

Jubilee publications (on the centenary of P L Kapitza's birth)

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This issue of *Uspekhi Fizicheskikh Nauk* rounds off, as intended, “Kapitza’s Days”, the meeting celebrating the centenary of the birth of one of the major physicists of the twentieth century—Petr Leonidovich Kapitza.

The evening in the Column Hall of the House of Unions, with a large portrait of Petr Leonidovich above the podium, consisted of nonstandard and some definitely not celebration-type words from his pupils and admirers, and above all the speech of Anna Alekseevna, wife of Petr Leonidovich, surprisingly poetic and penetrating, forcing—I think—many to read Ibsen’s *Peer Gynt*... At the Institute of Physical Problems they have not yet removed the exhibition of “63 Snapshots from the Life of Petr Leonidovich Kapitza and his Institute”, assembled by the remarkable artist-photographer V Gende-Rote. Sadness is setting: in a few more days the exhibition will come down and only a few striking photographic documents will be seen in the permanent P L Kapitza museum... The celebrations end... Memory naturally remains. The greater the man, the greater the mark he leaves behind, the longer the period for which his memory is retained, and the clearer the picture in this memory. But those who remember Kapitza will not live for ever. I hope that the Institute founded by Petr Leonidovich will be a permanent memorial. The Institute carries the name of its founder (thank God!) and it depends on the leaders of the Institute and its staff whether it will remain worthy of its name and be a true memorial to Petr Leonidovich Kapitza...

There is a book in front of me: *Petr Leonidovich Kapitza: Vospominaniya. Pis'ma. Dokumenty* (Reminiscences, Letters, Documents) (Moscow: Nauka, 1994). There are 542 pages in the book and it has been compiled by E L Kapitza and P E Rubinin. This is a fundamental publication published in time for the centenary. It is not the only centenary publication (a full list is given in the Appendix). The journal *Priroda* published a special issue on the centenary of Petr Leonidovich Kapitza’s birth (No. 4 in 1994). It is excellently designed: on the first page of the cover there is a portrait of the young Kapitza, painted by B M Kustodiev in 1926, and the fourth cover page shows the house of P L and A A Kapitza within the compound of the Institute of Physical Problems, where the Memorial Museum is now located. Between the covers the documents, reminiscences, and letters enclose symbolically and trace the life of a remarkable scientist and man.

These reminiscences, documents, and letters cannot leave anybody indifferent.

There are people who become (during their lifetime) historical personalities and they are accepted as such. One must admit that only a few scientists (even very major ones) have been regarded as historical personalities. This is true in spite of the enormous interest in science and in its achievements, and in spite of the acceptance of the importance in science in modern civilisation. Scientific interests are insufficient to convert a scientist into a historical personality for people who are far from science. Such personalities are created by their life stories, particularly by reversals of fortune, by their character and behaviour in extreme situations, and (as used to be said) by fate... One would like to think that recognition by colleagues is important, because they can understand better the results obtained by scientists. In the case of Kapitza one remembers the warm relationship between Ernest Rutherford and the young scientist, his friendship with such classical personalities as P A M Dirac, and—finally—the awarding of the Nobel Prize, which officially included Petr Leonidovich among the assembly of the great. Naturally, the recognition by colleagues is important, even essential, but obviously insufficient. Equally important is the relationship between scientists and the government and in a sense everything depends on the nature of this relationship. It appears that the persecution can be greater than the recognition, as in the case of Giordano Bruno.

These thoughts come flooding when reading the centenary publications.

Petr Leonidovich Kapitza undoubtedly belongs to the class of people who had become a historical personality during their lifetime. He has been regarded as such by his contemporaries for at least for the last 25–30 years of his life; this applies to those who had only heard of him and those who knew him personally. The circle of those he met personally was very large. For those who know the history of his life, this is not surprising. A different aspect does surprise. With sufficient self-criticism (sometimes plunging to lack of faith in himself, which—judging by his letters—he did not conceal from those close to him), P L Kapitza pursued his calling all his life, which was to be a scientist and to work in science. This calling and the belief in the importance of the role of science in the development of society were transmuted in Kapitza to a recognition of his role as a historical personality. It is very difficult to formulate what I want to say. It does not in any sense mean self-importance. The recognition of his own historical importance gave P L an internal freedom and enabled him to communicate freely with government

