Science in Russia.

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IN consultation with Sir Henry Miers and Prof. D'Arcy Thompson, who were among the British delegates, I have prepared the following account of our recent visit to Russia to the celebrations of the two-hundredth anniversary of the Russian Academy of Science. The celebrations began on September 5. We were to have six days in Leningrad, full of every kind of function both solemn and festive, to be followed by four more, similarly crowded with events, in Moscow. We came determined to see and hear all that we possibly could in the time; and aware that the gathering had been organised largely with an eye to its propaganda-value, I suppose that most of us with our curiosity combined a considerable measure of scepticism as to the real value of anything we might be shown.

Nothing could exceed the courtesy and hospitality with which we were received. Railway travelling in Russia was to be entirely free, and those who cared to do so were invited to visit any place in the country, Kieff, Odessa, etc., that could be seen before the end of September. At the frontier our baggage was passed in (and on the return journey passed out) unexamined, and we were authorised to send cables gratis. New motor omnibuses, specially sent from Moscow, met us at the station, and after we had been duly filmed, conveyed us to our hotel—a fine and well-appointed house. Rumour alleged that no other hotel could provide even reasonable comfort, but that may have been untrue. Of the ordinary charges we paid about half, but at Moscow, where we were distributed among several hotels, no charge at all was made.

If these preliminary symptoms inclined us to complacency we soon saw others of a different character. In the long drive through the streets of Leningrad the evidence of the empty and half-ruined buildings, the peeling walls, the dishevelled pavements, and the broken roadways—full of dangerous and neglected pits, above all the clothes of the population, with rarest exceptions, dingy and often improvised of coarse and unusual materials, were indications of troubles which no camouflage could conceal. Wherever we went in Leningrad, though in a slightly less degree perhaps in Moscow, we had the experience—to scientific persons novel and rather disconcerting—of finding ourselves conspicuously well dressed. It was indeed a little embarrassing to meet men of refinement and learning whose trousers were eked out with large and unrelated fragments, though almost worse to pass groups of artisans going home from work in rags which suggested the casual ward of a workhouse rather than decent employment. Readers of *NATURE* will not expect a report on social conditions, but some hint of the setting in which we saw what we did see can scarcely be omitted.

In preliminary announcements the numbers of foreign visitors expected had been given as about a hundred and fifty. We were not furnished with any list of those who did attend, but the highest estimate of our actual numbers which I heard was ninety-six. Of these perhaps half were representatives of mathematics and natural sciences in the stricter sense, the remainder being economists, historians, orientalists, and especially students of Slav languages, etc.

The proceedings opened with an evening reception in the rooms of the Academy. On this and on most other formal occasions our arrival was attended by a guard of honour with bayonets fixed, and we marched in under the lime-light of the ubiquitous cinema men. Here we found ourselves in an immense gathering assembled from all parts of Russia, representative of every kind of learning, and if several of the eminent foreigners whose presence had been promised failed to appear, there were no defects on the part of our hosts, for practically every one with whom we had acquaintance, direct or indirect, was there.

On the following Sunday we assembled for the first of several public seances, which both in Leningrad and Moscow constituted the formal business of the congress. Proceedings began—as always—with the singing of the International, which was followed by discourses of various kinds. After an introduction from the president, Karpinski, the secretary of the Academy, Oldenburg, gave an interesting history of its origin and activities, reminding us of the many distinguished men who had worked under its auspices. Other members of the Academy, especially Steklov and Lazarev, followed him, but alternating with them were speeches by members of the Government, giving their views on what science had done and might do for the people. At various times we were thus addressed by Kalinin, president of the Soviet, Krassin, Kameneff, Lunacharsky, minister of education—on several occasions—and other well-known leaders. At one of these seances Zinovieff, president of the Leningrad Soviet, gave a long and rhetorical address, developing an analogy between the aims of science and those of the revolutionists, which was afterwards printed.

