

Inconsistencies in a series of papers by Anatoly Buchachenko, Dmitry Kuznetsov and co-workers (2004-2012)

Results of a preliminary investigation

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A series of biochemical research papers, started by some Russian researchers in 2003 and then extended to Iranian researchers, concerns magnetic isotope effects in the enzymatic synthesis of ATP (adenosine triphosphate). This substance is synthesised by the action of enzymes. As cofactors are involved magnesium ions. The result at the base of this research concerns a different behavior of the three isotopes of magnesium. The isotope 25 (which occurs in nature for approximately 10%) possesses nuclear spin and nuclear magnetic moment. The isotopes 24 and 26 do not. It has been found that the synthesis of ATP proceeds more rapidly in the presence of the isotope 25 with a yield two or three times higher than with the other two isotopes. The first result was obtained with the enzyme creatine kinase, then it was repeated with other enzymes. The result has been repeated also with ions of other elements in place of magnesium 25, i.e. with the isotopes calcium 43 and zinc 67, these also endowed with nuclear spin and nuclear magnetic moment. It has also been found that the application of an external magnetic field further accelerates the process. Based on these results, theoretical studies have been done which could lead to interesting hypotheses about the nature of certain enzymatic processes.

In a second phase there has been a search for pharmaceutical applications and several patents have been registered.

For a compendium of the whole series of researches, one may see the 2012 review paper [21].

Along this line of research, more than seventy papers have been published to date by Russian and Iranian researchers. The reported results were always positive and have always led to confirmations. So far, no solid proof of magnetic isotope effects in the synthesis of ATP has been obtained by other independent laboratories. Rather, two laboratories have found contrary results, but of this we are not

here concerned.

§1. *The examined papers*

So far I have seen only about thirty papers in the series, less than half of the total. In many papers I have found apparent inconsistencies that are the subject of this report. At the end of this text there is the list of the 21 papers that are taken into consideration. (In the text the numbers in square brackets refer to that list.) In all 21 papers there is at least one apparent inconsistency and in some of them the inconsistencies are numerous.

The papers were published between 2004 and 2012 in international scientific journals.

All papers are signed by at least two and often by several authors.

For these 21 papers, the total number of authors is 41. In many cases an author is present in only one or a few papers. Other authors are present in numerous papers. Below is a list of the most frequent authors, taking also account of the role as first author or corresponding author. (Not always the corresponding author is clearly specified and then I assume that he is the first author.) In the list I include the names that are among the authors in at least five papers. I have also listed other names if they are present at least once as first author or corresponding author. (Of course, there are cases in which the first author and the corresponding author coincide.)

	Total	First	Corresponding
Dmitry A. Kuznetsov	20	5	5
Anatoly L. Buchachenko	13	8	7
Marina A. Orlova	12	-	1
Nima Amirshahi	8	5	6
Seyed Mahdi Rezayat	7	1	-
Stanislav E. Arkhangelsky	6	-	-
Renad N. Alyautdin	6	-	-
Saeed Sarkar	6	-	-
Artyom A. Markarian	5	-	-
Seyed Vahid Shetab-Boushehri	2	1	-
Asieh Hosseini	1	1	-
Mohammad Sharifzadeh	1	-	1
Seyed Nasser Ostad	1	-	1

We see that Kuznetsov is the most frequent author while Buchachenko has more presence as first or corresponding author. The other Russians in the list are Orlova, Arkhangelsky, Alyautdin and Markarian. Among the Iranians, the most frequent one is Amirshahi followed by Rezayat and Sarkar. The Russian authors are affiliated with various institutes and universities in Moscow (Semenov Institute, Lomonosov University, Pirogov University, Sechenov University). The Iranian authors are mostly at TUMS (Tehran University of Medical Sciences).

The most distinguished author is Professor Buchachenko who is a member of the Russian Academy of Sciences. Among the other authors there are professors at universities in Moscow (for example Kuznetsov, Alyautdin) and Tehran (for example Rezayat, Sarkar)

§2. *A collection of "not found"*

My inquest has been conducted primarily on the Internet. In a few cases I have also obtained information by mail.

I have tried to verify if certain names that are mentioned in the papers (names of publications,

foundations, instruments, persons) really exist or not. In many cases I have found no trace of their existence.