leaders. In none of his letters to Stalin, Molotov, and others who had real power to decide the fate not only of individuals, but also of nations, is there any servilism, obsequiousness, or the trembling of a slave. I nearly wrote that ‘the letters are seen to be communications between equals’, but I stopped because I do not want to equate P L with his addressees... It is difficult to give an accurate answer to the question: how, in taking a stand against L Beria, one of the most terrible persecutors of the repressive Stalinist regime, did P L survive and win the fight for the freedom of V Fock and L Landau? An interesting and probably accurate answer comes in the reminiscences of I M Khalatnikov (in *Priroda*, his article entitled ‘‘Kapitza won’’ is part of a chapter, wittily called ‘‘Grand master’’). In any case it is obvious that this acceptance of Kapitza as a major historical personality had played an important role in this encounter.

The self-awareness of P L Kapitza forced him to take seriously the need to keep letters and documents. Hence the reason why he exchanged communications even in those cases when everything was settled in direct talks. Hence also the procedure of signing the minutes of the meetings of the Scientific Council... I think that P L thought that everybody did the same and he would have been surprised that this was far from true. It is therefore not surprising that an enormous archive was left behind by Kapitza. Pavel Evgen’evich Rubinin has now been working on this archive for ten years. His efforts have brought to light the most interesting material.

Petr Leonidovich was one of those people with whom contact was very interesting. Analysing my own feelings, I concluded that it was interest in his personality that dominated the atmosphere when one was in his company. Irrespective of why and for what reason one came into contact with him — at a meeting of the Scientific Council of the Institute, at a conference on low-temperature physics, at a seminar, drinking tea after a seminar, at the dacha on the occasion of his birthday — P L was always himself: an interesting storyteller, with a striking richness of knowledge (from scientific facts to anecdotes), and — most important — capable of unexpected judgements. The nature of this article does not allow me to recount my own reminiscences and feelings. However, I feel impelled to recall one very short conversation, which should be regarded as a commentary on what Anna Alekseevna says at the end of the reminiscences of I M Khalatnikov (p. 218 of *Reminiscences...*): ‘‘P L, and also Aleksei Nikolaevich Krylov†, suffered authorities in the way they suffered the forces of nature: rain, storms, earthquakes, etc. They did not respect the forces of nature, but lived with them.’’ This disrespect was particularly blunt in the case of trivial requirements of the authorities. At the time my ‘party mission’ (a term now forgotten) was the responsibility for ‘party education’ (once again, fortunately a forgotten term) and this included, for convenience of the relationship with supervising organs, the excellent Kapitza seminar (mentioned many times with great admiration in the reminiscences). An order came from somewhere above to prepare a report and to outline and without fail obtain approval for the plan of such education; this was quite a normal instruction at the time and it was difficult to carry

out for a number of reasons. First, we never planned anything and tried to select interesting presenters and subjects. Since the interest in topics to be selected had been largely connected with events taking place (in political, cultural, and scientific life), planning (particularly long-term) would have been a fiction. Second (and most important!), the documents would have to be signed by P L Kapitza both as Director and as the nominal leader of the seminar, and it would have been impossible to get P L to sign such a ‘forgery’. Then, we (I B Danilov, who was then the Secretary of the Party Organisation, and myself) went to Petr Leonidovich and told him about our difficulty. He heard us and responded in roughly the following way: ‘‘Why do you want to behave as an obedient girl?!’’ When Kapitza saw the surprise in my face (I B obviously knew this formula), P L added: ‘‘An obedient girl told to lie down, does so and spreads her legs apart...’’ We put away the instruction received into a long box and did not answer it at all, and the person who instructed us did not risk putting pressure on Kapitza. P L was able to protect the Institute surprisingly well from the supervising bodies and to maintain our own rules at the Institute. This made the Institute of Physical Problems ‘an island of common sense’. This is the title of an article about Kapitza as Director, written by A S Borovik-Romanov in *Priroda* [(4) 138 (1994)].

