

Correspondence between G A Gamow and P L Kapitza[†]

Abstract. The letters exchanged between Peter Kapitza and George Gamow are published here for the first time. The correspondence throws light on the active support accorded by Kapitza to his Russian colleagues and on his work as the coeditor of a prestigious series of physics monographs published by Clarendon Press, Oxford. Gamow comes over in his letters, relating to one of the most interesting periods of his creative activity (1929–1934), in full blaze of his personality.

One of the many virtues of Peter Kapitza was an exceptional attention to correspondence. He was a most punctilious writer and responded promptly to letters. Fortunately, the letters he received and copies of his answers have been preserved. The copies were kept purely from practical considerations, as a record of subjects that have already been touched on in the correspondence. In this, Kapitza resembles very closely his father-in-law, academician Aleksei Nikolaevich Krylov, whose archives were kept in exemplary order even during his lifetime.

In the past few years a lot of material from the priceless archives of Kapitza has been published in books and journal articles, largely thanks to the efforts of his archivist,

P E Rubinin. The latter kindly provided us with material relating to the correspondence between Kapitza and Gamow, which extended over six years, from 1929 until 1934, and contains nineteen letters written by the two participants.

Gamow's name is no longer on the proscribed list, and he himself has lost his 'defector' tag (he left the USSR in 1933). Conferences timed to commemorate the 90th anniversary of his birth have already taken place or are about to take place in Odessa and St Petersburg. The year 1994 is also the 100th anniversary of the birth of Peter Kapitza. Publication of the correspondence between these two scientists is therefore very timely. It is even more germane in the light of the nature of the information it contains. The correspondence touches on important aspects of the scientific work of Gamow, his contacts with workers in the Cavendish Laboratory, problems related to the publication of his well-known monograph on the physics of the nucleus, and the first months of his stay abroad after October 1933. The reader will find here also additional

material demonstrating the help accorded by Peter Kapitza to his countrymen, by arranging their participation in various conferences and seminars, publication of their papers and monographs, assistance given to them in procuring visas, and so on.

Kapitza's letters to Gamow were written in English. In the mid-1920s Kapitza started to dictate business letters to his secretary, who noted them down in shorthand and typed them on an English typewriter. There was a further reason for this. In his answer to T A Afanas'eva-Ehrenfest's question why he was writing to her in English, Kapitza remarked that he was writing in English also to his Russian correspondents because they would find this easier than to decipher his rather idiosyncratic handwriting.

Gamow, on his part, wrote to Kapitza in Russian, often inserting foreign words in his letters. These have been retained in the translations of his letters and are printed in italics.

It should be mentioned that Gamow often did not adhere to the rules of grammar, and this applies as much to his Russian as to his English (or German, or Dutch, etc). This made him the target of friendly jokes, which he would always take in good humour. Such mistakes have been corrected in what follows without any special notes.

To throw more light on this period of Gamow's life we have included in this correspondence his letter to Paul Ehrenfest. It is printed here first, as it is chronologically the earliest. All letters are accompanied by commentaries.

Some words are needed to preface this publication.

It is well known that Kapitza, who had arrived in England in 1921, became towards the end of the 1920s one of the leading lights in Rutherford's Cavendish Laboratory. He obtained a number of fundamental results (very strong magnetic fields and the behaviour of metals in such fields, placing Wilson's chamber in such fields, etc). In the mid-1920s, the Kapitza Club, an ongoing seminar, acquired a high reputation and leading English as well as foreign physicists participated in it. In particular, Gamow appeared in it a few times. His first report, presented at the 209th session of the Kapitza Club on 22 January 1929, was on the theory of radioactive nuclei. In it Gamow used quantum mechanics to explain the process of α decay. But still earlier, before Gamow's arrival, his work on α decay had been described presumably by Kapitza himself (regrettably, on this occasion, in a departure from the rules, the name of the speaker was not recorded). On 18 November 1930, at the 265th session of the Club, J Watson presented a report on Gamow's work on the superfine structure of the α -particle spectrum. The page on which this report appears is adorned by a photograph of Gamow, who—from one of the Alpine peaks—added the

[†]The introduction, and annotations to the letters have been compiled by V Ya Frenkel'.

last few lines to this report (the photograph was taken by R Peierls, who — together with Gamow and L Rosenfeld — took part in an Alpine trek in July 1930). On 11 June 1934 Gamow presented a report on the negative proton.

Another side of Kapitza's public-spirited activities in England, already touched on before, consisted of the support he provided for his countrymen. He was instrumental in procuring for them invitations to the Cavendish Laboratory: Yu B Khariton, Gamow himself, K D Sinel'nikov, and A I Leipunskii got there with Kapitza's direct help. In the explanatory notes to the letters published here, mention is made of Kapitza's activities as the editor of an international series of monographs on new physics published by Clarendon Press (the second editor of this series was R Fowler).