If I find no trace of the existence, for example, of a publication cited in the bibliography of a paper, this does not prove with certainty that the publication does not exist. It just means that I have not found it. Then there might be three alternatives:

- a) The publication exists but the authors of the bibliography have incurred in mistakes in quoting the data, for example they have misspelled a name. Even a slight misspelling may be enough to render the Internet search engines ineffective.
- b) The publication exists and is reported correctly but for some reason I was unable to trace it.
- c) The publication does not exist and the bibliographic reference is false.

I will send this text to the authors of the papers (at least to those for whom I know the email address) and if they are willing to collaborate it will be easy to discriminate between these alternatives. In the alternative (a), the authors may (and should) provide a corrected version of the data. In case (b), the authors can provide a proof of the existence of what I have not found. In general, it will be easy to provide such a proof. For example, in the case of a person whom I was not able to trace, it will be sufficient to provide a street or email address of that person. In the case of a publication for which I have not found that there is a publisher, it will be sufficient to provide an address or website of the publisher. For references to journal papers, our authors might indicate a website where the contents of the volumes are available or, failing that, might send me a scan of a contents page of the journal or of the first page of the paper.

If I receive replies from the authors, I will publish all of them in future updates to this text.

Therefore I do not fear to unfairly accuse the authors because this list of “not found” has to be considered as provisional and will be reviewed by the authors who can provide their clarifications, which will all be published.

On the other hand the issues to be clarified are many and it seems reasonable to have some doubts about the reliability of the authors. So it seems legitimate to ask the authors to provide explanations for their own benefit.

It should be noted that there are also examples, especially in §12, with a direct proof of the alteration of bibliographical references. In such cases, the authors can hardly present an excuse.

I have to add that in recent months I have written to several authors expounding some of the results of this investigation. Most of the authors did not reply and, when they replied, did not provide any clarifications such as to dispel the suspicions. This is why I now send to the authors this complete report which is due to be published, hoping to encourage them to express themselves.

§3. *Compendium of results*

We begin with five persons who are mentioned in some papers but could not be traced with my search.

A Dr. Veloshin of Rostov on Don is supposed to have provided the viper venom with which the series of studies begun (§4).

A Dr. L. Gergely of Szeged (Hungary) is supposed to have provided samples of a purified enzyme (§5).

A Prof. L. De Sotta (or De Cotta) of the University La Sapienza of Rome is supposed to have provided a chemical that was necessary for an experiment (§6).

A Dr. M.N. Osmolov of Dubna (Russia) is supposed to have provided assistance in using a particular instrument (§7).

An A.A. Ivanov is supposed to have been the first to discover a magnetic isotope effect in an enzymatic process, thus stimulating this line of research (§8).

After this we consider the case of two Foundations of Varese (Italy) that are supposed to have financed the initial work of the group of Russian researchers but are untraceable (§9).

Then there are many instruments or materials that should have been used in the experiments but for

which the model codes seem to be unknown (§10).

All the remaining sections concern some of the bibliographical references listed in the bibliographies of the papers. There are references with altered data (§11) and references where the titles of the publications have been substituted (§12). In §13 there is a list of over thirty bibliographical references to apparently nonexistent publications. In some cases even the publishers of the quoted books do not seem to exist (§14). In the bibliography of a doctoral thesis of one of the authors there are curious similarities to the bibliographies of the papers examined (§15). Suspect bibliographical references are associated with suspect codes of the models of instruments (§16). Finally a comparison is made between two papers which describe the same experiment but have differences in the bibliographical references (§17).

§4. *Dr. Veloshin and the vipers from Azerbaijan*

This whole series of studies on the magnetic isotope effects began in 2003 when the authors experimented with the enzyme creatine kinase (CK) extracted from viper venom. The particular species of viper was *Vipera xanthia* (this species is usually termed in zoology as *xanthina*). The use of the enzyme extracted from the venom of *Vipera xanthia* is mentioned in various papers (for instance in [2, 3, 5, 7, 8, 9, 21]). In new experiments that were published in 2010 and 2011 (in papers which are not in the list), the same venom was used.