Among much in all these speeches which of course escaped us, one conclusion very plainly emerged, that the revolutionary government is perfectly sincere in its determination to promote and foster science on a very large scale. Signs were not wanting that science, especially perhaps in its applications, is regarded by the present governors of Russia as the best of all propaganda. It was interesting to hear the faith that the advancement of science is a first duty of the State proclaimed by professional politicians. We ought perhaps not to inquire too closely whether they and we mean the same thing by the term science. Zinovieff, for example, speaks in the same breath of the “discovery” of Karl Marx and the “discovery” of Charles Darwin. Each of these men valued the work of the other, he told us, in a very high degree, and in evidence of Darwin's admiration of Marx he spoke of a letter, sent in acknowledgment of the book on capital, which was to be published. In an impassioned passage, which was enthusiastically applauded, he drew a parallel—derived from Lenin—between what science had done for the abolition of syphilis, patiently trying and discarding 605 reagents before 606 was reached, with what revolutionists were attempting for the abolition of capitalism. Capitalism was a scourge worse than syphilis, and if need be, not 606 but 6006 remedies must be tried so that the planet may be delivered once for all from its “yoke.” Judging, however, from the

proportion of the population lost in the first experiments,¹ those who survive to benefit by the ultimate deliverance will be few.

Whether science will soon fulfil the many promises made in its name must be doubtful, yet not merely from what we heard, but also from what we saw, the failure we may be sure will not be for want of genuine effort. Next in importance after communism, the tenets of Leninism assert the doctrine that science is the basis of happiness. Religion is to be eradicated as a vice; science and the arts are to be promoted in its place. Those who regard this fervour for science as mere affectation for propaganda purposes miss an essential fact, and in our visits to laboratories and institutions, as related below, we found abundant and imposing evidence of the expression of this faith in material works. Of these new institutions we saw a great many, and though of course none of us could personally visit more than a part, we found on comparing notes that certain features were common to most of them. Palaces and great houses from which the owners have been dispossessed have been hastily adapted for the purposes of science. The effect was often incongruous. Though objects of value had been removed, we saw laboratory benches improvised among the remains of Empire furniture and statuary, and under Boucher ceilings representing nymphs sporting with amorini. Formerly each institution would have the Tsar's portrait and probably an occasional ikon. The modern analogue of these is the "red room," arranged as a sort of shrine of communism with the bust of Lenin, surrounded with copious literature of propaganda. Signs also there were that, in other and less innocent ways, not only the universities but also the various scientific institutions were utilised as agencies for the dissemination of communistic ideas.

Doubts might be entertained as to whether the best atmosphere for research has been created in the institutions, but no praise is too high for the zeal and vigour with which work is being conducted in the new circumstances. As typical of them may be mentioned the Institute of Zoological and Botanical Research under Prof. Philiptschenko and Prof. Dogiel, which has been set up in the house and parks of the Leuchtenberg family at Peterhof. Besides the permanent staff, many hundreds of students are there accommodated in the summer months, partly for instruction and in part co-operating in the experiments we saw in progress. The whole gave the impression of a very active and well-organised school, which has already done excellent work both in fundamental and applied biology. At Moscow Prof. Nawaschin and a band of cytologists trained by him are housed in a fine building and equipped with good instruments. His researches are of course classical, and we saw with satisfaction that in this case at least, one of the "purest" of biological sciences was not suffering through the competition of the applied branches.

Another very large house, also in Moscow, has been assigned to Prof. Koltsov as an Institute of Experi-

mental Biology. This includes numerous departments, especially a genetical station under Prof. Serebrovsky, work in experimental morphology, hydrobiology, etc. At the old Agricultural School at Petrovsky-Razumovsky, we saw more genetical work in application to agriculture and the long-established researches of Prof. Prianishnikov on agricultural chemistry. The Darwin Museum, created by Prof. Coats and his wife in illustration of the theory of evolution, was a remarkable and I believe unique curiosity. It contains a quantity of valuable and largely unpublished material bearing on the incidence of variation and a great number of other novelties. We were invited to inspect many more institutions, especially various establishments connected with public health, but all these I had to forgo.