So far very little has been written here about Gamow himself. Let us mention that in 1928 he was posted to Gottingen where he stayed only two months. But in this short time he completed a study on α decay. He reported it at a seminar run by Max Born, and this work made him widely known among his colleagues. It was also the reason he was invited to Copenhagen, where he started working in the Niels Bohr Institute and met Bohr's colleagues and collaborators. Gamow continued there his work on the quantum mechanical theory of α decay. It was there, too, that he started working on the structure of the atomic nucleus, and sketched the outline of the liquid droplet model. Having been invited on Bohr's recommendation to Cambridge, on his way to England he stopped in Leiden, where he discussed this matter with Ehrenfest.

Gamow to Ehrenfest

105 Castle Street
Cambridge

24 January 1929

Dear Pavel Sigizmundovich

I am already the second week in *Cambridge*,⁽¹⁾ have talked to many 'radioactivists', and learnt quite a number of new things. Unfortunately, many interesting studies have not yet been completed and only preliminary results are to hand. I would say that most amusing are the attempts to produce artificial α particles at 10^6 volts. The velocity is less than 'usual' but it still makes it possible to produce enormous currents (around an ampere!). I am evaluating the probability of *Ze rstummerung* [splitting of nuclei] and for such velocity it is not that small, and at this α -current density splitting would be very, very pronounced. What is particularly amusing is that one could equally successfully produce H beams and split atoms with H particles (α will escape!), and this itself will contribute a lot to the theory of the nucleus.⁽²⁾

Regrettably, it will hardly be possible to finish this before Summer — it is very difficult to apply such potentials to a tube. Maybe I shall come here again in the Spring; it is very nice here; with this in mind I sent some days ago an application to Russia asking for a further subsidy. The probability, although small (bureaucratic *Potenzialschwelle* [potential barrier]), is different from zero.

Should I stay abroad longer, I would hope to call on you again in the Spring (not during vacations). In a week's time I shall depart for Copenhagen and shall attempt to make a

detailed calculation of the "droplet-nucleus";⁽³⁾ at present this model is becoming increasingly probable.

Greetings to you and your family,

Yours G Gamow

⁽¹⁾Gamow went to Cambridge from Leiden where he stayed about a week (he left Copenhagen immediately after the New Year). On 6 January he put his signature on the visitors' board in the guest-room in Ehrenfest's house in Witte Rosenstraat 57. This board contains the signatures of the most prominent physicists of the first third of this century, including that of Peter Kapitza.

⁽²⁾Reference is made here to the work of J Cockroft and E Walton on the construction of an apparatus (a linear accelerator in the form of a tube) for bombarding nuclei by artificially accelerated protons. This work was carried out in 1932 in Rutherford's laboratory. They achieved the transmutation of lithium nuclei by accelerated protons: ${}_3\text{Li}^7 + {}_1\text{H}^1 \rightarrow {}_2\text{He}^4$. A little later in 1932 this result was repeated in the Kharkov Physicotechnical Institute (A K Val'ter, G D Latyshev, A I Leipunskii, K D Sinel'nikov). In 1951 Cockroft and Walton were awarded the Nobel Prize in physics for this work.

⁽³⁾The role of G Gamow in devising the liquid droplet model of the nucleus is summarised in V Ya Frenkel's paper "The droplet model of the nucleus" in the book *Delenie Yader—50 Let* [Nuclear Fission—50 years] (International Conference in Leningrad, USSR, 16–20 October 1989) (Radiyevy Institut im. V G Khlopina, 1992) Vol. 1, pp 128–132 (in Russian).

Gamow to Kapitza

Kobenhavn

15 Febr. 1929

Dear Peter Leonidovich

I am sending you the reprints. I got to Copenhagen after a lot of adventures: a storm in the North Sea, 'three days in ice in the straits'. I am most satisfied with the move.

Started to write a book; Bohr will probably contribute the preface.⁽¹⁾ At the beginning of March we shall convene a conference on the theory of the nucleus.

Received yesterday a letter with a refusal by Narkompros [People's Commissariat of Education] to provide me with the money I have asked for (oh Russia, Russia!), but... Abram Fedorovich⁽²⁾ acting as heavy artillery made them review this decision, and now it would seem they are going to give it. There are articles in newspapers (again a long article in the Leningrad "Pravda" asserting that radioactivity has nothing in common with radiotelegraphy!), but as far as money is concerned this is not so simple...

Greetings to you and your family,

Your G. Gamow

P.S. Please tell Kirill Dmitrievich⁽³⁾ that I forwarded his letter.

⁽¹⁾Apparently Gamow had by then started to work on his book, which was published in England in 1931 (see Note 1 to his letter dated 1.03.1931). Its first approximation was a series of papers [in Russian] "A review of the development of the science of the structure of the atomic nucleus" in *Uspekhi Fizicheskikh Nauk*. The first paper in this series was published in 1930 (Vol. 10, p. 521). Also in 1930 was published a small book by Gamow *Atomnoe Yadro i Radioaktivnost'* [The Atomic Nucleus and Radioactivity] (Moscow–Leningrad: GIZ, 1930).

⁽²⁾Abram Fedorovich Ioffe, director of the [Leningrad] Physicotechnical Institute.

⁽³⁾Kirill Dmitrievich Sinel'nikov from the Kharkov Physicotechnical Institute. See further references to him later in this correspondence.

