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Classification: UNCLASSIFIED **Status:** [STAT]
Document Date: 01 Aug 90 **Category:** [CAT]
Report Type: JPRS Report **Report Date:**
Report Number: JPRS-UST-90-012 **UDC Number:**

Author(s): OGONEK correspondent Vanda Beletskaya: ``OGONEK
 Correspondent Vanda Beletskaya Talks With Academician
 Anatoliy Petrovich Aleksandrov``; date and place not
 give; first six paragraphs are OGONEK introduction]

Headline: Former Academy President Aleksandrov on Chernobyl,
 Sakharov

Source Line: 917A0006A Moscow OGONEK in Russian No 35, Aug 90 pp
 6-10

Subslug: [Interview with Academician Anatoliy Petrovich Aleksandrov
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FULL TEXT OF ARTICLE:

1. [Interview with Academician Anatoliy Petrovich Aleksandrov by
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2. [Text] I arrived in advance at the Institute of Atomic Energy
 imeni Kurchatov. Time remained until the appointed hour, and I
 wandered about the grounds of the institute, which Anatoliy Petrovich
 Aleksandrov headed for nearly 30 years, and thought about the fate of
 the scientist, which just recently seemed so fortunate to everyone.

3. He was an undergraduate of Kiev University, when Academician A.F.
 Ioffe (a student of Roentgen himself!) invited him to work at the
 famous Leningrad Physical Technical Institute.... Then work and
 friendship with I.V. Kurchatov. The light of the reputation of the
 legendary scientist also falls on Aleksandrov, who after the death of
 Igor Vasilyevich was in charge of the solution of the atomic problem.

4. Academician Aleksandrov, three times Hero of Socialist Labor, has
 orders, nearly all the ones that have been established in the country
 (eight Orders of Lenin!). There are all the prizes--the Stalin Prize,
 the Lenin Prize, the State Prize.

5. When in 1975 Anatoliy Petrovich became president of the Academy

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of Sciences, he was already over 70 years old. But after expiration of the term scientists reelected him to this high post. Recognition in the country, recognition abroad. An honorary member of the academies of many countries of the world....

6. And suddenly ``the president of the Academy of Sciences of the era of stagnation...,`` ``the author of the Chernobyl catastrophe.....``

7. Our conversation also began with the accident.

8. OGONEK: Anatoliy Petrovich, much has already been written about the causes of the Chernobyl catastrophe, but I would like to find out your point of view.

9. A.P. Aleksandrov: You pose the question tactfully, but actually you probably want to hear whether I consider myself responsible for the the accident. You need not apologize, it is nothing.... That I have not heard in recent times.... Here is what I will say to you: Chernobyl is a tragedy of my life as well. I feel this every second. When the catastrophe occurred and I found out what a complicated thing they had begun to do there, I nearly went to kingdom come. I was in very bad condition. That is why I decided to leave the post of president of the Academy of Sciences and even turned in this regard to Gorbachev. Colleagues stopped me, but I believed that I must do that. My duty, I believed, was to put all my energy into the improvement of the reactor.

10. To be answerable for the development of atomic power engineering and specifically for the Chernobyl catastrophe are different things. Judge for yourself. Although, incidentally, I am convinced that everything related by me will cause a new stream of abuses on my old bald head. But I would be acting against my conscience if I were to agree with the opinion that now one must not develop atomic power engineering and all nuclear power plants should be shut. Mankind's rejection of the development of atomic power engineering would be disastrous for mankind. Such a decision is no less ignorant, no less monstrous than the experiment at the Chernobyl Nuclear Power Plant, which directly led to the accident.

11. OGONEK: Did you know about it?

12. A.P. Aleksandrov: That is the tragedy of it, that I did not know. Not I, not anyone at all at our institute. And the designer of the reactor which is at the Chernobyl Nuclear Power Plant, Academician Dollezhal, also knew nothing about this. When I later read a description of the experiment, I was simply horrified. I will not go into the technical details, I will merely say that the

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experiment involved the takeoff of excess heat. When the reactor is shut down, the the turbogenerator owing to inertia turns and provides current, which it is possible to use for the needs of the plant.

13. OGONEK: Who devised the experiment?

14. A.P. Aleksandrov: The management of the nuclear power plant commissioned Donenergo, an organization which had never dealt with nuclear power plants, to prepare the plan of the experiment. Dilettantes can be guided by the best intentions, but cause an immense catastrophe, just as happened at Chernobyl.

15. The plant director, without enlisting even the chief engineer of his nuclear power plant, a physicist who understands the gist of the matter, concluded with Donenergo a contract "on the performance of work." The schedule of the experiment was drawn up and sent for consultation and approval to the All-Union Planning, Surveying, and Scientific Research Institute imeni Zhuk. The associates of the institute, who have some experience of working with nuclear plants, did not approve the plan and refused to stamp it.

16. I now often think: If only the All-Union Planning, Surveying, and Scientific Research Institute had notified anyone of us! But, having not approved the plan, they could not even have assumed that all the same they would decide to conduct the experiment.

17. In our former ministry, the Ministry of Medium Machine Building, they also did not know about the experiment. For the Chernobyl Nuclear Power Plant had been transferred to the Ministry of Power and Electrification. Perhaps, this was the first mistake....

