revolution radically changed the entire setting for the discussions of reforms of scientific research organizations, although it was a long time before the full implications of this change were realized. Before the Revolution no prominent Bolshevik leader had ever given the problem of the organization of science special attention; obviously a variety of other tasks connected with the consolidation of power, the resolution of the Civil War and the repair of the economy were of much higher priority in the thoughts of the governmental and Party leaders.[10]

Yet a few of the implications of the overturn were discernible to scientists fairly early, at least to those who decided to cast their lot

[9] Bastrakova, *op. cit.* note 7, *passim.*

[10] A possible exception to this statement might be a few sections of Lenin's 'Uderzhat li bol'sheviki gosudarstvennuiu vlast?' written at the end of September or the beginning of October 1917. In that work Lenin seemed to defend the idea of retaining the existing forms of scientific organization, although his thoughts were still quite indefinite. After speaking of the need of the new proletarian government of the future for all types of specialists he continued, 'And we will not invent the organizational form for this work, but from capitalism we will take over ready-made the banks, syndicates, best factories, experimental stations, academies, etc.; only we must borrow the best models from the experience of the leading countries'. V. I. Lenin, *Sochinenie,* 4th ed., XXVI (Moscow, 1955), 86.

with the Soviet regime. The stated commitments of the new government to eliminate private capital and to plan the development of the economy as a part of state policy simultaneously diminished the importance of all private, philanthropic efforts to reform science – and this included the Ledentsov Society, the Society of the Moscow Scientific Institute, and the Free Association for the Development of the Positive Sciences – and enhanced the position of established bodies that were a part of the state bureaucracy, such as the Academy of Sciences. And here the very failure of most efforts to organize research outside the Academy before the Revolution contributed to its eventual survival afterwards. Those few successful private efforts – such as the Physical Institute created by the Society of the Moscow Scientific Institute – were simply nationalized. They did not provide a large enough centre of gravity to be a genuine competitor to the Academy and the universities in the early Soviet years.

Yet the Academy's position was nonetheless extremely precarious in the early years of the Soviet regime. The reason for this vulnerability was the fact that the members of the Academy were bourgeois intellectuals, largely antipathetic to the goals of socialism, and still committed, on the whole, to the ideal of autonomous, pure science that would be criticized so thoroughly by Party activists in the coming years. The Academy was caught in the middle of a social and class conflict that raised the most fundamental threats to its existence. Many leaders in science and education, both on the Academy side and within the new Soviet bureaucracy, were fully aware that the Académie des Sciences in Paris had been suppressed in the French Revolution. Whether the same fate awaited the Academy of Sciences in Petrograd was an open question. An example of the ultra-left approach was a memorandum drawn up in November 1918 by a local committee of communes in which the observation was made that institutions like the Academy of Sciences are 'destined to quick abolition as the completely useless vestiges of the pseudoclassical epoch of the development of class society'.[11] Such expressions were not entirely confined to the unofficial radicals. Within the Commissariat of Education itself, the part of the new bureaucracy responsible for the Academy, there were influential figures who favoured the replacement of the academy by an 'Association of the Sciences' which would include a variety of research

[11] Quoted in A. V. Kol'tsov, *Lenin i stanovlenie akademii nauk kak tsentra sovetskoi nauki* (Leningrad, 1969), 61, from *Vestnik narodnogo prosveshcheniia soiuza kommun severnoi oblasti*, No. 6-8 (1918), 69.

institutes. Early supporters of such a plan were the historian M. N. Pokrovsky and the astronomer P. K. Shternberg. In later years the head of the Marx-Engels Institute, the colourful and caustic D. B. Riazanov, promoted the same viewpoint.[12]

Relations between the Soviet government and the scientific community were particularly uncertain in the first months of Soviet power. Many scientists doubted the possibility of developing research fruitfully in the new political conditions; some feared that the Bolsheviks would destroy not only the existing scientific institutions but the very possibility of continuing research work. In these circumstances it was fortunate that the head of the Commissariat of Education, the cultured A. V. Lunacharskii, and an important group of scientists in the Academy of Sciences were convinced of the importance not only of retaining existing centres of strength in science, but even of expanding them. And, as we shall see, the leader of the new state, Lenin, underscored the importance of retaining and nourishing the most important existing institution in science, the Academy of Sciences.

Whenever the governmental authorities wished to consult with the scientific community they usually went through the Academy, even if the subject under discussion went far beyond the Academy's normal competence. For example, when in January 1918, the Commissariat of Education drew up a memorandum entitled 'Proposals for a Project for the Mobilization of Science for the Needs of State Construction', the addressee of the memorandum was the Academy of Sciences.[13] Furthermore, the memorandum proposed that the organizational centre for the mobilization of science should be a special commission of the Academy. The commission would include representatives of many scientific organizations which were not connected with the Academy in any direct way. The permanent secretary of the Academy, S. F. Ol'denburg – who was certainly not favourably disposed to Bolshevik political principles – recognized the significance of this pattern of communication, and he encouraged his fellow members of the Academy to reply favourably to such requests, or at least to those portions which seemed feasible in terms of the Academy's traditions and resources. Ol'denburg was anxious to preserve the importance of the Academy, even to expand it, while at the same time guarding its precarious state of relative autonomy.