Among the new organisations of a biological character the most extensive is the Institute of Applied Botany and Plant Breeding. The immediate object is to provide breeds of cereals and other agricultural plants for the various parts of Russia. The work is in the hands of Prof. Vavilov, who has already built up a great establishment for this purpose, employing 350 people, of whom some 200 are trained workers. In his travels through Turkestan, Afghanistan, and neighbouring countries, and by a vast correspondence, collections of seeds of wheat, barley, rye, millet, flax, etc., have been brought together on a great scale. The central office is in Leningrad and occupies a very large building, which is in great measure a living museum of economic plants as represented by their seeds. Of wheat alone some 13,000 forms are here collected. In various parts of the country are twelve subordinate stations, and by sowings made once in about three years it is proposed to perpetuate most of the collection alive. Besides a cytological department under Prof. Levitzky, there are special sections for meteorology, statistics, etc. Exceptional opportunities have been provided for investigating the geographical distribution of cultivated plants, especially in its bearing on problems of origin, which have resulted in several novel suggestions. At Dyetskoe (formerly Tsarskoe) Seló is the home breeding-station of this Institute. The chief building on it is a pleasant house, originally intended as a villa for Queen Victoria, and adjacent to this a number of laboratories and additional accommodation have been provided.

Sir Henry Miers contributes the following notes on three great Institutes, indicating the scale on which scientific work is contemplated in Russia, and its concentration in Moscow and Leningrad.

"*The Geological Commission*, recently installed in a vast new building in the Vassili Ostrov, contains numerous rooms for the geologists who take expeditions to all parts of the country and generally work up their material in the winter months. There are no less than 200 geologists and a total staff of 400. All results are classified and co-ordinated in a central bureau; the relative abundance and distribution of minerals of economic importance are collected in a graphic form on special maps. The whole top floor is being utilised as a museum.

"*The Aero-hydro-dynamical Institute* at Moscow, approaching completion, at an estimated cost of three million roubles. A new wind channel, 52 metres in length, built in two sections, 3 metres in diameter at

¹ Though accurate figures are wanting, some estimates may be formed from the "Report on Epidemics in Russia since 1914," 2 Parts, by Prof. L. Tarassévitch, published at Geneva, 1922, for the League of Nations. On the basis of the statistics provided he estimated that "Russia may consider herself fortunate if she emerges from the present crisis with the loss of 20-25 per cent. of her population." Pt. 2, p. 44.

one end, 6 metres at the other, is nearly finished. An experimental tank, like the Froude tank at the National Physical Laboratory, 225 metres long, 12 metres broad, and 6 metres in depth, is being constructed. A large experimental tower for wind experiments has been erected.

"The *Institute of Applied Mineralogy* in Moscow is being built on a grandiose scale at an estimated cost of 1,800,000 roubles, with an area from 9 to 12 thousand sq. metres and cubic content of about 60,000 cubic metres. It will be equipped for research work on a vast mass of material from all parts of the country.

"Typical of the organisation of research in special directions is the *Institute of Biological Physics*, in Moscow, directed by Prof. P. Lazarev; the whole interior of a large building has been rearranged for work on many branches of applied physics, and includes investigations on such subjects as the ionic theory of nervous excitation, with a geophysical laboratory in which researches on the remarkable magnetic anomaly of Kursk have been conducted.

"As an example of the growth and reorganisation of scientific collections:

"The *Mineralogical Museum* of the Academy has been quadrupled in extent during the last twenty years and has just been established as a national public mineralogical museum, distinct from that of geology, and fully equipped with laboratories.

"A visit to any school would show how important and overwhelming a part is played by nature study and elementary science in the education of children, especially in reference to all the affairs of life under the Soviet system."