18. It is possible to treat the former Ministry of Medium Machine Building in all sorts of ways and to reproach it with the lack of glasnost and excessive secrecy, but there were there professionals and people disciplined in a military way, who observe instructions precisely, which in our business is extremely important.

19. There is an instruction, which the personnel of any nuclear power plant are obliged to observe. This is a guarantee of its safety. Thus--you will not believe it!--at the very beginning of the schedule of the experiment it is recorded: "Shut off the emergency reactor cooling system--the SAOR system." But precisely it switches on the emergency protection system. What is more, all the valves were closed, so that it would be impossible to switch on the protection system.

20. The schedule of the experiment violates on 12 occasions our instruction on the operation of nuclear power plants. You would not

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dream such a thing in a terrifying dream. The nuclear power plant operated for 11 hours with a disconnected emergency reactor cooling system! As if the devil supervised and prepared the explosion.

21. OGONEK: But who specifically from Donenergo was the author of the experiment? Is this person now alive? What is his fate?

22. A.P. Aleksandrov: A certain Metlenko. I know nothing about his fate, except that he is alive. I judge no one.

23. OGONEK: Anatoliy Petrovich, but flaws exist in the very design of the type of reactor that is at the Chernobyl Nuclear Power Plant....

24. A.P. Aleksandrov: Yes, they exist. However, the cause of the accident is all the same the ill-considered experiment and the gross violation of the instruction of the operation of nuclear power plants. Reactors of this type are at both the Leningrad Nuclear Power Plant and the Kursk Nuclear Power Plant.... In all there are 15. Just think, why did an accident occur at Chernobyl, but not at Leningrad?

25. Understand, the reactor has drawbacks. It was developed by Academician Dollezhal long ago, with allowance made for the knowledge of that time. Now these drawbacks have been reduced and offset. It is not a matter of the design. You are driving a car, you turn the steering wheel in the wrong direction--an accident! Is the engine to blame? Or the designer of the car? Everyone will reply: "The unskilled driver is to blame."

26. OGONEK: Where is the guarantee that among the personnel, who service other nuclear power plants, there are no "unskilled drivers"? For you yourself, Anatoliy Petrovich, repeatedly warned about the need to train such specialists better. I myself heard this from you more than 10 years ago. You said that among the people, who operate nuclear power plants, vigilance had become less keen, that they had become relaxed and are forgetting about the danger, inasmuch as God is merciful and there have been no serious accidents. You spoke about a plan of establishing in Obninsk, on the basis of the first nuclear power plant, an international school. You warned that the calm can inadvertently be broken....

27. A.P. Aleksandrov: I did not speak that foolishly. But, unfortunately, an international school was never established. I believe that now it is still not too late to return to this plan.

28. It turned out that new nuclear power plants went into operation and more and more people were drawn into the system of their maintenance. And--no matter how painful it is to admit this--they

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began to train specialists worse.

29. OGONEK: But before Chernobyl were there really no "irregular situations" at our atomic reactors? The accident during the tests of a reactor in the southern part of the Urals is now common knowledge. They told me that only you, Anatoliy Petrovich, kept your head and instantly inserted the control rods, which saved it from an explosion. General Vannikov, chairman of the scientific and technical council for the uranium project, noted at that time: "In this minute you earned your wage for all your subsequent life."

30. A.P. Aleksandrov: There was such an incident, near Chelyabinsk.... And at nuclear power plants accidents have occurred. However, skilled specialists, who operate the nuclear power plants, always saved them from explosions.

31. At the Kola Plant there was, for example, such an incident, which miraculously did not end tragically. One of the attendants (and at the Kola Plant there are very competent people!) noticed that steam was coming from a pipeline. They shut the plant down. And what of it? A crack was progressing along the welded seam. They cut out this gate valve and sent it for study. It turned out: Production had been completely violated. An iron rod had been placed under the Y-shaped welded seam, while from above, as though they had welded on the metal in conformity with the technology, it was filled up with an electrode. The seam did not have strength. A little longer, and an accident would have been inevitable! I came at that time to the Kola Plant. They shut the plant down. They inspected all the seams and pipes.

32. There turned out to be 12 gate valves with such seams, 12 potential accidents!

33. OGONEK: Where did they make the gate valves? Why did they miss the defective output at the plant? For X-ray inspection immediately reveals such defects.

34. A.P. Aleksandrov: The Chekhov Plant near Moscow made this ill-intentioned defective plant output. They hurried when they made it, they hurried when they accepted it. On the drawing it was even written: "Exempt from X-ray inspection." They never found who wrote this. Evidently, it was very advantageous for the plant to deliver the order more quickly.

35. I and Slavskiy (our Minister of Medium Machine Building) could not leave it at that. We raised the issue in the Council of Ministers, a special investigation took place. At that time they did not punish anyone at the plant, and it is a pity.... The gate valves,

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however, were rewelded.

36. There was another incident, a very unpleasant one, at the Leningrad Nuclear Power Plant, which ended, fortunately, happily. Nothing was also reported about it in the press. They noticed that during the operation of the nuclear power plant the vibration of the turbogenerator was increasing, its magnitude was approaching the limit. They instantly shut down the machine--a 500,000-watt turbogenerator. It turned out that the armature of the generator had been welded in such a way that a crack was progressing along the welded seam. Another 15-20 seconds, and the turbine plant would have disintegrated!

37. They shut down and inspected all the reactors. It turned out that there was the same flaw in seven machines! Again they conducted an investigation. This time the Kharkov Turbine Plant was to blame. I went there together with Paton.