---

[12] Loren R. Graham, *The Soviet Academy of Sciences and the Communist Party, 1927-1932* (Princeton: Princeton University Press, 1967), 181.

[13] Kol'tsov, *op. cit.* note 11, 38.

Since the primary concern of the Soviet authorities at this time was making use of applied science to meet the national emergency brought about by war, revolution and foreign intervention, the logical centre in the Academy for the new tasks was KEPS. Lunacharskii, in a letter to the president of the Academy sent in March 1918, underlined the importance of KEPS. He called upon the Academy to serve as the organizational centre for Russian science since its 'initiative and organizational potential had been demonstrated so clearly in the work which it did during the war years through KEPS'.[14]

Within the Academy itself there was a genuine division of opinion over the proper way to receive such requests. Not only were the members of the Academy suspicious of the Soviet government, but many of them also feared becoming too involved in practical, economic tasks to the detriment of the fundamental research which had been their traditional concern. The solution which gradually emerged was based on the idea of preserving the old strengths of the Academy while expanding the activities of KEPS and facilitating the creation of new institutes, both within and without the Academy framework.

Lenin played an important role in emphasizing that the Academy was the organizational centre of Soviet science in his famous 'Draft Plan of Scientific-Technological Works', written in April 1918. In this memorandum Lenin called upon the Academy to organize the study of natural resources, the location of industry near sources of raw materials, the electrification of industry and transportation, and the development of sources of energy. Although many Soviet scholars have maintained that this memorandum had a significant impact on the Academy's activities, we now know, as a result of the work of several Soviet archivists and historians, that it was never transmitted to the Academy and that the Academy archives relating to the early years of Soviet power contain no mention of it.[15] Nonetheless, Lenin's memorandum was important in that it revealed his opinion that the Academy was the logical organizational centre for Soviet science. The draft plan, along with Lenin's warnings to Party functionaries on several occasions to treat the Academy with special care, is evidence that the Academy had support on the highest level of the Soviet bureaucracy.[16]

---

[14] *Ibid.*, 48.

[15] *Ibid.*, 76. See also E. N. Gorodetskii, 'Kistorii Leninskogo plana nauchno-tekhnicheskikh rabot'; Iz istorii revoliutsionnoi i gosudarstvennoi deiatel'nosti V. I. Lenina (Moscow, 1960), 191-232.

[16] For an example of a warning from Lenin to treat the Academy carefully, see A. V. Lunacharskii, 'K 200-letiiu vsesoiuznoi akademii nauk', *Novyi Mir*, 10

The organized system of research expanded markedly during the early Soviet years.[17] In 1917 there was only one institute within the Academy (the Caucasian Historical-Archaeological Institute), although there were many commissions and committees which promoted research. By 1927 there were eight institutes, six of them in the natural sciences and two in the social sciences. Between 1927 and 1933, 29 major organizations appeared in the Academy, some based on amalgamations, others entirely new.[18] Even more dramatic, however, was the expansion of institutes outside the Academy. In many of these new organizations KEPS played an important role. For a while it even appeared as if KEPS might become a competitor to its parent organization, the Academy itself. Already by the end of 1918 there were two institutes and 19 departments belonging to KEPS in Petrograd and six departments in Moscow. The departments of KEPS tended to become full-fledged institutes with the passage of time. These organs, originally sponsored by KEPS, frequently ended up as parts of the ministerial research organizations, especially when they did not fit comfortably into the Academy framework.

Another organization which was important in promoting research in the 1920s, especially in the social sciences, was the Communist Academy (called the Socialist Academy from 1918-23). The Communist Academy was a clear competitor with the Academy of Sciences, created for the specific purpose of counterbalancing the bourgeois influence of the older academicians of the Academy of Sciences. The unanswered question was whether it would supplant its venerable predecessor. The inability of the Communist Academy to perform high-quality work in the natural sciences limited its role as a substitute for the Academy of Sciences, but in the social sciences it produced a number of influential works in the Marxist tradition.[19]

(1925), 110.

[17] See M. S. Bastrakova, *Stanovlenie sovetskoi sistemy organizatsii nauki (1917-1922)* (Moscow, 1973). Governmental leadership of research institutions in the twenties was centred in a section of the Commissariat of Education entitled the Chief Administration of Scientific Institutions, headed from 1923-28 by F. N. Petrov. For his memoirs, see F. N. Petrov, *65 let v riadakh leninskoi partii: vospominaniia* (Moscow, 1962).

[18] Graham, *op. cit.* note 12, 161.

[19] Joel Shapiro of Columbia University, N.Y. is presently writing a study of the Communist Academy.