Among the papers I have available, there is only one indication of how the venom was procured. It is in a 2004 paper [3] by Kuznetsov et al:

«A lyophilized venom samples obtained from 63 male and female (1-2-year-old, 60-70 cm long) *Vipera xanthia raddei* snakes collected in the countryside 15-20 km South-West of Nakhjevan City, Province of Nakhjevan, Republic of Azerbaijan, during July-August of 2002, by a team of serpentologists from the Rostov State University. The samples were then combined for further acute toxicity tests and CK chromatographic isolation. Each one of the individual reptiles used was a donor of not less than 4.5 g of the lyophilized total venom in a 3-week donorship duration (a lyophilized venom was kindly donated by Dr. Veloshin, Rostov State University, Rostov-on-Don, Russia).» [3]

The province of Nakhjevan (or Nakhchivan) is an Azerbaijan exclave separated from the main territory by a strip of territory of Armenia. The area indicated, at 15-20 km south-west of the capital, is near the border with Iran. It is located about 1000 km away from Rostov.

The authors say that the venom had been "kindly donated" by a Dr. Veloshin of the University of Rostov on Don. This would be a generous gift because the venom of this viper is commercially available at prices in the range of 2-3000 dollars per gram. It is strange that only the surname Veloshin is mentioned, without the full name or the initials of name and patronymic as is customary in Russia.

I have searched the website of the University of Rostov (which has since changed its name to Southern Federal University). I have not found any Veloshin (or "Велошин" in Cyrillic). Nor have I found on the Internet in general a Veloshin associated with snakes.

I have written to the Department of Zoology of Rostov asking if they know a Dr. Veloshin and if they are aware of an expedition of Rostov herpetologists in 2002 for chasing the vipers of Azerbaijan. I have received a precise answer, indicated as the official answer of the Department. In that Department there is no Veloshin. Nobody at the Department knows a Veloshin or has heard of him. There has not been an expedition of Rostov herpetologists to Azerbaijan.

So the question arises of how our authors have obtained the venom of *Vipera xanthia*. The Russian authors of [3] are Kuznetsov, Arkhangelsky, Orlova, and Markarian. It is to be hoped that they can indicate a means to trace that Veloshin and can explain how they got the venom.

§5. *Dr. L. Gergely and the Hungarian pig enzyme*

In a 2005 paper [6] that was published in an important American journal, the magnetic isotope effect in the synthesis of ATP was studied with another enzyme in place of the creatine kinase, that is with the phosphoglycerate kinase (PGK). In part of a 2011 paper [19] a description of the same 2005 experiment is repeated.

In the section "Experimental Procedures" of [6], the authors begin by indicating who had given them the samples of the enzyme:

«Purified pig skeletal muscle PGK samples were kindly donated by L. Gergely (Institute of Biophysics, Hungarian Academy of Sciences, Szeged, Hungary).» [6]

Again in 2011 the authors of [19] say:

«The purified pig skeletal muscle PGK samples (EC 2.7.1.08) were kindly donated by. Dr. L. Gergely, Institute of Biophysics, Hungarian Academy of Sciences (Szeged, Hungary).» [19]

It is true that in Szeged there is a Biological Research Centre (BRC) of the Hungarian Academy of Sciences which comprises also an Institute of Biophysics.

Searching the website of the Centre of Szeged I have not found a Gergely with that initial, nor I have found, searching the Internet, an L. Gergely associable with Szeged or enzymes. So I wrote directly to the Centre of Szeged. According to the answer I received, there is not, and there has not been in recent years, an L. Gergely at the Biological Research Centre.

The papers [6] and [19] have a total of eight authors. Those who are present in both papers are Buchachenko and Kuznetsov. In [6] Buchachenko is the first of four authors and is also the corresponding author. In [19] Buchachenko is the first of six authors and Kuznetsov is the corresponding author. (Note 1)

Hopefully Buchachenko and Kuznetsov will be able to indicate a means to trace that Gergely and will explain how they obtained the PGK enzyme.

The situation for these two papers is even more serious because, as we shall see in §17, for the experimental procedures the authors refer to seemingly nonexistent publications.

§6. *Prof. L. De Sotta (or De Cotta) and the methylnicotinamide from Rome*

In a 2005 paper [5] the authors say that a certain chemical, the 1-methylnicotinamide produced by the American firm Upstate Biotechnologies, was given them by a professor of the University *La Sapienza* of Rome. For the name of the professor there is a small uncertainty because of an ambiguity in the transcription from the Cyrillic. This paper was published in a Russian journal in two languages, the original Russian and an English translation. I have only the Russian version available. In the text the name is this: "Проф. Л. Де Корра".