38. It was after such facts that they established the system of atomic energy supervision.

39. OGONEK: However, shutdowns of nuclear power plants are continuing. There are assertions of specialists that industry of the country is not ready today to provide atomic power engineering with sound equipment. Hence, nuclear power plants are operating on the verge of risk....

40. A.P. Aleksandrov: No, it is impossible to say that. It is necessary to talk not so much about the level of development of industry as about its incorrect organization. When it comes to such a complex product, saving, haste, and any competitions there are not needed. It is necessary to pay workers for quality.

41. We went once with the same Slavskiy and the Minister of the Shipbuilding Industry (I do not remember who he was at that time) to a plant, where they manufactured machines for the nuclear fleet. Slavskiy said to the minister: "Let us make it the first business that in all operations every element would undergo personal acceptance, the entire structure of the seams would be accepted by layers. To hell with all socialist competitions. Pay for a well-made seam, do not hurry the foremen."

42. We did not have any mishaps in the fleet plants, but at that time, in 1957, industry was less developed, yet it does not matter, they managed.

43. I will say the following: Atomic power engineering is a stimulus for the development of industry in general. One must not shut it down

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now for 15-20 years, as some people propose. This would mean to lose specialists completely, and then to repeat the entire path all over again. As it is, our specialists under the pressure of public opinion are scattering in all directions.

44. The persecution of atomic power engineering, which has begun in the country, greatly disturbs me. An entire sector of science and industry cannot be ostracized. In this respect there is already the negative experience with genetics and cybernetics. Now it is not just not fashionable, but even not safe to say such a thing. And I do not know whether you will publish our conversation. But I have strived all my life to assert only what I am convinced of. I am convinced as before of the necessity of the development of atomic power engineering for the country. I am convinced that in case of the correct approach to it and the observance of all the rules of operation it is safer and ecologically more reliable than thermal power plants, which pollute the air, and hydroelectric power plants, which spoil rivers.

45. When they were starting up a nuclear power plant, I often took there my own children, then grandchildren. I remember that I came with my younger son, a school boy, to the tests of the nuclear-powered vessel Lenin. But it is possible to have an explosion not only at any plant, but also in one's own kitchen....

46. Perhaps, I am exaggerating, but it seems to me that nuclear power plants have now become hostages of someone's political interests. If the pickets near plants are actually worried about the safety of the population living there, and not about their own vanities, how it is possible to contribute to the disruption of the operation of nuclear power plants, to make the attendants nervous, not to let through the employees, who are coming to take the shift, and even to beat them up? In a nervous state attention is distracted, a worked-up person can also make a mistake and not pay attention to a scarcely noticeable deviation in the operation of mechanisms. This, after all, is also clear to a child! How can the champions of ecology and safety not understand the obvious? For in case of an accident the people, whose interests the militant pickets are ostensibly defending, will suffer. Today they are blocking the Khmel'nitskiy Nuclear Power Plant, tomorrow they will set to work on the Leningrad Nuclear Power Plant. Well, it is incomprehensible to me, an old man. For the life of me, it is incomprehensible.

47. It is another matter when people demand glasnost and truthful information about the actual state of affairs in atomic power engineering. To tighten up supervision, to make more strict the monitoring of the construction, acceptance, and operation of nuclear power plants--this is understandable. Everyone, and specialists first

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of all, are vitally interested in the operating safety of nuclear power plants.

48. Operating safety is the only criterion of the existence of nuclear power plants. It is possible to fulfill it only by taking into account the already available experience of operation. Why destroy a sector of industry, in which scientists, engineers, and designers, who nevertheless were worth something, worked? For all the same one cannot do without atomic power engineering, and the new generation will inevitably have to return to this and to begin everything from scratch.

49. OGONEK: Were you a member of the commission on the causes of the Chernobyl accident?

50. A.P. Aleksandrov: No, from our institute Legasov was on the government commission. He helped greatly in eliminating the consequences of the catastrophe.

51. OGONEK: The suicide of the 50-year-old academician stunned everyone. Is he also a victim of Chernobyl?

52. A.P. Aleksandrov: There he became very tired and worn out. And, of course, he experienced very much, understanding the dimensions of the disaster. But to not extent did he himself have anything to do with the accident. This could not have influenced his decision. I was the director of the institute, he was merely a deputy. He, just as our entire institute, knew nothing about the experiment being readied at the plant.

53. I relied on Valeriy Alekseyevich as my successor. An excellent organizer, a young, very creative man. Not for a minute do I think that his elimination was advantageous to anyone. Such rumors also went around.

54. It is difficult with all this. Here one must take into account both heredity (his brother committed suicide) and the fact that earlier there was a suicide attempt. It is not ruled out, of course, that the situation, fatigue, and nervous strain prompted the tragedy. I would not want now to judge and lay down the law....

55. All the horror fell on me at once--Chernobyl, the loss of dear people--my wife and my student, to whom I wanted to turn over the institute, a part of my life....

56. OGONEK: Did you at that time also send in your resignation from the post of president of the Academy of Sciences?

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57. A.P. Aleksandrov: I remember my presidency with a heavy feeling. When the burden fell, I felt better. I cannot tolerate administrative positions, I was completely unprepared morally for the high post and did not want to take it.