THE SIGNIFICANCE OF FOREIGN MODELS

Soviet scientists and science administrators in the 1920s were eager to make use of the best foreign experience in their efforts to organize a new framework for the promotion of science. Every year during the 1920s, Soviet scientists journeyed to Western Europe, where they discussed not only their fields of specialization, but also questions of science organization. In 1923 the permanent secretary of the Academy of Sciences, Ol'denburg, went to France, England and Germany to examine the organization of scientific research abroad. He went again in 1926, and upon his return home he wrote: 'If the eighteenth century was the century of academies, while the nineteenth century was the century of universities, then the twentieth century is becoming the century of research institutes'.[20]

Certain Soviet journals of the 1920s were literally filled with reports on the best ways to organize science. The journal *The Scientific Worker*, for example, contained in almost every issue from 1925-30 one or more reports on science in foreign countries; the total number of such 'foreign country reports' in this one journal during this six-year period was over 50. The leading countries treated in *The Scientific Worker* were Germany (approximately 20 articles); the United States (approximately 10); France (8) and England (5).

Germany clearly emerged as the country most appropriate as a model for the organization of science and the new Kaiser-Wilhelm Institutes as the most interesting institutions. Each leading nation, however, had its Soviet analysts and even emulators. The United States was particularly admired for the strength of its industrial research, the scale of its educational and scientific effort, and its 'cult of efficiency', evidenced by its new methodologies based on technology, such as 'Fordism' and 'Taylorism', which became watchwords in the Soviet Union. Many Soviet critics thought, however, that the rampant capitalism in the United States, the decentralization of science organization, and the emphasis on commercial applications of science made American science inappropriate for Soviet replication. The Soviet physicist A. F. Ioffe, reporting in 1926 on a visit to the United States, expressed dismay at the anti-intellectualism there and the extent to which private benefactors to American universities seemed to be able to

---

[20] S. F. Ol'denburg, 'Vpechatleniia o nauchnoi zhizni v Germanii, Frantsii i Anglii', *Nauchnyi Rabotnik* (February 1927), 89.

distort research by giving only to favourite projects.[21] Other Soviet critics extended similar analysis to Great Britain, where it was thought there was much less anti-intellectualism than in the United States, but still a great deal of commercialism, and, in addition, an exaggerated emphasis on individual, isolated research conducted in idiosyncratic ways. British scientists seemed to be particularly hostile to the idea of the planning of science.[22]

France also had its Soviet admirers, and its centralized structure rendered it more understandable to Soviet planners. Visiting Soviet scientists praised the Institut Pasteur, although not always in terms that won approval at Soviet governmental levels. One Soviet scientist admired the 'freedom and anarchy' that the Institut Pasteur managed to combine at the level of the individual researcher with *autorité indiscutable en haut.*[23] This remark reveals the paradox and historical uniqueness which Soviet observers often perceived in France's scientific institutions, characteristics which rendered these organizations interesting, but somehow inappropriate as models for Soviet science administrators. The opinion seemed widespread among Soviet visitors to France that, great as France's scientific traditions were, the organization of science there was too heavily conditioned by a long and unique history to be reproducible. In addition, in the 1920s France seemed too static in its population and its institutions to provide many examples of the latest models of the organization of science.

Germany, however, seemed both more familiar and exciting, despite its postwar economic difficulties. Germany, like Russia, had industrialized later than France and England, and its institutions in science and education were heavily conditioned by this upsurge of the late nineteenth and early twentieth century. Furthermore, like Russia in the 1920s, Germany was attempting to adapt the institutions of a recently overthrown empire to the needs of a new government. Academic relations between Russia and Germany had always been close, particularly in science. The most common place for Russian science students to study abroad in the late nineteenth and early twentieth century was

---

[21] A. F. Ioffe, 'Vpechatleniia ot poezdki po amerikanskim laboratoriiam', *Nauchnyi Rabotnik* (April 1926), 59-65. For a somewhat more complimentary discussion, while observing that American research is weak in theory, see P. P. Lazarev, 'Amerika i ee nauka', *Nauchnyi Rabotnik*, 1 (1925), 135-49.

[22] S. F. Ol'denburg, 'Britanskaia konferentsiia i nauchnye issledovaniia', *Nauchnyi Rabotnik*, 2 (1927), 93-97.

[23] L. A. Tarasevich, 'Iz zagranichnykh vpechatlenii', *Nauchnyi Rabotnik*, 4 (1926), 66-79, esp. 67.

in the German universities; Russian scientists often published their research in German journals. As one Soviet scholar observed in a 'country report' in 1927:

> They know us better in Germany than in any other country.... It is impossible for a Soviet scholar there to be given the question which a French intellectual recently posed to a Russian scholar: 'Is it true that in Russia after the Revolution they preserved the universities? '[24]