In the book I am reviewing and in the special issue of *Priroda* there are no papers by Petr Leonidovich. Therefore, one has to read the *Collected Works*‡ in order to become acquainted with the scientific work of Kapitza and particularly to learn from it. True, *Priroda* reproduced six papers in the chapter expressively entitled ‘‘Kapitza’s ideas today’’: they demonstrate the long life of Kapitza’s work. In the *Reminiscences* there are many articles by collaborators of Petr Leonidovich, who reconstruct the atmosphere at the Institute, and the style of relationships between P L and his disciples and colleagues. Since physical experiments nowadays require team effort, it follows that ability to carry out experiments implies learning how to communicate with people. The reminiscences of Petr Leonidovich provide a surprisingly rich material on this topic. The reminiscences are therefore not only interesting but also instructive.

In the centenary publications Petr Leonidovich appears not only as a creative personality (scientist and engineer) and as a social activist, but also as a leader directing an academic research institute. P L described his leadership principles in papers and lectures, which can be found in *Eksperiment. Teoriya. Praktika* (Experiment, Theory, Practice) [Moscow: Nauka, (1987)]. Many recollections (particularly of collaborators), letters, and documents provide an excellent illustration of these principles. Naturally, they are also of intrinsic interest. One would like the *Reminiscences* and the special issue (No. 4 of 1994) of the journal *Priroda*, together with the books published earlier, to be desktop texts for leaders of various ranks: it is never too late to learn.

The instructive nature of the centenary publications is not limited to the style of Kapitza’s work, although this does include the relationships with his colleagues and with

† Father of Anna Alekseevna Kapitza, a mathematician, mechanic, and shipbuilder.

‡ ‘Nauka’ published [in Russian] three volumes of scientific works of P L Kapitza (*Strong Magnetic Fields*, 1988; *Low-Temperature Physics and Technology*, 1989; *High-Power Electronics and Plasma Physics*, 1991).

the authorities at various stages, when they helped and when they hindered... . It is instructive to learn about Kapitza as a person. Science, to which P L devoted his life, is created by living persons. How one lives, which rules one follows, how one reacts to fate's misfortunes and which compromises one accepts and which never, determine one's fate and the fate of one's results. A psychological portrait of the discoverer of the superfluidity of helium, rewarded by the Nobel Prize, cannot be deduced from a paper in *Zhurnal Eksperimentalnoi i Teoreticheskoi Fiziki*. However, when one reads the letter to Molotov asking him to release Landau from prison, where Petr Leonidovich argues that without Landau nobody can develop a theory of the phenomenon discovered by Kapitza (superfluidity is meant here†), the reaction is not only respect for the courage of the author of the letter (we well know how such requests have ended for the requester), but also boundless admiration and perhaps envy: Kapitza as a scientist clearly understands the importance of his discovery (before recognition of its value by the world's scientific community), and it is this knowledge that gives him the right to approach the authorities. If we read also his other letters (including that to Stalin!), we can see that he always knows his own value and that of his work.

One of the peak periods in the life of Kapitza is the saving of his colleagues from the clutches of the KGB. There were also well-known periods of severe hardship in his life. Fortunately, 'hardship' did not mean hunger and extreme material deprivation (with the exception possibly of the war years, together with the rest of the nation). However, hardship is the word to be used for forced separation from loved work. And this happened twice in his life! Each time it was through no fault of Petr Leonidovich and there seemed to be no hope, at least at the moment of the blow. Letters and reminiscences demonstrate the reaction of a wounded, very sensitive man, who has enough strength to fight not only external circumstances but himself and his own depression. And not only to fight, but to win. A F Andreev said: "To start from scratch five times! The example of Kapitza forces us to question whether we do not exaggerate the force of external perturbations that disturb scientific work today. At the time of Kapitza and particularly in his own case there were as many perturbations." ["A word about Kapitza" in *Priroda* (4) 4 (1994).] The life of Kapitza is an unusually striking example of courage and it is instructive, but naturally with the clear realisation that courage is difficult to learn. It is necessary to be born this way. It is important to know that there are always people who are capable of fighting and winning even when faced with such a terrible state machine as our country under Stalin. It is important to understand these things if only to lament: "If only I could..." I believe that resistance, which sometimes makes it possible to survive, is born from such sighs and laments. I do not wish to continue this subject. However, I hope it will never become a reality to the readers of the books I am reviewing here. Many upheavals in the life of P L Kapitza are well known: the successful work in Cambridge under Rutherford, which was terminated when P L was prevented from leaving the Soviet Union after a holiday there in 1934; the formation of the Institute of Physical Problems; the