58. OGONEK: But why did you agree? I remember how scientists said at that time that the situation at the Academy was complex. The majority would vote only for you, but you all the same would not agree to become president.

59. A.P. Aleksandrov: How much effort I spent to resist! From the sentiment of scientists and my colleagues and friends I actually had grounds to assume that they would not accept my refusal to accept and, very likely, the majority would vote for me.

60. It is no secret that the candidate for president of the Academy of Sciences in our country was always discussed in the government, more precisely in the Politburo. If it were not for the secret vote of academicians, they would, very likely, simply have appointed him there.

61. Having found out that the choice had fallen on me, I set off to see Ustinov, whom I knew and with whom I was connected through work for long years. I asked him to persuade them to leave me in peace. I tried in vain--"I do not want even to discuss it, agree!" I also met with Suslov. The result was the same.

62. However, I still did not consent! Mstislav Vsevolodovich Keldysh convinced me. Here is in whom the sense of duty and responsibility was developed! Apparently, at one time he was himself faced with the same dilemma as I was.

63. Well, and when they elected me, I worked and did not spare myself.

64. OGONEK: Did you often have to agree to compromises?

65. A.P. Aleksandrov: It depends on what kinds. All compromises are not alike. I, you know, do not like bold clever people who, while sitting today in safe warmth and comfort, condemn everyone in succession. They self-confirm themselves that way, do they? They have not dreamed about our problems and difficulties. It is customary to curse scientists in particular. That one worked during the years of Stalin repressions, this one worked during the years of Brezhnev's stagnation. Just where would our science be, if it had not been for these scientists?!

66. OGONEK: Yes, one has occasion sometimes to hear that Sergey

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Ivanovich Vavilov is bad (''How did he agree to be president of the Academy, when his brother was in prison?''), Petr Leonidovich Kapitsa is not good (''Why did he write to Stalin and, besides, attempt to make him change his mind?''), Kurchatov is the wrong person (''How could he admit in Beria's torture chambers that he, and at the same time the entire institute of Kapitsa, sold out to the capitalists?''), and Korolev and Keldysh--all are bad.

67. A.P. Aleksandrov: I knew many of them. They had behind them not bold speeches at rallies and on television, but scientific works and deeds. They were forced to proceed from the rigid framework of the circumstances, into which fate had placed them. And it hurts me when they judge them today. It is an ignoble role.

68. Well, about myself personally.... In science I did not allow compromise. At least I tried not to. But in relations with people, in politics, in relations with the authorities....

69. At the beginning of the war our group worked on the degaussing of ships, so that fascist mines would not destroy them. The work had been conducted back before the war. Professor Regel, a very talented scientist and a fine person, belonged to our group. He and I were close. But after the war, when the work on the atomic problem began, they removed Vadim Robertovich. And I agreed, but meanwhile I could have gotten my way. But I was afraid not for myself, but for him. I was afraid that they would oppress and torment him. I could have insisted that they give him to me, at that time my work was very necessary, but was there certainty that under those circumstances his life would be preserved? Alas.... That is why I agreed.

70. OGONEK: Did Vadim Robertovich understand this? Did you talk with him?

71. A.P. Aleksandrov: Such things are not discussed among men. We trusted each other--that is sufficient.

72. OGONEK: Were you also friends later?

73. A.P. Aleksandrov: Of course. Or here are my relations with Petr Leonidovich Kapitsa. When Beria removed him from the post of director of the Institute of Physical Problems, which he established, they appointed me in place of him. Do you imagine that it was pleasant for me? Before this there was an analogous situation at the Kharkov Physical Technical Institute, for which they also intended me in place of the removed director. True, at that time I extricated myself: It is not, I said, my theme, I work in Leningrad in Kurchatov's direction. This time I did not have a leg to stand on. The heavy water plant, according to Kapitsa's idea, was along the

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lines of the works of Kurchatov, our research.

74. I was transferred with my Leningrad laboratory to the Institute Physical Problems and tried to see to it that no person suffered, no person was dismissed. At the request of Petr Leonidovich we even sent to him at Nikolin Mountain, where he conducted his experiments in a barn, his associate and assistant Filimonov. And when later they reinstated Kapitsa, I returned the institute to him with pleasure. And what is interesting, he included me later in the collective for the Lenin Prize for the works, which were also performed during the period of my directorship and in which I had participated. But I, of course, refused, although Kapitsa himself spoke with me.

75. It would seem that it is a trifle, but I was never able to see to it that they conferred on this institute the name of its founder and director, Academician P.L. Kapitsa, even in our times of perestroyka. When Trapeznikov was the chief of the science department of the Central Committee, I appealed to him many times, and I spoke with Zimyanin, and comparatively recently with Medvedev, but again the result is negative. It is supposedly impossible because the name of Sergey Ivanovich Vavilov has been conferred on the Institute of Physical Problems. We explained: It is possible to confer the name of Vavilov on the Optics Institute, with which he was directly related.

76. OGONEK: Did you have occasion to meet Beria?

77. A.P. Aleksandrov: Yes. He was a frightening, disgusting man. We all understood this. The life of each of us depended on him....