The appropriateness of the German model for science was, to be sure, ambiguous. Germany, like all the West, was in Russian eyes a capitalist domain where the organization of science heavily reflected class interests. As we will see, the Soviet critics perceived in the organization of science and education in Germany the influence of a philosophy of education and knowledge that Soviet radical critics, in particular, found unacceptable. Yet without question the Germans were creating new organizational forms in scientific research which provoked intense interest among Soviet scientists. Many of them liked what they saw there.[25] Furthermore, their interests were abetted by the paths of international politics, for after the Treaty of Rapallo in 1922 relations between Weimar Germany and Soviet Russia were closer than between Soviet Russia and any other West European nation. This rapprochement bore cultural and scientific fruits. In June 1927, a 'Week of Soviet Science' was celebrated in Berlin, with 18 prominent Soviet scientists entertained by the German scientific elite, including Planck and Einstein. Upon his return to Soviet Russia the geologist and science administrator A. E. Fersman wrote about the importance of the Kaiser-Wilhelm Institutes for the organization of Soviet science. He said that some people had feared that by placing scientists in large organizations individual creativity would be fettered, but, according to Fersman, Germany had provided 'the first examples of the creation of independent scientific research institutions' which, on the contrary, provided a 'powerful tool for the promotion of research'.[26]

The significance of the Kaiser-Wilhelm Institutes for the Soviet

---

[24] I. K. Luppol, 'Ob osobennostiakh raboty sovetskogo uchenogo za granitsei', *Nauchnyi Rabotnik*, **11** (1927), 101.

[25] After visiting the Kaiser-Wilhelm Biology Institute and other institutions, the Soviet geneticist Iu. A. Filipchenko wrote that 'we must follow these examples at home when we organize those institutions which we need'. Filipchenko, 'Iz vpechatlenii zagranichnoi poezdki', *Nauchnyi Rabotnik*, **1** (1925), 150-59.

[26] A. E. Fersman, 'Nedelia sovetskikh uchenykh v Berline i ee mezhdunarodnoe znachenie', *Nauchnyi Rabotnik*, **9** (1927), 76-83, esp. 80.

Union was almost universally recognized by Soviet scientists, but there was considerable debate about which aspects of their organization were appropriate for import, and which should be replaced by revolutionary innovations of Soviet origin. In order to illustrate the similarities and differences between the main ideas involved in the discussion of science affairs in Germany and Russia, it will be useful to examine the conceptual framework contained in the founding documents of the Kaiser-Wilhelm Society and compare them with the main ideas expressed in the debates over the organization of Russian science.

The main topics which the following comparison highlights are: *(a) The universities and science; (b) Industry and science; (c) The Academy and science; and (d) The nature of scientific creativity.*

GERMANY

(a) The universities and science

The main idea behind the creation of the Kaiser-Wilhelm Institutes, as expressed by the men instrumental in drawing up the original plans – Friedrich Althoff, Adolf Harnack, Friedrich Schmidt-Ott, and Rudolf von Valentini – was the freeing of talented university scientists from the heavy load of teaching.[27] Valentini, in his letter asking Harnack to compose plans for the new institutes, observed that science laboratories located in the universities were inevitably used primarily for pedagogical functions, not for the advancement of science. With the growth of the importance of science to the professions, especially medicine, but also to education in general, the universities were becoming more and more involved in 'service functions'. The development of mass education was overloading the university teachers and threatening the quality

[27] See 'Dokumente aus der Gründungszeit der Kaiser-Wilhelm-Gesellschaft', in *25 Jahre Kaiser Wilhelm-Gesellschaft zur Förderung der Wissenschaften,* I (Berlin, 1936); this source contains both Valentini's letter of commission to Harnack as well as Harnack's 'Denkschrift' of 21 November 1909. Also: Friedrich Schmidt-Ott, *Erlebtes und Erstrebtes* (Wiesbaden, 1952); Georg Schreiber, 'Deutsche Wissenschaftspolitik von Bismark bis zum Atomwissenschaftler Otto Hahn', *Arbeitsgemeinschaft für Forschung des Landes Nordrhein-Westfalen* (Köln and Opladen, 1954); F. Glum, 'Zehn Jahre Kaiser-Wilhelm-Gesellschaft zur Förderung der Wissenschaften', *Die Naturwissenschaften,* XVIII (6 May 1921), 293-300.

of German science, which had found a natural home in the nineteenth century in the small, elitist German universities. Now, as enrolments grew, the universities were becoming mere *Lehranstalten* instead of centres of fundamental research. Concurrent with this development was the increasing danger that the universities would develop primarily in the directions that have significance for 'practical life', since these directions were valued for service needs. Valentini believed that this emphasis would harm science itself, which he thought should develop freely in all directions in order to serve 'its goal of unified knowledge' *[das Streben nach einheitlichen Erkenntnis des Naturgeschehens]*.[28]

Harnack in his famous memorandum on the Kaiser-Wilhelm Institutes of 1909 agreed on the unsuitability of the universities for advanced research and urged the creation of entirely separate organizations. He sketched out the relations between the new institutes and the existing institutions of the German state.

(b) Industry and science

Much of the motivation to create the Kaiser-Wilhelm Institutes came from German industrialists, who by the early twentieth century had realized that science, even fundamental research, could have an important stimulating effect on industry. The German chemical industry, in particular, had led the way in showing that research, which at first glance seems quite unconnected with application, could subsequently have great economic significance. The industrialists were willing, therefore, to help finance the Kaiser-Wilhelm Institutes.