discovery of superfluidity (1937); the development of a new progressive method for the cooling of air, which predetermined the construction throughout the world of modern installations for the production of large amounts of oxygen, nitrogen, and rare gases; the leadership of Glavkislород; the invitation to help in the construction of atomic weapons and Kapitza's refusal to participate (the quarrel with Beria); a period of nine years out of favour, living at Nikolina Gora; the formation of a hut laboratory at the dacha and the change of direction to the new subject of high-power electronics; the return to the Institute; the travel abroad and in particular to England ("Thirty-two years later"); and the Nobel Prize (1978) for the discovery made in 1937.

Even those who know the life story of Kapitza quite well can find in these books many interesting details, concrete points, estimates, hypotheses. They can look at events from different angles and, I am sure, they will see something not noticed or not known before. Reading the centenary publications we can conclude with joy that we are living in an epoch of openness and possibly even freedom of the word.

Moving somewhat away from what is usually called 'politics', it gives me (and I hope also the readers) pleasure to draw attention to the publication of the humorous tale of A I Shal'nikov "We are not at a conference here, have a bite and... disappear (when talking about the seminar)". This joy applies also to the family odes of P L Kapitza, a wonderful drawing with a caricature of Anna Alekseevna and a caption in verse by P L, and finally a report by P E Rubinin entitled "Nobel week of P L Kapitza" [unfortunately, for some reason this report is shorter than even the version published in *Magnit*, a wall bulletin at the Institute (January 1979)].

The chronicle of the life of P L Kapitza does not mention that in 1941 he spoke at a meeting organised by the Jewish Antifascist Committee. The text is reproduced in *Priroda* (p. 169) and is accompanied by an article by A Borshchagovskii "Unplayed Hamlet". The 'plot' begins with a short recollection of the wife of S M Mikhoels, A Pototskaya-Mikhoels. This story is called "Mikhoels's toast". It recounts the toast which Mikhoels raised at a banquet on the occasion of the fiftieth birthday of P L Kapitza. The toast included these words: "The bill, presented by you—the play 'Hamlet' in Russian will be paid for by me!"

I am aware that only few know this episode from Kapitza's life, but it is important for understanding the man. It might be appropriate to mention that all the members of the Presidium of the Jewish Antifascist Committee, apart from Academician Lina Shtern, were executed by shooting on 12 August 1952.

In reading the *Reminiscences* I frequently thought about the unity of the cultural life of our country. The apparent opposition 'physicists-lyricists' or the theory of two cultures (C P Snow) is negated by the friendship between people of very distant specialities (Kapitza and Prishvin, Kapitza and Yu Lyubimov, etc.), by the interest of P L in fine arts and theatre, his concern for the fate of humanity, and perhaps most importantly the attraction to his creative personalities irrespective of the branch of culture they were representing.

On the occasion of the eightieth birthday (9 July 1974) I estimated that hundreds of people came to the dacha at

† P L was right: a theory of superfluidity of helium was developed by Landau, who received the Nobel Prize in 1962.

Nikolina Gora. Unfortunately, there is no panoramic photograph of the festive tables on this day in the centenary publications. There is, however, such a photograph in the exhibition '63 Snapshots...'. Naturally, one cannot get to know everything. However, having learnt more, one can see what a surprising cross section of the intellectuals of our country is represented in this photograph, where Kapitza is the unifying personality. Some compensation for the absence of this panoramic photograph is the inclusion of many photographs in *Priroda*: 'The toast of Lyubov' Orlova' (p. 165), 'Shakespeare evening on 13 May 1946; SYa Marshak on the right' (p. 171), 'A Yu Ishlinskii (mathematician), P L Kapitza, V V Smyslov (former world chess champion)', 'On a walk with B Livanov (actor from the Moscow Art Academic Theatre), early fifties'. (The last two photographs are both on p. 184.) There are also photographs in the *Reminiscences*: 'Yu P Lyubimov with the writer Fedor Abramov in the Moscow home of Kapitza, 1977' (p. 295); 'With A I Solzhenitsyn at Nikolina Gora, 1969' (p. 245); 'Prishvins as guests of Kapitza at Nikolina Gora' (p. 180); 'Kapitza and Mikhoels, 1945' (p. 141), and so on.