If transcribed from Cyrillic, this would be "Prof. L. De Sotta ". But in this paper the foreign proper names are usually written in the Latin alphabet. (In the same sentence the words "La Sapienza" and "Upstate Biotechnologies" are in the Latin alphabet.) Assuming that also this name was intended to be written in the Latin alphabet but for an oversight two Cyrillic letters were left in "L. De", the name of the professor might be "L. De Cotta".

At any rate at La Sapienza (the first university of Rome) there is neither a De Sotta nor a De Cotta. These are rare Italian surnames and cannot be found on the Internet in association with La Sapienza or generally with chemistry. That the names are not known at the Chemistry Department of the university was confirmed to me by a chemistry professor of La Sapienza.

This chemical, methylnicotinamide, was necessary for conducting the experiment as described in

[5]. The chemical is commercially available and it would be strange if people in Moscow need to obtain it just from Rome..

The authors of this paper [5] are eight Russians with first name Kuznetsov. We hope that any of them will remember who was the professor of Rome. Maybe they misspelled a name that is foreign for them. We expect that they offer an explanation.

§7. *Dr. M.N. Osmolov, the man in Dubna*

In three papers of 2008 [10], 2009 [15] and 2010 [18] the Iranian and Russian authors mention in the text the collaboration of a Dr. M.N. Osmolov of Dubna and thank him in the final acknowledgements. For example:

«SANS (small angle neutron scattering) spectra of PMC16 monomers and dimers were registered and analysed in SANS 2TD accelerator at the International Nuclear Research Institute, Dubna, Russia, with a kind technical assistance provided by Dr. M.N. Osmolov.»
[18]

«Special thanks to Dr. M. N. Osmolov, the International Nuclear Research Institute at Dubna, Russia, for his exceptional help in getting and analyzing the nanoparticles SANS images.»
[18]

In past decades Dubna, not far from Moscow, has been the city of the development of Soviet nuclear physics. The SANS (Small-angle neutron scattering) is a sophisticated technique that undoubtedly is available at Dubna.

Searching the Internet with Google or Google Scholar, one cannot find an Osmolov with those initials before or after the surname, either in Latin or in Cyrillic letters ("М.Н. Осмолов"). Not only one cannot find it in association with Dubna but one cannot find it anywhere on the web. The papers do not give the first name in full so it cannot be used in the search.

The authors say that this Osmolov works at an "International Nuclear Research Institute." Today there does not seem to exist in Dubna an institution with that exact title (in English). Rather it might be the "Joint Institute for Nuclear Research." I have not requested information directly from the Institute which is an aggregate of several laboratories which employ a total of 5000 people.

Therefore for this Osmolov as yet I lack substantial evidence that he does not exist. I provisionally mention also this name only because there is stronger evidence for the previous three names and there might be some suspicion also for this one. On occasion I can examine more thoroughly this case in the future. If the authors are kind enough to provide some more details, for example the first name in full and the particular laboratory in Dubna where Dr. Osmolov works (or still better his email address), they will facilitate my task.

I also note that the model code of the instrument used by Osmolov, which is given in all three papers as "SANS 2TD", cannot be found anywhere on the Internet, apart from just these three papers. In §10 we will find a list of several other instruments which seem to be an exclusive of our authors.

For the three papers [10, 15, 18] the authors are eighteen in total. The corresponding authors are twice Amirshahi and once Ostad. Among the authors who are present in all three papers, there are Buchachenko, Kuznetsov and Orlova.

§8. *A.A. Ivanov and RuBisCO*

As told by the Russian authors of three papers [1, 5, 21], a certain A.A. Ivanov had been a precursor of this line of research about the magnetic isotope effects in enzymatic processes. Indeed he should

have been the first one to discover such an effect and reportedly had thus stimulated our authors to take that course of research. However, the authors do not offer any indications that would permit to identify the person behind the surname Ivanov. Only two references are provided to two books of 2000 and 2002, both with an Italian publishers, but it seems easy to believe that the books do not exist.

In a 2004 paper [1] by Kuznetsov and others, the reference n. 21 of the bibliography is:

«Ivanov, A. A. Recent criticisms on the radiocarbon method accuracy in the light of biofractionation of C-isotopes and related molecular phenomena studies. In: *Advances in Archaeological Biomaterials Research* (Ed. T. Baglioni). University Press: Turin, 2000, pp. 70-92.»