However, Harnack, the major institutionalizer of the German reform, saw a genuine danger in this new interest of the industrialists in science. He welcomed their initiative but he did not entirely trust their commitment to theoretical research. He noted that research in organic chemistry, which earlier had been conducted in the universities, was by the early twentieth century, 'almost completely closed off in great factory laboratories. Therefore this entire direction of research has been in large part lost to pure science, for the factories pursue research only so far as it promises practical results and then they hold these results as industrial secrets or cover them with patents'.[29] As a result, continued Harnack, one can rarely expect a true promotion of science by the

---

[28] *Ibid., 25 Jahre Kaiser Wilhelm-Gesellschaft* . . . I, 25.
[29] *Ibid.*, 33.

laboratories of individual factories, no matter how well they may be equipped or how talented their researchers may be. Thus, Harnack supported the view that the new institutes should be separate from the factories, as they should also be from the universities. His attitude toward industrial research, reflecting the German academicians' respect for pure science, will make fascinating comparison with the attitudes of the Russian radical critics.

(c) The Academy and science

Harnack and the initiators of the Kaiser-Wilhelm scheme proposed close relations between the new institutes and the old Prussian Academy of Sciences, but they wanted to keep the organizational lines distinct. Harnack urged the creation of the new institutes as the 'third factor' mentioned by Alexander von Humboldt in his memorandum on education of 1809-10, but never developed. The new institute network would take its place beside the Academy of Sciences and the universities as the third pillar of German learning. Humboldt had observed that the Academy, the universities, and the *Hilfs-Institute* are the 'three integrating parts of the total scientific establishment under the leadership and supervision of the state'.[30]

Harnack proposed that the administration of the Kaiser-Wilhelm Society should deeply involve the leadership of the Academy of Sciences and the universities while remaining separate. The director of each institute, for example, should be a member of the Academy. But he agreed with Valentini that it would be inappropriate 'to burden the Academy of Sciences with the administrative load of the institutes' and thereby make the Academy of Sciences directly subordinate to the state bureaucracy.[31]

(d) The nature of scientific creativity

Perhaps the greatest difference between the stated philosophy surrounding the creation of the Kaiser-Wilhelm Institutes and the creation of new institutes in the Soviet Union concerns the nature of the research scientist and the origins of scientific creativity. Fundamental

[30] Quoted by Harnack in *ibid.*, 31.
[31] *Ibid.*, 28.

to the conceptions underlying the Kaiser-Wilhelm Institutes was the idea of the free reign of the 'great personality', the scientific genius. Valentini and Harnack emphasized that each institute in the new society must be headed by a director of outstanding talent, a proven eminence in the scientific world who would be able to guide the research of his institution in whatever direction he wished for as long as he wished. Valentini wrote that 'the particular direction that work is taken in the institutes should not be determined so much by a prior decision *(Bestimmung)* in a certain discipline as by the personalities of the leading scholars'.[32] Harnack emphasized that the directors of the institutes would have enormous authority; they would be freed from teaching responsibility unless they expressed a desire to teach, would have excellent equipment at their disposal, and could choose assistants and staff as they wished, for long or short periods of time. The directors of the Kaiser-Wilhelm Institutes would have, in effect, life tenure, while no one else in the institutes would have any tenure at all. It was considered beneficial to have a constant exchange of research personnel between the institutes and the universities. No researcher below the director, Harnack emphasized, should be given a permanent contract so that maximum opportunities would exist for young researchers.[33] The director would be permanent, however, and he would control the exchange of personnel.

THE SOVIET UNION

(a) The universities and science

The opinion of German cultural leaders that the main reason that new research organizations must be created was to free university scientists from teaching met a mixed reception in the Soviet Union. Russian university teachers certainly had suffered under heavy teaching loads for decades and many of them agreed entirely with the German reformers. Before the Revolution complaints about exhausting teaching obligations had been legion; the prominent physicist P. N. Lebedev had objected to the 'academic serf labour *(barshchina)* which Mendeleev, Sechenov, Stoletov and other great Russian scholars had been forced to perform in order to have the right to conduct their own scholarly

[32] *Ibid.*, 25-26.
[33] *Ibid.*, 39.

research, in order to purchase the possibility of bringing fame to Russia by dint of their discoveries'.[34]

The permanent secretary of the Academy of Science, S. F. Ol'denburg, also agreed with the Germans that mass education was antithetical to deep research for knowledge. After returning from a visit to Western Europe, Ol'denburg wrote, in 1927, that the influx of large numbers of students in the universities was converting their function from research to pedagogy.[35] He concurred with his German colleagues that it was necessary to form institutes separate from the universities in order to promote science.

To the committed socialists and communists who were trying to reform Russian educational institutions, however, the effort to divorce teaching from research sounded very strange. To create citadels of pure thought, untainted by teaching responsibilities or concerns with educating a new generation of technical specialists, seemed to them to be a reinforcement of the 'caste-like secludedness' which they thought was an unfortunate characteristic of Russian science inherited from the tsarist regime.[36] They urged scientists to make visits to factories and schools, to participate in the practical labour of socialist construction and the tasks of popular enlightenment. In response to these calls, and the political pressure surrounding them, research laboratories of the Academy of Sciences set up public exhibits and invited the masses to lectures. The enthusiasm of the scientists for such tasks was usually limited, however, and when it was possible they retreated to their laboratories. They justified their actions by noting that in the long run it would be more valuable for them to preserve high-quality research in the Soviet Union than it would be for them to squander their time on tasks which other people could perform more competently.