Gamow to Kapitza

Astronomical Observatory
Simeiz, Crimea

13 June 1929

Dear Peter Leonidovich

I am already a full month in Russia. Now I have come to Crimea to crawl over the mountains and bathe. Under the effect of “astronomical induction” I gave some thought to the “insides” of stars—*Sterne und Kerne* [stars and nuclei]⁽¹⁾ and the reaction “electron + proton = one vacancy”...⁽²⁾

Have you seen Skobel'tsyn's work (*Z. f. Phys.* < 1929> Bd. 54, H. 9/10) on penetrating radiation⁽³⁾—wouldn't it be fun to measure $h\nu$ accurately, and not get it from some kind of absorption. The magnetic field he used was not strong enough to bend electrons [trajectories] in an arc—one should try this in your fields! Aren't you going to?⁽⁴⁾ < ...>

What success has Cockroft had with artificial α -rays?⁽⁵⁾ I have now some new thoughts on the theory. By the way, Peter Leonovich, I have a request to make. I received the Rockefeller forms⁽⁶⁾ and since Abram Fedorovich [Ioffe] is away (he is in Spain and from there—it appears—he will go to Japan), I sent them to *R H Fowler* with a request for this to be fixed somehow by the *Cambridge* powers that be. I do not know whether my letter reached him while he was still in England, or was he then already in Africa? Perhaps you could let me know the current status of this. The reply from the *Education Board* [of the Rockefeller Foundation] should presumably be sent to *Cambridge—to the proposer* (the person in Cambridge who put forward [my] candidature). Perhaps you could arrange that I would be informed without delay, as Fowler will be absent from Cambridge until the end of September.

See you, soon, in Autumn.

Yours G Gamow

P.S. Greetings to your family.

⁽¹⁾Gamow's “astronomical induction” presumably refers to his contacts with English astronomers.

⁽²⁾Let us recall that in 1929 the positron had not yet been discovered, and the proton was thought to participate in the annihilation reaction related to the capture of a hole in the so-called ocean of states with negative energy (Dirac). Gamow sketched this out beautifully in his letter sent from Cambridge on 3 January 1930 to A F Ioffe. See A F Ioffe *Vstrechi s Fizikami* [Meetings with Physicists] (Leningrad: Nauka, 1983) pp 189–191.

⁽³⁾This concerns D V Skobel'tsyn's paper “On a new kind of very fast γ -rays”. In the course of this work, Skobel'tsyn discovered cosmic ray avalanches.

⁽⁴⁾This refers to D V Skobel'tsyn's experiments in a Wilson's cloud chamber placed in a magnetic field. The idea of using strong magnetic fields to study charged particles was advanced and implemented by Peter Kapitza at the beginning of 1920s. In his Cambridge laboratory he produced the highest at that time magnetic fields.

⁽⁵⁾See Note 2 to Gamow's letter to P Ehrenfest.

⁽⁶⁾Those who wanted to apply for Rockefeller Foundation fellowships had to fill in special forms. They had to be signed by two persons: one recommending the candidate and one supporting the candidature. In the case of Gamow these two persons were, respectively, A N Krylov and Yu A Krutkov. The application presented by them was supported by a number of Cambridge physicists, including Rutherford. More about this is in the paper by V Ya Frenkel' and P Josephson “Soviet physicists grant-aided by the Rockefeller Foundation” [*Usp. Fiz. Nauk* **160** (11) 103–134 (1990); *Sov. Phys. Usp* **33** 938 ff (1990)].



Peter Kapitza and George Gamow (Cambridge, beginning of 1930s).

Gamow to Kapitza

Moscow

9 September 1929

Dear Peter Leonidovich

On Saturday 28 Sept. I shall leave Leningrad⁽¹⁾ for England. On the way I would like, however, to stop for three or four days in Copenhagen and visit the old man, Bohr. I propose to get there an English visa. It is very difficult to get it here as there is no [English] consulate, whereas they already know me in the consulate in Copenhagen—I got a visa there last winter.

If *Rutherford* and *Fowler* have returned from Africa, please ask them what is the best way.

I propose to fill in and send my visa application as soon as I arrive in Copenhagen. I hope that there will be no delay—on the previous occasion all was settled in about five days.

See you soon.

Your Joe

My address until 28 September is c/o L D Landau, Troitskaya 29, flat 41, Leningrad. After 28 September it will be *Inst. for teoretisk. Fysik, Blegdamsvej 15, Kobenhavn*.

⁽¹⁾Gamow returned to Russia from Copenhagen in the Spring of 1929. His subsequent trip was connected with the award to him of the Rockefeller fellowship.

Kapitza to Gamow

30 September 1929

My dear Gamow

I have just returned to Cambridge and find that Professor Fowler and Professor Rutherford are not yet back from South Africa. They are due here in a few days' time: the boat on which they are sailing has been very much delayed. To speed up the matter of your visa Chadwick is writing to the Foreign Office asking for a visa to be sent to the British Consulate at Copenhagen to enable you to enter this country as soon as possible.

Hoping to see you soon.

I am,

Yours most sincerely

[PLK]

Kapitza to Gamow

11th October 1929

Dear Gamow,

I had your telegram to-day and have already spoken to Fowler and we are doing all possible to speed up your Visa and hope that by the middle of next week you will obtain it.