Of the old-established scientific institutions, the Museums of Zoology and of Palæontology and the Botanic Garden were the only ones which I managed to visit. The fine and largely unique contents of the two museums are of course familiarly known. One recent acquisition I saw with mixed feelings—the almost complete skeleton of the giant *Indricotherium*, a rhinoceros-like creature, standing about twelve feet high at the shoulder. These bones, the collection of which has taken three years, were found exposed at Chalkar Tengiz, a remote and little known locality, but from the photograph of the site I saw that in 1886 I must have passed within a few yards of the very spot. The Botanic Garden alone still showed signs of the hardships through which it had come.

Great provisions are being also made for the development of art, archæology, and ethnology. Though unable to visit the Musée Russe, in which the collections illustrative of the history of the races included in the Soviet are preserved, I heard continually of its extraordinary excellence. Though it is the work of several decades, its recent extension has been much assisted under the new regime. Of the new developments at the Hermitage, Sir Martin Conway lately published an account. Among later novelties I was shown the astonishing collections brought from East Turkestan by M. Kozlov's recent expeditions. From tombs originally constructed at a depth of twelve metres below the surface and permanently immersed in water, have been brought a vast series of textiles, both woollen quilts and silks in admirable preservation,

together with ornaments of various kinds and domestic objects, the whole belonging to a civilisation previously unknown. The decorations representing stylised animals, especially reindeer (possibly elk) and oxen, are evidently Sassanian in affinity, as M. Orbeli demonstrated. Some of the designs in the silk fabrics are of incomparable beauty, and very striking also are fragments of a curious red and black lacquer showing the utmost delicacy of taste and workmanship. These remains have not as yet been dated with certainty, but are presumed to cover a long period belonging chiefly to the sixth-seventh century A.D., but in part probably to a much earlier epoch.

Of all the things seen I suppose the interior of the Usspensky Sobor, the great Cathedral of the Coronations, exhibited the greatest break with past traditions. Until lately the whole was plastered with gold leaf and paintings rising little above the *objet de pitié* type of art, giving an effect certainly solemn and gorgeous but tasteless and oppressive. The archæologists have declared the whole of this display of orthodoxy to be modern and debased. The process of stripping has been begun and is steadily proceeding under scholarly and skilful guidance. The ancient pictures are being slowly recovered and will be seen before long as they were intended to be seen upon the original white of the walls. The most famous and venerable of all ikons, the Korsun Madonna, traditionally ascribed to St. Luke, has already been cleaned. I remember it looking like a piece of black leather. Seven layers of paint have been removed and a most remarkable original picture has been displayed in its entirety. Terrible judgments were expected by the common people to follow these impieties and the opening of the reliquaries by which they were accompanied. Time alone can show whether their anticipations will be justified, but meanwhile there is no gainsaying the fact that in the restorations which are to be extended throughout the Kremlin churches, and carried out upon every ikon of importance, the history of religious art in Russia will be revealed.

Of the banquets, lordly, if indeed the term princely were not more appropriate, graced, as that in Moscow at least was, with Imperial porcelain and madeira; of the operas, of the ballets and the sumptuous production at the Arts Theatre, where several of the courtly costumes were real brocades—lately somebody's "properties" in the fullest sense—one I verily believe lent from the Kremlin collection itself—this is not the place to speak at length.

We left with no clear conception of the principles or practice of communism; and in particular as we looked round at the 1200 persons assembled for the Moscow banquet, in a city teeming with beggars, we tried in vain to conjecture any system by which admission to the table, or exclusion from it, may have been determined. Of liberty we saw no sign. We here are accustomed to think of science and learning as flourishing best in quiet places, where they may come to slow perfection, under systems providing a reasonable measure of personal independence and security. Present conditions in Russia have brought about the very contrary, and among the grave indications of disharmony, which every visitor observes, the want of freedom is by far the most serious.