78. I remember the following detail. I sent to the Defense Committee the proposal to introduce at one of the plants the method of obtaining deuterium, which had been developed by us at Kapitsa's Institute. But I must say that during the laboratory tests there was an explosion. They invited me to a meeting of a special committee. Beria, of course, ran the meeting. Makhnev (there was such a general, he dealt with the uranium problem) reported to Beria that I was proposing to build a plant for obtaining deuterium. I sat right here (incidentally, next to Beria), but he seemed not to see me, as if I was a nonentity. He asked Makhnev whether, he said, your Aleksandrov knows that the experimental plant had exploded. Makhnev replied that he knows. "And does he insist that he is not withdrawing his signature?" Makhnev responded that he is not. "And does he know that if the plant explodes, he will go where Makar drives calves?"

79. I ought to have kept quiet, but I could not contain myself. "I visualize this," I said. Only now did he deign to notice me. He turned his head: "And still you are not removing your signature? Well, take care." To this day everything with the plant is in order.

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80. But Beria vetoed the idea of developing atomic plants for ships as far back as 1945 (at the same Institute of Kapitsa we had begun to design such a reactor). Only the atomic bomb interested him. It is a pity that it was that way. For we began to design nuclear-powered vessels earlier than the Americans began to design the Nautilus.

81. Beria is the past. But then the perpetuation of the memory of Academician Kapitsa, while students, who knew him, his widow, and his children are still alive, is a present, vital matter.

82. OGONEK: Who settles the questions of perpetuating the memory of scientists, if not the Academy of Sciences?

83. A.P. Aleksandrov: What do you mean who? The Politburo, the KGB. It was always that way before. Perhaps, now something will change, I do not know....

84. I always tried to change what it is still possible to correct, and to accept what it is not in your power to change.

85. Now, in my opinion, it is possible to change the situation with 'blue blood,' which in my days as president of the Academy I was unable to do.

86. OGONEK: Our journal wrote about this. But they brought a suit against OGONEK.

87. A.P. Aleksandrov: Well, well. Provided the KGB or the procuracy was implicated in the case, be you whoever you like, you will not get anything.

88. The case with 'blue blood' is of the following sort. Two organs--the Academy of Sciences and the State Committee for Science and Technology, where Guriy Ivanovich Marchuk was at that time--supervised the work on the development of blood substitutes. They began to carry out the theme under the supervision of Academician Yuriy Ovchinnikov. Professor Feliks Beloyartsev directly conducted the research in Pushchino, at the Institute of Biophysics under Corresponding Member Genrikh Ivanitskiy.

89. I supervised this work a little, they made the fluorocarbons at one of our plants. Of course, medical personnel, civilian and military, also participated.

90. They completed the experiments on animals, clinical tests were begun. The military gave permission for the use of the new blood substitute in Afghanistan. There this saved many people. Things went

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well. I do not recall who at that time gave a report on this at the Academy of Sciences, but I precisely recall that then Yuriy Ovchinnikov (a vice president at that time) spoke very benevolently and praised the work. Wait, you are the one who wrote at that time in OGONEK that the work was very talented and promising.

91. But the events developed as follows. The research on "blue blood" was submitted for the State Prize. I participated in the preliminary discussion and felt that there was not complete agreement concerning the collective which had been submitted for the prize. And at that time, perhaps, foolishly, at an operations meeting for half an hour I related before the presidium that the work was being proposed for the prize, but there were difficulties with regard to the collective and it was necessary to elaborate the matter. And suddenly to my complete surprise Ovchinnikov got terribly excited, jumped up, and began to say in raised tones that the research had not been completed, while Genrikh Ivanitskiy was misrepresenting, was misleading everyone, and was all but giving false information about the results of the clinical testing of the preparation.

92. Such behavior of Yuriy Ovchinnikov was completely incomprehensible to me. Some people at that time conjectured that Yuriy Anatolyevich himself wanted to be in the collective of authors. But this is not so. Ovchinnikov from the very start of the nomination for the prize was not among the authors of the work, he himself did not want to be included. At one time precisely Ovchinnikov signed the document concerning the fact that Ivanitskiy, the director of the institute at which the work was performed, should be the supervisor of the research.

93. I asked Academician Aleksandr Aleksandrovich Bayev, he was closer than I to this matter, he is a biologist. He replied: "I do not understand myself why Yuriy Anatolyevich get wound up. This happens with him, perhaps, it will pass. Let us wait."

94. A very little time passed, and suddenly Ovchinnikov gave me a little note about the fact that fluorocarbons had been studied in Japan and America and their use there in the clinic had not been halted, since they have a bad effect on patients. Therefore, we must also halt the tests. I read the signature: Kryuchkov. Yes, the same one, from the KGB, as now.

95. I as president of the Academy commissioned then Chief Scientific Secretary Georgiy Konstantinovich Skryabin to set up a commission made up of scientists. He agreed with me that the KGB is not an authority in science. Why should we halt the research, if they are opposed? I recall that I advised enlisting on the commission Academician Ivan Lyudvigovich Knunyants, a most prominent specialist

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in fluorocarbons. Bayev was also included there. I said to Skryabin that they should examine particularly carefully the clinical tests and see whether there were always the appropriate permits for them.

96. And then several members of the commission began to give in (and I set up two commissions!). Their conclusion was to postpone the nomination for the prize to the following year, and then once again to examine the results and to make the decision accordingly.

97. Later the rumors that in the KGB they had put pressure on the members of the commission, reached me. I shared my views with Academician Vladimir Nikolayevich Kudryavtsev. He said: "What does the KGB have to do with this? If Beloyartsev and Ivanitskiy violated something, the procuracy and the militia should deal with it."