My experience with Visas is that it always requires about a fortnight before you get it.

We are all hoping to see you soon here in Cambridge.

With most kind regards,

I am,

Yours sincerely,

[PLK]

Dr. G. Gamow,
Inst. for Teoretisk Fysik,
Blegdamsvej 15,
Copenhagen.

Gamow to Kapitza

Blegdamsvej 15, Kobenhavn

30 Oktober 1930

Dear P.L.

Greetings from Cope[nhagen]. How did your trip to Mother Russia go? How are Kir [and] Eddi?⁽¹⁾ What's new in Cambridge?

Your Joe

Regards to all *Cambridgers* from many Copenhageners

⁽¹⁾Kirill Dmitrievich Sinel'nikov, deputy director of the Ukrainian Physicotechnical Institute in Kharkov, and his wife Edna (nee Cooper). Sinel'nikov was for two years (until May 1930) Rockefeller Foundation fellow and as such worked under Peter Kapitza in the Cavendish Laboratory.

Kapitza to Gamow

Dr. G Gamov,
c/o Professor Niels Bohr,
The University,
COPENHAGEN

21 November 1930

Dear Gamov, Here is a letter which I am sending on to you. Thank you for your reprints and for your short note. I

would like to hear more about you and Landau, what are you plans and what are you doing?

I had a very nice trip with my wife to Russia and now am very hard at work. I saw Sinelnikoff and many other of your friends who send their kind regards.

With best wishes for your life and work,

I am,

Yours sincerely

[PLK]

Gamow to Kapitza

11 Martz 1931

Dear Peter Leonidovich

It seems that you are now *in charge of the book*⁽¹⁾, as I have found out that *Fowler* has gone away. Therefore I enclose the remaining pictures which I forgot to include with the manuscript. Have you seen my manuscript? Do you like it? When can I expect the proofs? Guided by my financial genius (according to *Mrs Kapitza*)⁽²⁾, I would very much like to get some sort of an advance, of the order of £20. In January I went with Bohr to ski in Norway. Of course, I spent all my money and now I am broke. Please let me know how quickly can this be arranged.

I will stay in Cope[nhagen] throughout the Summer; I shall probably attend the *Kern-Woche* in *Zurich*, and in October the International Congress in Rome about which you have, no doubt, heard. Who has ben invited from *Cambridge*?

Hoping to receive a prompt answer & with love from all people here

Your Joe Gamow

⁽¹⁾George Gamow's book *The Constitution of Atomic Nuclei and Radioactivity* was published in England in 1931 in the International Series of Monographs in Physics. The general editors of this series were R Fowler and P Kapitza and the series was published by Clarendon Press, Oxford. Soviet physicists who contributed to this series, obviously with active support of Kapitza, included, apart from Gamow, N N Semenov (1935) and Ya I Frenkel' (1932, 1934, 1936). The first monograph in this series was the celebrated work of P A M Dirac *The Principles of Quantum Mechanics* (1930). The book appeared in Russian in 1932, with numerous subsequent reissues.

⁽²⁾Anna Alekseevna Kapitza, the wife of Peter Kapitza.

Kapitza to Gamow

PK/MJS

Dr G. Gamow,
Universitetets Institut for Teoretisk Fysik,
Blegdamsvej, 15,
COPENHAGEN

17 March 1931

Dear Gamow,

I have arranged for the £20 advance on your book and it is being sent direct to you by the Clarendon Press. The people at the Press write as follows:

'The printer is now at work on his (Gamow's) MS., and our draughtsmen on the drawings. We have one slight difficulty. You will remember that Gamow indicated by a skull and cross-bones parts which he considered less certain, and I propose to mark these by asterisks. The difficulty we have is to decide where the doubtful passages end. Had it been possible to do this, I think I

UNIVERSITETETS INSTITUT
FOR
TEORETISK FYSIK

BLEGDAMSVEJ 15, KØBENHAVN Ø.

DEN 11. Marts 1931.



Дорогой Петръ Леонидович!

Очевидно Вы сейчас in charge of the book
т.к. поскольку я знаю Fowler уехал.

Посему посылаю Вам две оставшиеся
картинки которые я забыл приложить
к рукописи. Видели ли Вы манускрипт,
как он Вам понравился и когда я
могу ожидать корректуру?

С присущим мне финансовым гением
(согласно утверждению Mrs. Kapitza) мне очень бы
хотелось получить что нибудь вроде
аванса передка £20. Я был в январе
с Божом на лодках в Норвегии, конечно,
пропорочился и сейчас кукаю.

Мамашите, пожалуйста, можно ли это
уступить поскорее?

Я остаюсь в Кон'е всё лето, вероятно б-
ду в июне на Kern-Woche в Zürich и
в Октябре на Интернациональном конгрессе
в Риме, о котором Вы, конечно, слышали.
Кто приглашен из Cambridge'a?

В надежде на скорый ответ & with love
from all people here Yr. Joe Gamow.

should have indented the type, as well as marked with an asterisk. But all I can do now is to mark the beginnings with asterisks and leave him to mark the ends in proof.”

and I should be glad if you would clear up the question about the doubtful passages. I hope that if their suggestion suits you, you will indicate the end of the passages in the proof yourself.