In reviewing the books I am unhappy that I cannot describe everything, although I know that I am not expected to.

However, there is one continuing thread in the book and in the journal and I must speak of it. It is the role of his family in the life of P L Kapitza: the story of the help he had from his mother and wife (Anna Alekseevna) and his role as a good family man Petr Leonidovich was himself. In our age of devaluation of the family I would very much like to see that the letters of Petr Leonidovich to Anna Alekseevna and to his mother could be read by young people who are getting married or who are thinking about marriage. I am convinced that young people would learn much from the published letters and reminiscences.

The last comment sounds very boring. This is my fault. The relationships in the family of P L were not boring and his relationship with his sons had not even a trace of hectoring. If we read the pages of *Reminiscences* by Anna Alekseevna, Andrei and Sergei, we can see that there was not even a trace of tedious or boring lecturing, that Andrei and Sergei were surprisingly successful with their 'choice' of parents, and that Petr Leonidovich had (to use military terminology) a protected rear in the form of a harmonious devoted family on whom he could always rely and which in fact always came to his aid at difficult times and rejoiced with him in his victories.

By definition, art is the ability to organise materials. The materials in the book and the journal were reminiscences, letters, and documents. However, it was necessary to select them, arrange them in a certain order, and to provide comments. The materials had to form a book or be organised in a journal issue. This work (and it was enormous) was carried out excellently by the compiling editors.

The *Reminiscences* is an interesting book which reads like a novel, a novel about the life of a major scientist. Indeed, the life of Petr Leonidovich Kapitza is a real novel, with a plot of keen interest in unexpected turns of fate, and a complex but fashionably somewhat indefinite ending. The Nobel Prize and the uncompleted work of the last two decades of his life...

I have praised the journal *Priroda* at the beginning of this review. Perhaps one complaint can be made about the centenary issue: why is it labelled no. 4, when it came out in June and should be No. 6? This numbering advertises the lack of meticulousness by the editorial team of *Priroda*, while in all his work Petr Leonidovich valued very much meticulousness and precision in carrying out one's duties, no matter how difficult this would be to achieve... .

Finally, a suggestion. A full scholarly edition of Kapitza's works is needed: it should include all his scientific papers, all the general and political articles, all letters, and all documents. A separate volume should contain all the reminiscences (without cuts of the kind made in the reviewed publications). In addition to all that was said about P L, there is a certain dignity about him, which the publishers should make use of. P L was undoubtedly a talented writer. All his life he was creating the book of his life. It remains to be published. Petr Leonidovich deserves this.

Moscow, 21 August 1994

Books and special editions of journals published to celebrate the centenary of P L Kapitza's birth

Kapitza E L, Rubinin P E (compilers) *Petr Leonidovich Kapitza: Vospominaniya. Pis'ma. Dokumenty* (Petr Leonidovich Kapitza: Reminiscences, Letters, Documents) (Moscow: Nauka, 1994) 542 pp., volume in the series *Uchenye Rossii: Ocherki. Vospominaniya. Materialy* (Russia's Scientists: Essays, Reminiscences, Materials)

Rubinin P E (compiler) *Vse Prostoe – Pravda...Aforizmy i Izrecheniya P L Kapitzy, Ego Lyubimye Pritchki, Pouchitel'nye Istorii, Anekdoty* (Very Simple, Isn't It?...Aphorisms and Sayings of P L Kapitza, Parables He Loved, Instructive Stories, Anecdotes) (Moscow: Moscow Physicotechnical Institute, 1994) 150 pp.

Priroda special issue (4) (1994)

Fizika Nizkikh Temperatur **20** (7) (1994)

Uspekhi Fizicheskikh Nauk **164** (12) (1994)