98. Then the tragic events, about which you know, developed. In Pushchino they made a search at Professor Beloyartsev's place. Feliks Feliksovich committed suicide.... I believe that he was unable to bear the suspicions of the unscrupulousness of the experiments. The works were banned. It has not been possible to rehabilitate them. Although medical personnel have a high opinion of them, for example, Academician Shumakov. It is not ruled out that the priority of the discovery will thus vanish from the country and we will buy the same blood substitute for foreign currency. I am talking about this in such detail, because it is still not too late to correct the situation with "blue blood." Now the times are a little easier, although thus far I do not see serious positive results.

99. OGONEK: And what about glasnost? The appearance in our country of democratic freedoms? And what about Sakharov, finally? Is it really not a triumph of justice that he returned from Gorkiy and became a people's deputy?

100. A.P. Aleksandrov: I had in mind only the sphere of science. Sakharov, of course, is a strong example. And, believe me, for me the return of Andrey Dmitriyevich was a great joy.

101. OGONEK: Anatoliy Petrovich, Sakharov addressed a letter to you. Why did you not reply?

102. A.P. Aleksandrov: What could I have replied?! I have already said, after all, that it is necessary to fight while you can still change something. Neither I nor Keldysh, under whom this happened, could have revoked the exile of Sakharov to Gorkiy. Although, of course, we considered it unjust, very unjust, and unpleasant for everyone. True, I again spoke with Ustinov about whether it was possible to return Sakharov to Moscow and what it was necessary to do for this. He said: There is no hope. It is good that Sakharov is in

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Gorkiy, and not somewhere a little farther away. If you now start to attract attention to him, it will be not better, but worse. His conditions in Gorkiy are decent, he is working. He assured me that nothing threatened the life and health of Andrey Dmitriyevich. Now there is not what there was before, there are not the conditions, under which we in our day worked, under Beria.

103. Many people probably do not like this, but I believed and believe that the most agonizing thing for a scientist is when he does not have the opportunity to busy himself with his own science. How else am I to explain it to you? Many of us worked, for example, on the atomic problem in a certain isolation, while officially being completely free. Kurchatov, I, and the same Sakharov. Therefore, I did not regard the isolation and obstacles to contact with foreigners as a tragedy.

104. Then I saw to it that they would let the fiancee of the son of Yelena Georgiyevna Bonner go to America and herself to go abroad to undergo treatment. Of course, I did everything for Sakharov, he had, after all, gone on hunger strikes on this account....

105. It is possible to cast stones at both me and Keldysh. However, while presidents of the Academy of Sciences, we did not allow the expulsion of Sakharov from its members. But they put pressure on us, and very much pressure. Everyone understands this. How many times I explained myself in the Central Committee, in the Politburo, in the government.... Writers surely expelled Pasternak, they expelled many from the Union of Writers.

106. Of course, it was possible to scandalously submit my resignation on account of Sakharov. At that time they would no longer kill me, there was not what there was under Beria, when they were quite able to do that. Only it would hardly have become better for Sakharov. And, in general, I do not like this "if" and "and." I did not submit my resignation then, I stayed. And I even bore my burden of responsibility, when they elected me to a second term. Of the 180 members of the Academy 168 voted by secret ballot "in favor." Just as the first time. And quite frankly I believe that I was not the worst president of the Academy of Sciences. However, it is not for me to judge this.

107. And here is what else I will say about Sakharov. I and Keldysh tried to keep him for science. Differing, very likely, with the majority of admirers of Andrey Dmitriyevich, I believe that what was done by Academician Sakharov for science and his scientific works will remain in our history. All the rest is temporary, transient passions, which with time will pass and then will be forgotten. While of all his democratic activity in defense of rights his protest

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against the Afghan war will remain.

108. I also did not understand why we stuck our hand in there. At the Academy of Sciences in the lobby many people were indignant. Only those, who dealt with international economics, talked of the fact that we had invested much capital there and would not want to lose it.... But that way we lost more--the lives of people....

109. OGONEK: They deprived Academician Sakharov of an award which he received precisely for a contribution to science....

110. A.P. Aleksandrov: The Academy of Sciences could not prevent this. The government made do without us, they did not ask for the consent of scientists.

111. OGONEK: Anatoliy Petrovich, what do you think of your own awards? Now it is all but customary to be ashamed of received orders. On television you see: At conferences, at meetings of the session of the Supreme Soviet, and even at the party congress there are few people with awards on their chest.... You also do not wear them....

112. A.P. Aleksandrov: Let those, who received them for nothing and whom they cost nothing, be ashamed of orders. I know for what I received every award of mine.

113. I received my first Order of Lenin, for example, during the war for the degaussing of ships, which saved thousands of lives of sailors. I received my first Hero of Socialist Labor Star for works on the obtaining of fuel for the development of atomic weapons. I received the second one for the nuclear plant for the icebreaker Lenin, the third one also for scientific developments....

114. True, I received foreign orders, I do not know for what, probably for the total combination of scientific works....

115. But I do not wear the orders, I simply have so many of them, I would be covered like a Christmas tree. But on solemn occasions I put on the three Hero of Socialist Labor Stars.

116. OGONEK: You knew all the leaders of our country, starting with Stalin, and met with them. What do you think of Gorbachev?