I am glad to hear that you are keeping well. We are very hard at work in Cambridge.

With most kind regards,

I am,

Your sincerely,

[PLK]

⁽¹⁾The skull-and-crossbones stamp can be seen in the facsimile of Gamow's letter to Kapitza dated 11 March 1931 shown on the following page.

Gamow to Kapitza

Blegdamsvej 15
Copenhagen

27 June 1931

Das ist natürlich Geldfrage, aber Sie brauchen nicht zu fürchten [This concerns money, but you need not worry]. Could you please let me know as accurately as possible how much money I am likely to get from *Oxford Press* in the final settlement. In September I am going from here to Germany and in October I should attend the Nuclear Congress in Rome⁽¹⁾. From there via Constantinople to Russia⁽²⁾. Keeping in mind that it is not excluded that I may have to buy a *Doppel Fahrkarte* [return ticket], I expect that all my royalties will be gone half-way through my journey. With Bohr's help I can easily obtain a loan for a sum of money, but it should not exceed the net royalties from my book.

Therefore I have the following questions:

(1) How much money can I count on getting from *Clarendon Press*, on top of the £20 advance royalty I have already received?

(2) *Hirtzel Verlag* has informed me that in accordance with the agreement it concluded with *Clar[endon Press]* the royalty for the German translation is going to be forwarded to *Oxford*⁽³⁾.

How much will this come to?

I will be most grateful for a very prompt reply.

Yours very truly Joe Gamow

P.S. Greetings to all (in the laboratory and your home).

P.S.2 It is very hot here—motorcycles and *Bade-Auzuge* [swimming suits] are given preference over everything else.

P.S.3 I started getting *endgültige* [final] proofs of the book. They look very cheerful.

P.S.4 Are you going to Rome?⁽⁴⁾

⁽¹⁾Gamow's trip to Rome to attend the Congress on 11–18 October 1931 did not materialise. Ehrenfest wrote about this to A F Ioffe: “The fact that Gamow in the end could not come was naturally a very great disappointment to all those interested in young Russian physics” [*Ehrenfest–Ioffe. Nauchnaya Perepiska 1907–1933* [Ehrenfest–Ioffe. Scientific Correspondence 1907–1933] (Leningrad: Nauka, 1990) p. 226]. Gamow's paper “Quantum theory of nuclear structure” was presented at Gamow's request by Delbruck. In his autobiography Gamow stated that he was told in Moscow that he had not been allowed to go to Rome as a reprisal for the action of the German Academy, which

did not invite Soviet scientists to an earlier Congress in honour of Hegel. But Gamow doubted this explanation: in 1932 he was refused permission to go to the USA, where he had been invited by the University of Michigan. Gamow's autobiography contains a reproduction of a postcard sent to him from Rome on 17 October expressing regret that he was not present at the Congress. Among those who signed the postcard (and some further signatures could not be deciphered because of the poor quality of the reproduction) were P Blackett, N Bohr, G Vatin, W Heisenberg, S Goudsmit, P Debye, A Compton, M Curie, R Millikan, W Pauli, O Richardson, B Rossi, R Fowler, E Fermi, P Ehrenfest (Vatagin and Ehrenfest signed in Cyrillic). An impressive list!

⁽²⁾The plan to return to Russia from Rome, via Constantinople was prompted not only by Gamow's desire to visit exotic places, but also by his wish to stop in Odessa and see his father Anton Mikhailovich.

⁽³⁾German edition of Gamow's book was published in Leipzig in 1932.

⁽⁴⁾Kapitza did not go to Rome (see his letter to Gamow dated 11 July 1931).

Kapitza to Gamow

PK/MJS.

11 July, 1931.

Dr G. Gamow,
Blegdamsvej 15,
COPENHAGEN.

My Dear Gamow,

I have just returned from a holiday in France. With regard to your German book, I enclose herewith the proposed agreement between the Oxford Press and the German editor which is the same as for Dirac's book⁽¹⁾. This agreement, of course, is for your personal information and must be kept private.

The German will pay $7\frac{1}{2}$ per cent royalty out of which you will get at least $\frac{2}{3}$ and probably $\frac{3}{4}$. With regard to the royalty which you can expect to draw on your book, the sales will probably be about 2,000, the sale for the first year being about 1,000, the remaining thousand may be spread over several years. These figures are only for your guidance, and I can take no responsibility for them as they depend on the way in which your book is received.

Thank you very much for your kind greetings and wishes, I was very surprised to hear about the proposed change in your future—I would like to hear a few more details.

I am not going to Rome as I am staying all the while in Cambridge except for a short week in the end of July when I am visiting Hamburg and seeing Stern's laboratory⁽²⁾.

With most kind regards and best wishes,

Yours very sincerely,

[PLK]

⁽¹⁾See reference to P A M Dirac's book in Note 1 to Gamow's letter dated 11 March 1931.