The eventual successful separation of advanced research from teaching in the Soviet Union was a result of a combination of factors, including some unusual coincidences of interest. The Germans, as we have seen, wanted to promote research in separate institutes because they feared the effects of mass education upon the quality of scientific research. There were some Russian scientists who had similar fears -- particularly among the old intelligentsia – but most of them were silent about these worries as the Soviet mass education campaign gathered

---

[34] Quoted in Bastrakova, *op. cit.* note 7, 167, from P. N. Lebedev, *Sobranie sochinenii* (Moscow, 1963), 339.

[35] Ol'denburg, 'Vpechatleniia o nauchnoi . . . ., *op. cit.* note 20.

[36] 'Khronika', *Nauchnyi Rabotnik* (March 1929), 86.

speed. To the leaders of the Communist Party, however, there was an entirely separate, and somewhat ironic, reason for wanting to keep research and pedagogy fairly separate. The leading scientific researchers in the early years after the Revolution were not sympathetic to Soviet power and might be a bad influence upon Soviet youth. Since there was no way of quickly replacing the old intelligentsia – how does one make a good Communist factory worker into an internationally-known physicist? – the logical solution was to convert the universities into mass institutions where the spirit of socialism was carefully observed while maintaining the advanced research institutes on a separate level. Thus, while the Germans feared the effects of mass education on science, the Soviet authorities feared the effects of bourgeois scientists on mass education. Both favoured, therefore, the separation of research and teaching, but for different reasons.[37]

The division between research and pedagogy that developed in the Soviet Union by the early thirties was never absolute. Many members of the Academy of Sciences taught in the universities, while the universities also developed laboratories. Research in some fields – for example, mathematics – remained strong in the universities. Furthermore, after 1930, when Communist influence within Academy institutes had become more secure, the Academy developed a system of graduate study *(aspirantura)*. Nonetheless, the resulting pattern of research and education was based on a degree of separation of the two that was much greater than in Western states, particularly the United States and England.

(b) Industry and science

Soviet reformers of the Russian science establishment followed an externalist approach to the development of science and technology that was predicated on the belief that the most important stimulus to the development of science was economic need. Therefore, they believed that the requirements for the construction of socialism would place

---

[37] Many scholars would maintain that both the German fear of mass education and the Soviet suspicion of bourgeois scientists were not well-grounded. German universities in the first decade of the century were not, in fact, being engulfed by the masses, nor were older specialists in Soviet Russia in the 1920s engaged in subversive activities on any wide scale. Yet the perception was more important than the reality in influencing attitudes.

demands before the scientists and engineers that would be translated into discoveries and innovations. As Engels had once commented, 'If a technical demand appears in a society, then it will move science ahead more than ten universities'.[38]

The Soviet critics noted the large-scale development of industrial laboratories in the West, such as those of General Electric and du Pont in the United States, and saw them as evidence in favour of their view of the close connections between industry and science. They believed, however, that by creating large, central institutes serving Soviet industry as a whole rather than individual plants they would establish a much more effective industrial research establishment than was possible in a capitalist country, where the research was fragmented among a variety of individual firms which competed with each other and concealed their innovations if possible. Underestimating the very real stimulus which economic competition provides to industrial innovation, the Soviet planners originally paid very little attention to the development of on-site industrial laboratories, favouring instead the complex institutes under the administration of the industrial ministries.

During the 1920s and 1930s Soviet authors published many articles and books criticizing industrial research in the West, with its industrial secrets, patent laws and cut-throat competition.[39] And on this topic there was a rather interesting agreement with the views of the founders of the Kaiser-Wilhelm Society. Harnack, in his memorandum of 1909, had lamented the fact that organic chemistry research had, by the early twentieth century, been 'walled-off' by the German industrial laboratories.[40] His proposed solution was to protect research from industry in his special institutes, just as he also wanted to protect it from mass education.

Thus, there was an affinity of views on this particular topic between German mandarin intellectuals, who viewed the development of industry with mixed feelings, and looked nostalgically back to the days when German learning had been unsullied by industrial concerns, and the opinions of Soviet socialist critics, who perceived the 'perversion of

---

[38] K. Marx and F. Engels, *Izbrannye pis'ma* (Moscow 1947), 469.

[39] For examples: N. Finkel', 'Kapitalizm i issledovatel'skaia rabota', *Molodoi Bol'shevik*, **14-15** (1931), 22-30; *Science at the Crossroads* (Papers presented to the International Congress of the History of Science and Technology, London, 29 June – 3 July 1931, by the delegates of the USSR), (London, 1931); N. A. Raigorodskii, *Imperializm i uchenye* (Moscow-Leningrad, 1934).