117. A.P. Aleksandrov: He is the only one of them, whom I like as a person. But as the leader of the country.... It is necessary to wait with this.

118. OGONEK: And what worries you now in the affairs of the Academy of Sciences?

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119. A.P. Aleksandrov: Something worries me. For example, the establishment of the Russian Academy of Sciences. This is no good. The union Academy of Sciences, which before the revolution was the Imperial Academy of Sciences, existed more than 250 years. And it was not bad, it was a quite worthy institute.

120. It upsets me that many scientists have gone up in the world, without having grounds and scientific works for this.

121. OGONEK: Who specifically.

122. A.P. Aleksandrov: Well, for example, Academician Zhuchenko. His positions are quite strange, and the scientific contribution, which he advertises, does not exist. In general with biology it was most difficult of all for Keldysh, he came into a most distressing inheritance: The students of Lysenko and its associates were in power. But they do not want to surrender their positions even now.

123. I worries me that parascientific directions: extrasensory perception, unidentified flying objects, and the like, have begun to flourish. It is not the business of the Academy to encourage such a thing. Although this is a trivial thing as compared with the decrease of the pace of development of the basic sciences, in which with every year we are losing our positions.

124. Relations between people are also becoming more and more complex, all kinds of confronting groups are emerging.

125. True, complex relations always existed among scientists. Like those of bears in one den. Prominent scientists did not get on with each other. At least when I was president, I had a hard time, I always tried to see to it that science did not suffer. The examples of this went beyond the walls of institutes long ago, for example, the falling out of Academicians Basov and Prokhorov. Both are Nobel Prize laureates and brilliant scientists, but together they felt restricted. Here the solution was simple--they established for Prokhorov a separate institute, and this completely justified itself, science did not suffer and even profited.

126. Back under Keldysh, I remember, they dragged me into being involved in the commission for rocketry. Well, there was simply a civil war among the missilemen! Korolev and Yangel were on one side, Chelomey was on the other. The civilians were for Korolev and Yangel, the military was for Chelomey.

127. OGONEK: And what position did you take?

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128. A.P. Aleksandrov: I tried to take a conciliatory position, although, like Keldysh, I was on the side of Yangel (Korolev had already died), on the side of the civilians. I will not touch upon the essence, due to which the war flared up, it is nothing, it existed and passed, like all arrogant passions. Another thing is important--they did not use illicit methods in this group struggle. They preserved personal decency. Now it happens differently.

129. Now, it seems to me, in scientific collectives the moral climate is degenerating, the trust among colleagues and even between the teacher and his students has been lost.... The lack of respect for a teacher is fraught with large moral losses.

130. OGONEK: They tell that there was such an incident in the life of your teacher, Abram Fedorovich Ioffe. A quite young researcher came to him and placed in front of the director several handwritten pages. The conclusions of yesterday's student, in essence, put an end to the theme, on which the famous academician had been working, and showed an error in his theory. Was there, Anatoliy Petrovich, actually such an incident, and how did the academician behave?

131. A.P. Aleksandrov: He sat down to check everything from the very start and understood that I was right, while he had made a mistake. But Abram Fedorovich at that time was awfully enthusiastic about this work of his on thin-layer insulation. He expected that it would create a revolution in aviation and machine building. It was hard for him to give up an entire direction.

132. I was not seeking any error in the work of Ioffe, of course. I wanted to apply it in practice, but nothing was turning out for me, for the life of me! Then I began to study everything myself and discovered the error.

133. Later I together with Academician Ioffe published an article on this error. But a part of the institute was already working on the theme. It was necessary to put an end to the entire direction on dielectrics and to reorganize the institute.

134. That was 60 years ago, it is awful how long ago it was... But I will also say today--I am indebted to Abram Fedorovich Ioffe for everything.

135. OGONEK: Did conflicts really not occur in your collective, did no one quarrel with each other and take offense? After all, could not such different people as future Academicians Semenov, Kapitsa, Alikhanov, Khariton, Artsimovich, and Kurchatov look at everything in the same way? For you yourself said--''bears in one den.''

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136. A.P. Aleksandrov: At that time we were not yet ``bears.'' We were very young. And we revered the authority of our teacher. But we looked at the world, of course, in different ways. And very likely we both quarreled and took offense.... Only I do not remember. But how cheerfully, how enthusiastically we worked--I remember. How we helped each other out, if someone's instrument got out of order, how we left our own jobs and started to repair it. We shared everything with each other. Well, when seminars were under way and we were of a different opinion on a scientific problem, in the heat of the debate we did not choose expressions. One of us, I remember, even shouted at Ioffe himself: ``You have forgotten Ohm's law!''

137. And here is what is interesting: At the institutes, which people from the Leningrad Physical Technical Institute later headed, there were also no conflicts and, in my opinion, there are none to this day. Take if only the institutes of Semenov (now the director there is Academician Goldanskiy) and Kapitsa. Petr Leonidovich was particularly stern: If two people came to grips and he did not make out who was right and who was at fault, he fired both.

138. OGONEK: Did your work on the atomic problem begin at Ioffe's Institute?

139. A.P. Aleksandrov: I did not begin immediately to concern myself with atomic physics. At first they attached little importance in general to this problem.