⁽²⁾It is not clear what is meant by this. Changes in Gamow's life which might have been connected with his name being put forward for the membership of the Academy of Sciences of the USSR occurred much later, and attempts to involve Kapitza in the efforts to get Gamow elected were made in the Autumn of 1931 [see G E Gorelik, V Ya Frenkel' *Matvei Petrovich Bronshtein* (Moscow: Nauka, 1990) p. 88]. Also there were no changes in his domestic conditions—Gamow met his future wife Lyubov' Vakhmintseva in the Autumn of 1931. Kapitza thanks Gamow for the greetings he received from him on the occasion of the birth of his second son Andrei (born 9 July 1931, now Corresponding Member of the Russian Academy of Sciences).

Gamow to Kapitza

L'Institut de Radium
 11 rue P. Curie
 Paris

15 Nov. 1933

An expanse of wild freedom
 is again in the air
 And the scent of roses and wild strawberries
 drifts in from the ancient forest
 A Tolstoi†

A month has already passed since we have found ourselves “on this side of the border” and we are very well⁽¹⁾. I have started to work again in earnest on subjects I neglected in the past two years during which I was mainly concerned with crossing the potential barrier which surrounds a sixth of the world. Now I wish to follow your steps and, if possible, enter the “*Kapitza Zustand*” [Kapitza state], that is reside abroad with a Soviet passport. I have written to Moscow requesting *in firm expressions* an extension of my posting by a further year. I hope they will understand there that a refusal would not pay⁽²⁾.

In Paris I am scheduled to give a few lectures at the *H Poincare* Institute, which from the financial point of view will allow us to stay here until the New Year. Bohr invited me to Copenhagen in the Spring and I would like to spend the time in between (January, February, March) in *Cambridge*. Bohr spoke to the Crocodile⁽³⁾ about this subject in Brussels—in particular whether it would be possible for me to get some sort of a grant. But I am not yet quite clear about this question, and would like to ask you whether you could find out indirectly what the position is and whether, when we arrive in England, we shall have to rely on [staying with] our good friends. I hope to see you soon and tell you about the exciting events of the past few years. *With kind regards also to Mrs Kapitza from myself and Ro, yours very truly Joe Gamow.*

P.S. Please write to me at the address given above.

For your collection

The Crocodile, I
 by d'Aktil⁽⁵⁾; English version by S P Harrop

This took place on the shores of the Nile
 Among tombs mysterious in style
 Where explorers fought with true spirits
 And crocodile, crocodile, crocodile
 Fell in love with Miss Willis
 Crocodile, crocodile, crocodile
 Strived so hard to change his wife
 To catch the eye of the curly lady
 So he wriggled like a wounded fiend
 To slowly wriggle out of his skin
 Wriggle, wriggle,... at last he was finished
 Oh Miss Willis, Miss Willis!
 And when time came for her to go
 Crocodile did not sob or moan
 (the Africans are not like us)

†Gamow cites this verse from “Il'ya Muromets” by A Tolstoi. It is a reference to Niels Bohr and Gamow's recent stay in Copenhagen. Forest in Russian is ‘Bor’, the spelling in Russian being the same as that of (Niels) Bohr.

But to Miss Willis at the beach, saying farewell,
 He gave a travel bag, a keepsake of himself
 Made from his own crocodile husk.
 That husk from which, with heavens fillip
 He'd wriggled, wriggled, and relinquished—
 Oh Miss Willis, Miss Willis!

— * —

And Mr Hopkins, spouse to this amour
 Packed into this bag his socks and pyjamas, for
 Men are such boors!

The Crocodile, II
 by Agnivitsev⁽⁶⁾; English version by J R Briggs

There once lived a very nice crocodile
 Who was nine-feet long—good golly!
 There also lived a very nice girl
 A black lady named Molly
 And Molly, a maiden with time to spare,
 Decided to take a breath of fresh air
 And in this hour that she took
 Went to the river running
 The crocodile at her did look
 And found her rather stunning
 And ate her
 And said later:
 “Oh! Lovely Molly is so nice!”
 Crocodile love has a terrible price!

The Crocodile, III
 (Soldier's tale); English version by J R Briggs

Walking the streets on show
 A large she-crocodile did go
 She, She, ...
 But, of course, the rest you know

⁽¹⁾George Gamow left USSR in October 1933, together with his wife L Vakhmintseva, a physicist by training.

⁽²⁾Gamow's request was turned down. An interesting opinion on this subject is contained in the letter Peter Kapitza sent from Cambridge to Niels Bohr on 15 November 1933. We shall reproduce here an excerpt from this letter [full version of this letter appears in the collection of letters of P L Kapitza *Pis'ma o Nauke* [Letters on Science] (Moscow: Moskovskii Rabochii, 1989) pp 25–26]. “Gamow's failure to return to Russia will make it exceedingly difficult for young Russian scientists wishing to study abroad to obtain permission to leave the country. For me this is the main argument against such a step. At present some ten or so young physicists would like to go abroad and their applications are now being considered. But if Gamow stays in Europe without the permission of the Russian government, this will have a very negative effect on their case. I think the only way we can get out of this difficult situation is to obtain from Russia permission for Gamow to remain in Europe. To achieve this it is necessary for Gamow to obtain an official leave for at least a year. To extend this leave for another year will then not be so difficult. And one should go on like this until his absence will resemble a chronic disease to which one has already got accustomed!”

⁽³⁾It is well known that Kapitza called Rutherford by this name and Rutherford knew this.