[40] *25 Jahre Kaiser Wilhelm-Gesellschaft . . . op. cit.* note 27, **I**, 33.

science' by capitalist industry. But the Soviet critics of capitalism did not believe that similar distortions of scientific research could occur in a socialist economy. Their reasons for separating research from individual plants was not fear of perversion, but desire for the advantages of centralization.

Already by the 1920s, however, a visible tension developed between the Soviet critics who believed that socialism should open up boundless horizons for the unfettered development of scientific research in the physical, biological and social sciences, and those who emphasized that science in the Soviet Union also had a specific obligation: the strengthening of the industrial and military power of the Soviet Union. Some writers, such as V. T. Ter-Oganesov, commented that it was always the capitalist, not the socialist, who wanted to know if such-and-such a scientific development could be given a profitable application.[41] Other Soviet critics, however, emphasized that a scientist 'must be not only a representative of science, but a servant of the Soviet government'.[42] And the application of science in industry, or socialist construction, became the ever-pressing demand. The new permanent secretary of the Academy of Sciences in 1930, V. P. Volgin, commented that 'the idea of the closest ties of the work of the Academy of Sciences with socialist construction runs like a red thread' through the new regulations governing the Academy.[43] By emphasizing the need for a centralized science establishment, and by mobilizing the entire society for industrialization, the Soviet authorities were creating a highly pragmatic science programme. Thus, the Soviet Union created distortions in science quite similar to those found in industrial research in other countries, but which were partially counteracted there by a diversity of universities, private foundations and other independent institutions pursuing rather different goals.

(c) The Academy and science

A genuine distinction arose between the approach of the German science administrators to the Prussian Academy of Sciences and the

---

41 V. T. Ter-Oganesov, 'Industrializatsiia SSSR i voprosy organizatsii nauki', *Nauchnyi Rabotnik* (September 1926), 5-6.

42 Quoted in Graham, *op. cit.* note 12, 80.

43 *Otchet o deiatel'nosti akademii nauk SSSR za 1930 god,* (Leningrad, 1931), ii.

Soviet science administrators to the Soviet Academy of Sciences. By drawing a line between the Prussian Academy and the new Kaiser-Wilhelm Institutes the German Leaders continued the trend that was already well-established by the late nineteenth century: the Academy was a largely honorific organization, important as a learned body facilitating the publication of scholarly works and serving as an advisory council for the new research institutions, but not directly responsible for the organization and administration of the new complex institutes.

In the Soviet Union, however, the Academy of Sciences increased its status and activity with respect to other research organizations, particularly the universities. Many new institutes were created within its system. Although a large number of research institutions were also created outside the framework of the Soviet Academy, it became, and still is, the prestigious centre of Soviet science, more important than the various government coordinating bodies that were nominally superior to it. In later years the president of the Academy would refer to it as 'the director of the Soviet scientific orchestra'.[44] Its position became unique among scholarly institutions. By the 1960s the entire Academy system contained approximately 600 research institutes. The Soviet Academy of Sciences was the only one of the eighteenth century academies of science of Europe that continued to dominate the scientific research of its nation in the twentieth century.

The reasons for the eminence of the Soviet Academy of Sciences are various: the position of relative strength which the Academy already possessed at the time of the Revolution; the experience it had gained in World War I in mobilizing industry through KEPS; the decision to assign the universities a primarily pedagogical role; the absence of private efforts to organize research after the elimination of capitalism; the vision and talent of early administrators of the Academy in the Soviet period; the importance which Lenin assigned to the Academy; and the failure of the critics of the Academy to create a viable alternative to the Academy of Sciences. After the consolidation of Stalin's rule in the late 1920s few changes were made in the institutions of the government bureaucracy. The initial organizational decisions carried great weight. Stalin distrusted the radical reformers in his Party; his purges of the 1930s struck the Communist Academy even more drastically than the Academy of Sciences. The Communist Academy was disbanded in 1936.

---

44 *Vestnik akademii nauk SSSR* (April 1960), 67.

(d) The nature of scientific creativity

The basic principle behind the administration of the Kaiser-Wilhelm Institutes was, as we have seen, the free rein of the creative personality of the institute director, a principle fully in line with traditional German idealism; the first principle of the new institutes being created in the Soviet Union was, on the contrary, that of collectivism. The new institutes were conceived as giant coordinating centres for the expression of cooperative endeavours in the exploration of nature and in the development of technology. The prominent plant geneticist N. I. Vavilov, a sincere socialist who would later die in one of Stalin's camps, wrote in 1929: 'From the work of solitary scientists we are shifting to collectivism. Modern institutes and laboratories – they are, so to speak, "factories of scientific thought" '.[45] The discounting of the work of the individual scientist in favour of group efforts was a prominent theme in speeches and debates. The political leader Nikolai Bukharin, speaking at a conference in 1931, said that future progress in science depended much less on the individual scholar isolated in his study and much more on the large, organized research laboratory in which cooperative labour was possible.[46] He pointed to the significance of the development of expensive research equipment in the physical sciences as one of the reasons for the trend.