140. A strange thing happened. I remember that I and P.P. Kobeko, later a corresponding member, developed a method of obtaining cold-resistant rubber and introduced it at a plant. This direction was regarded at the institute very nearly as the main one; when the authorities came, they led them directly to us to boast. But they did not show the authorities the nuclear physicists-- Alikhanov and Kurchatov--and their work. The authorities believed that they were concerning themselves with nonsense. Ioffe from the very start understood the importance of nuclear research and attached great importance to it.

141. Later everything changed, when they discovered the fission of uranium and got whiff of the bomb.... But atomic weapons were our basic work only for Beria and Stalin. All of us regarded it as forced and temporary work. Kurchatov often said: ``God forbids that this be used against people! Only a peaceful atom.''

142. OGONEK: The ``peaceful atom'' proved to be unreliable. Now the opponents of nuclear power plants and their supporters are demanding the passage of a law on atomic power engineering. What, in your opinion, should it be like?

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143. A.P. Aleksandrov: It is very important to normalize the legal aspect and to make accessible to the public literally everything--the discussion of the design of nuclear power plants and the choice of the construction site-- and it is necessary to publish information on all breakdowns at nuclear power plants, including on those that do not have any harmful consequences. The population of the regions, where nuclear power plants operate, should benefit from this, which it is necessary to stipulate in the law. Both a material benefit and a benefit in the sense of the distribution of and payment for electric power. It is also necessary, in my opinion, to envisage privileges in medical examination and medical assistance to the population.

144. I am talking about the choice of the site for nuclear power plants because there were shortcomings precisely here. The first thing is that natural conditions, seismic surveying, and so on were not always taken into account. (Although during the designing of the Armenian Nuclear Power Plant they consulted with the Japanese, the latter are also building in localities where 9-point earthquakes are frequent. But, as they say, they have nowhere to go.) Second, the opinion of the population of the republic was absolutely not taken into account. In the legislation it should be clearly specified: If the republic wants it, it is to be built, if the republic does not want it, it is not to be built. But it will not be as follows--I do not want a nuclear power plant nearby, but I want to get (and at a low price!) electric power from another republic.

145. It is very important, in my opinion, to make provision in the law for the study of the radioactive conditions at the site before the construction of a nuclear power plant, so that it would be clear what radiation there was earlier and what radiation there is from the nuclear power plant. Incidentally, it is also necessary to take this into account in case of any construction. There can be natural radiation in any construction material, water, and so on.

146. The choice of the site and the design of the plant should be approved not only by the minister, as was the case earlier, but also by specialists, the Academy of Sciences, the Commission of the republic Supreme Soviet....

147. OGONEK: Will provision be made for the training of more skilled personnel for nuclear power plants, which today particularly worries everyone?

148. A.P. Aleksandrov: Yes, both the establishment of special courses and the introduction of new occupations at higher educational institutions are here. It is necessary to allow to work at nuclear

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power plants people with a special diploma, and not with any technical or physical diploma, as now.

149. Personnel are obliged to be checked periodically for professionalism. After leave and illness, when skills disappear, before starting work they are obliged to take examinations. Strictly speaking, at one time long ago, in the beginning, it was also that way.

150. I would insert in the law a provision on the disposal of radioactive waste. This is to be done only on hard rocks, in regions where there are granite and basalt. Limestones and sands are unsuitable, but they were used at times, in spite of our protests. And so that during the danger period (300-500 years), in practice never, they would not be dug up through the failure to understand.

151. OGONEK: Land dead for centuries, it is rather frightening....

152. A.P. Aleksandrov: Not dead, but protected, where no construction and no economic activity are performed. It is possible, after all, also to call it that.

153. OGONEK: Is the disposal of the radioactive waste of other countries being carried out on the territory of our country? The public protested, and now they assure us that it is not being carried out. But I cannot believe something....

154. A.P. Aleksandrov: And it is correct that you cannot believe. We take the waste from the countries, where we are building nuclear power plants in accordance with our own designs, and are supplying them with fuel for the reactors? Are we to refuse to act that way? I do not think that this is a reasonable statement of the question. They dispose of it worse in their country, there is little territory there.

155. OGONEK: All countries prefer to dispose of it not at home, but a little farther away. France, where nuclear power plants provide 70 percent of the power, is striving to send the waste to Pacific Ocean islands....

156. A.P. Aleksandrov: There were instances of disposal on Pacific Ocean islands. But for the most part the French are localizing the bulk of the waste on their territory. And there have not been, thank God, accidents at nuclear power plants, and there has also not been elevated radiation.

157. It is entirely a matter of the standards of production.

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158. The publication in the general press of the draft of the law on atomic power engineering and its discussion before passage in the Supreme Soviet will relieve the tension that has appeared today in society in connection with atomic power engineering.

159. The minimization of the danger is amoral, but its exaggeration, the promotion of the spread of unverified rumors, and the invention of all kinds of terrifying incidents, which worry people, are also amoral. In this respect the law on the use of nuclear power will put everything in its place.

160. OGONEK: And all the same, Anatoliy Petrovich, we cannot, after all, say that nuclear power plants today are complete safe....

161. A.P. Aleksandrov: We cannot. A danger exists. Yet not only scientists, but also the public are obliged to do everything in order to reduce it. Strictly speaking, a reactor, in which physics itself does not allow what happened at Chernobyl, has already been designed. But time is needed in order to refine it. Passions are heating up over operating nuclear power plants. Therefore, steps to make monitoring more strict are also needed, a law on nuclear power engineering is needed.

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