⁽⁴⁾Gamow calls his wife ‘Ro’ in his letters to his friends and acquaintances, after the letter of the Greek alphabet. Why he has chosen this nickname is not explained in any of his writings. In his letters Gamow spells her name ‘Ro’, but in his autobiography he spells it ‘Rho’.

⁽⁵⁾d'Aktil' is the pseudonym of the Russian poet, song-writer, and translator, A A Frenkel' (1890–1942). It is of some interest that on the one hand he was the composer of the well-known song “Marsh

Budennogo” (“Budenny’s March”), and on the other hand he was the translator into Russian of Lewis Carroll’s *Alice in Wonderland*.

⁽⁶⁾Russian poet N Ya Agnivitsev (1888–1932).

Kapitza to Gamow

20th November, 1933.

Dr. J. Gamow,
L’Institut de Radium,
11, rue Pierre Curie,
PARIS

Dear Gamow,

Thank you for your letter and for all your verses. I spoke with the Crocodile about your visit. He will be very glad to see you here, and I understand he has written about your coming to you personally. I also understand that he will provide the necessary funds—I think it will be £35—on which you can live here.

I hope you are enjoying your time abroad. Is your wife picking up the language?

Looking forward to seeing you here,

Yours sincerely,

[PLK]

Gamow to Kapitza

Institut de Radium
11 Rue Pierre Curie
Paris

10 Dec. 1933

Dear Peter Leonovich

We have decided to spend the festive days in London. We shall arrive there on the 23rd and will reach *Cambridge* on the 8th. I would be most grateful if you, as an old hand in England, would advise me in which hotel I should stay in London—it must not be too expensive.

Love & Kisses from Ro.

I am remaining, Sir, your obedient servant Joe Gamow

Kapitza to Gamow

J. Gamow, Esq.,
Institut de Radium,
11, Rue Pierre Curie,
PARIS

19th December, 1933.

Dear Gamow,

I am looking forward to seeing you here in Cambridge. Meanwhile, as regards where to stay in London, I cannot give you much advice as I do not know your requirements. For one night or two it is a good plan to stay in one of the hotels near Russell Square which is right in the centre of London, and you can get inclusive terms. One hotel where I have stayed is the National Hotel, Upper Bedford Place. If you want a small hotel with good conveniences, there is one run by a Scotch lady—the Commodore Hotel, 4, Pembridge Square, W.2. The address is in the London Telephone Directory. It is slightly out of the centre of London and is quite close to Hyde Park.

With best wishes for Christmas and the New Year,

Yours sincerely,

[PLK]

Gamow to Kapitza

Blegdamsvej 15,
Kobenhavn

13 March 1934

Dear Peter Leonovich

It is exactly a month since we exchanged the soot-covered walls of the colleges for the green (CuO_2) roofs and spires of this blessed city. Here flourish *varme pølser*⁽¹⁾ (if you have never eaten them, any further explanations are useless), *ping-pong* on the library table in the Institute, and discussions on the theory of β -decay. I have taken on this vile and wretched world problem⁽²⁾ seriously, and Ro started work under Jacobsen, measuring the β -activity of rubidium, and is strutting around in a snow-white overall.

You have probably heard from *Fowler* that I have broken with the Americans (the swines do not want to print the book with pull-out pages) and am getting ready a *good old fashioned* second edition of the Oxford book⁽³⁾. I am now finishing a paper for “*Nature*” on current nuclear theory and would like to send it to *Fowler* with a request to deliver it to “*Nature*”⁽⁴⁾. I am entrusting the net income to you—please do not be cross; we are now economising even on cigarettes and are going to cinema only once a week. Perhaps we shall become rich in America—we shall be in clover there. Our visit to America is fully planned and even the tickets have been ordered. We shall sail on the “*Majestic*” (56598 tons) and on the way we shall stop in London for a couple of days (11 and 12 June). I hope to visit *Cambridge* and congratulate the atom-splitters there on their recent successes.

Greetings from both of us to both of you

Your Joe

P.S. The most recent sensation. *Bohr* is departing around the First of May for the route *Leningrad–Moskwa–Kharkov* to take part in a conference in the last of these cities. He is accompanied by two apostles—*Rosenfeld & Klein*. Alleluia, alleluia...Amen⁽⁵⁾.

⁽¹⁾Hot sausages

⁽²⁾The theory of β decay is discussed in Gamow’s paper “Über den heutigen Stand (20 Mai 1934) der Theorie des β Zerfalls” (*Phys. Zs.* **35**, 1934).

⁽³⁾The second edition of Gamow’s book, substantially revised and enlarged appeared in 1937 under the title *Structure of Atomic Nuclei and Nuclear Transformations*. It was published by the same publishing house (Clarendon Press, Oxford) as the first edition. It was not published in the USA.

⁽⁴⁾The paper concerned is “Modern ideas on nuclear constitution”, published in *Nature* on 19 May 1934.