True to the collective spirit, numerous Soviet authors discussing science were highly critical of the German adulation of individual creativity as something intuitive, inexplicable and even mystical. One Soviet writer maintained that 'scientific creativity must lose its status as a "holy of holies" ' and become a product to be studied, altered, and promoted much as one does material products. The principles of mental labour may be different, he admitted, from those of physical labour, but surely such principles exist and can be discovered.[47]

In line with the effort to desanctify science, to stop scholars from regarding it as an unmodifiable product of the individual genius, Soviet science administrators made a long and only partially successful effort

---

[45] 'Khronika', *Nauchnyi Rabotnik* (March 1929), 86. See also N. Rozhdestvenskii, 'O kollektivizatsii nauchnoi raboty', *Nauchnyi Rabotnik* 7-8 (1929), 20-23.

[46] *Vsesoiuznaia konferentsiia po planirovaniiu nauchno-issledovatel'skoi raboty, 1-ia* (Moscow-Leningrad, 1931), 20.

[47] N. A. Podkopaev, 'O planirovanii nauchnoi raboty', *Vestnik akademii nauk SSSR*, 3 (1931), 1-6.

to plan science. The most unsuccessful part was, of course, the effort to see the future of scientific theory. Once that goal had been abandoned – and the leading scientists never took it seriously – considerable progress in less ambitious directions was actually made. These included the planning of regional research facilities and the long-term expansion of the research budget.

Despite the Soviet praise of the collective principle in the administration of research, the actual management of the institutes was soon entrusted to powerful directors, just as in Germany. True, these directors were never quite given 'free rein' for their creative personalities. Political and economic pressures were always present. But in the Academy system in particular the directors of the institutes usually exercised great authority. In fact, one of the criticisms of the Academy voiced in later years was the view that senior distinguished scientists refused to step down from their authoritative positions early enough to make room for younger scientists. Furthermore, new institutes have been occasionally created on the demand of star scientists, a sign of emergence of the influence of the creative personality. After the war, Novosibirsk became known for its institutes of this type, often headed by younger scholars than in Moscow or Leningrad. Thus, we can see that there has been a retreat from the calls for collectivism in research during the early years of the Soviet state. The earlier spirit still maintains influence, however, in the large numbers of group projects and publications. Furthermore, the trend toward group research has increased in all nations as the need for complex and expensive equipment has grown, along with the number of problems on the borders of disciplines that require cooperative study. Thus, while the idea of 'collectivism' may have lost some of its earlier allure, the principle of 'cooperation' has become increasingly important.

CONCLUSION: A BLENDING OF FOREIGN, NATIVE AND REVOLUTIONARY MODELS

The system of scientific research that emerged in the Soviet Union by the 1930s was based on three pyramids: the Academy of Sciences of the USSR and the republican academies, the educational institutions, and the governmental ministries. In terms of intellectual eminence, there was no question which of the three pyramids enjoyed the commanding position. The full members of the Academy of Sciences of the

USSR occupied the most prestigious academic positions in the Soviet Union, and they were given preference in material support in their research institutes.

The forms of new institutions which emerged in the 1920s were a result of a blending of foreign, native and revolutionary influences. We have seen that long before the Revolution, leading Russian scientists were proposing the creation of a national network of research institutes. They knew that such proposals were also widespread in Western Europe, and they drew inspiration from some of these projects, but they were also reacting to the political events and institutional framework in imperial Russia. After the Revolution the discussions were given new impetus by the commitment of the new regime to expand science and education. The socialist critics of the 1920s tried to adopt the Western models which were most attractive to them, while modifying these models in accordance with their own ideology.

The decision to develop new institutes on a large scale was a result of the discussions of the 1920s. At the time the concept of research in integrated institutes, as distinguished from research in universities or academies, was still relatively new in all countries. The Soviet planners looked over their shoulders at the new types of research organizations developing in the West and attempted not only to catch up but actually to anticipate Western trends. In the process they promoted the idea of specialized research institutes to an unheralded prominence. At the same time, they demoted research in the universities to such a low status that in subsequent years it was necessary to make special efforts to revive it.[48]

Thus, some aspects of the Soviet reforms turned out to be permanent, while others lasted only a short while. The basic decision to make the Academy of Sciences the centre of Soviet science has remained valid to the present day. Other, more ideological efforts, such as the attempt to make collectivism the governing principle of research in the institutes, have done less well.

---

[48] Some Soviet scientists were worried even in the 1920s about the effects of depressing the place of research in the universities. P. S. Osadchii wrote in 1928: 'We must not ignore the fact that the concentration of scientific work in the new institutes, separated from the universities, has been disadvantageous to the latter, reducing them to purely pedagogical organizations with a low level of scholarly work. This has a bad effect on the type of young specialists finishing the universities. It is necessary to revive and broaden scholarly work within university walls . . . .' Osadchii, 'Nauka v planovoi rabote sotsialisticheskogo stroitel'stva', *Nauchnoe Slovo*, 1 (1928), 17-18.

Out of the combination of such diverse influences there arose in the Soviet Union the present organization of scientific research, an impressive achievement which displays numerous features bearing witness to the unique history of that nation.