⁽⁵⁾The visit of Bohr and his assistant L. Rosenfeld (O. Klein could not go) did actually take place. The conference to which Gamow refers is the “2nd Conference on Theoretical Physics” [cf V Ya Frenkel “Niels Bohr and Soviet physicists” (in Russian) in *Collected Papers Nil’s Bor i Nauka XX Veka* [Niels Bohr and XX Century Science] (Kiev: Naukova Dumka, 1988) especially pp 20–25]

Gamow to Kapitza

Blegdamsvej 15
Copenhagen

6 May 1934

Dear Peter Leonovich

In a month’s time I shall go to *Ann-Arbor* to read there lectures over a period of two months, and on the way I hope

to visit *Cambridge*. The liner (“*Majestic*”) sails on 13 June, so hospitality in your nice town would be welcome on the 12th. If people have not yet dispersed for their summer vacations I could give a lecture on the topical subject of negative protons⁽¹⁾. Alas, our further plans are again uncertain, because Lawrence recently wrote to Bohr that the dollar is very slowly creeping upwards and in no way can they find a place for me this year in California. Bohr is now in the USSR (Leningrad–Moscow–Kharkov)⁽²⁾ and will not be back until the 27th. We shall then consider where I should spend the next year. The nasty Cambridge nucleonists do not want to make me fellow of some impoverished college!

Well, somehow everything will sort itself out. What upsets me most is that I shall have to go to America on my own and leave Ro in Copenhagen, as two return tickets across the ocean would sorely hurt.

There are, of course, also some good things: participation in the Copenhagen (September) and London–Cambridge conferences (has the latter one been fixed?), but all this pales before the lost opportunity of crossing the American continent in my own motorcar.

See you soon. Regards to Anna⁽³⁾ from both of us.

Yours Joe

P.S. (1) I sent a letter to *Fowler* requesting him to write to the *Foreign Office* concerning visas. If he is not in Cambridge, could you please do this (two visas, for me and Ro, to cover all eventualities).

P.S. (2) My review paper in *Nature* is about to be published (I have already had the proofs)⁽⁴⁾. But the publishers have said nothing about my fee (my debt to you), but I still hope that there will be some.

⁽¹⁾After the discovery of the positron consideration was given to negative protons (and even neutrons); see, for example, the Collected Papers *Pol' Dirak i Fizika XX Veka* [Paul Dirac and XX Century Physics] (Moscow: Nauka, 1990). Gamow examined the possibility of existence of “internuclear protons” (see his paper “The negative proton”, in *Nature*, 2 June 1935).

⁽²⁾See Note 5 to Gamow's letter of 13 March 1934.

⁽³⁾Anna Alekseevna Kapitza.

⁽⁴⁾See Note 4 to Gamow's letter of 13 March 1934.

Kapitza to Gamow

Dr G. Gamow,
Blegdamsvej 15,
Copenhagen,
DENMARK.

15 May, 1934.

Dear Gamow,

I was very glad to hear that you are coming to Cambridge and we shall be very glad if you will speak to our Club about your negatron on Monday, June 11th⁽¹⁾. I am arranging a meeting for this date.

I am sorry that your wife is unable to join you on your trip across the ocean, but I hope everything will sort itself out eventually.

At the moment Leypounsky is here, and I expect also in June that Joffe⁽²⁾ will be here.

Looking forward to seeing you here in Cambridge,
With kind regards,

Yours sincerely,

[PLK]

⁽¹⁾See Note 1 to Gamow's letter of 6 May 1934.

⁽²⁾It appears that Ioffe did not attend the congress in London (USSR was represented by A I Alikhanov), although he submitted two papers which were published in the proceedings of the congress.

Gamow to Kapitza

Kobenhavn

22 Mai 1934

Dear Peter Leonidovich

So my lecture is scheduled for Monday, the 11th. O.K.! I shall probably arrive in *Cambridge* on Monday morning and shall stay there the whole day; maybe I shall spend the night there.

Please tell the Crocodile and Cockroft that they should split as many nuclei as they can before my arrival.

Greetings to Anna⁽¹⁾ and Leipunskii⁽²⁾.

Yours Joe Gamow

⁽¹⁾Anna Alekseevna Kapitza

⁽²⁾A I Leipunskii stayed for about one and a half years in Rutherford's laboratory (from April 1934 until October 1935).

With the letters written in May 1934 the correspondence between Kapitza and Gamow ceased; no further letters from Gamow or to Gamow have been found in Kapitza's archives. Soon after this Gamow settled in USA and became a professor at the George Washington University. Kapitza went for holidays to Leningrad in the Autumn of 1934, and was then deprived of the possibility of returning to England. For very many years he was not allowed to go abroad. There are at least two letters concerning Gamow among his papers. An excerpt from one is quoted in Note 2 to Gamow's letter of 15 November 1933. The second is related to the candidature of Gamow, on the wave of his nuclear quantum mechanical successes, for the membership of the Academy of Sciences of the USSR. L D Landau wrote to Kapitza with a request to “praise Johnny”, and to ask Rutherford and others to do the same. Kapitza replied to Landau on 25 November 1931 in these words: “Dear Landau, that the Academy should be rejuvenated—I agree. That Johnny is a suitable monkey gland—maybe. But I am not doctor Voronov and do not like to poke in affairs that are not mine.” [cited after G E Gorelik and V Ya Frenkel' *Matvei Petrovich Bronsh-tein* (Moscow: Nauka, 1990) p. 88].