The same reference is in the 2012 review paper [21].

Of this supposed publication I have found nothing, not the titles of the chapter and of the book, not the publisher, not the name of Baglioni associated to the rest. In Turin there is a University Academy Press, but has only recently begun to publish. I wrote to the Academy and they said they have not publish the book and do not know of the existence of a University Press in Turin.

In the text of [1], the passage with the reference to n. 21 of the bibliography is as follows:

«So the main aim of this study, which was the development of an efficient microtechnique for ^{25}Mg substitution in a CK-active site, has eventually been reached. The most intriguing part of our data, however, is a surprisingly high level of isotope (spin)-dependent CK-activation effect. Although a similar effect promoted by ^{25}Mg cations and by $^{13}\text{CO}_2$ was first reported by Ivanov (21) who used to work with ribuloso-5-bis-phosphate carboxylase/oxidase (RuBisCO), which is a key photosynthesis enzyme, the precise biophysical mechanism of this phenomenon remains obscure.»

(CK is the enzyme creatine kinase. The enzyme RuBisCO, or Ribulose-1,5-bisphosphate carboxylase oxygenase, intervenes in the process of carbon fixation by the leaves of the plants.)

So this Ivanov, in the work cited, would have been the first one to find a magnetic isotope effect for magnesium 25, as well as for the carbon 13, although in an enzymatic process different from the synthesis of ATP.

In the 2012 survey [21], where Buchachenko and Kuznetsov summarise the whole series of their studies on this subject, the importance of the alleged work of Ivanov in the genesis of their research is expressed in explicit form. The authors say:

«As has been shown by Ivanov, the reaction of photosynthetic CO_2 fixation, which is catalyzed by rubiloso-5-bisphosphate carboxylase/oxidase (RuBisCO), is strongly activated by the presence of $^{25}\text{MgCl}_2$.²² This result stimulated Kouznetsov et al.²³ to develop a preparative electrophoretic technique to substitute Mg^{2+} ions with natural isotope composition by $^{25}\text{Mg}^{2+}$ ions. By using this technique, the samples of creatine kinase from the *Vipera xanthia* venom with high content of $^{25}\text{Mg}^{2+}$ ions (86% versus 10% of natural abundance) were obtained. In the experiments, these samples were shown to exhibit enormously high ATP-generating activity of enzyme: an 8-fold increase in the share of $^{25}\text{Mg}^{2+}$ ions in a total pool of magnesium ions was accompanied by a 2.4-fold increase in the ATP yield. This unbelievable result indicated that the presence of magnetic isotope nuclei ^{25}Mg in the catalytic site of the enzyme somehow promotes ATP synthesis. In a series of later studies, this new and unpredictable phenomenon was investigated in detail, and the results are summarized and discussed later.»

In the above excerpt, reference n. 22 is to the same 2000 book of University Press, Turin as previously mentioned, while reference n. 23 is to the paper [1] by Kuznetsov et al from which we

have already quoted. This paper [1] of 2004 (which had already been presented in 2003 at a conference in Germany) was practically the first one to announce the effect of the isotope 25 of magnesium on the synthesis of ATP by creatine kinase. So we are led to assume that Kuznetsov in 2003 (or the year before) had undertaken this research because he had been stimulated by the mysterious work of Ivanov.

There is another reference to a publication by A.A. Ivanov in a 2005 paper [5] by Kuznetsov et al. Here it is at n. 24 of the bibliography:

«A. A. Ivanov, Biofractionation of Carbone [sic] Isotopes and Photosynthesis (Turin Polytechnical University Press, Turin-Varese-Milan, 2002).» [5]

This would seem to be a 2002 monograph by Ivanov. This too is a phantom publication. Among other things, for us in Italy it is immediately evident that it would be strange for a publisher to join together a polytechnic and a university. Moreover there would be no reason to place a supposed “Turin Polytechnical University Press” in Milan, much the less in Varese. Even so I have searched for this book but have not found it.

The paper [5] was published in early 2005 but the first version of the manuscript had already been sent to the journal in September 2003, still in an early stage of the work of our group. In the text, the passage containing the reference to n. 24 of the bibliography reaffirms that Ivanov was the first one to discover a magnetic isotope effect in a similar enzymatic process. I must quote an adaptation of an automatic translation from Russian, hoping that the original text is not too badly distorted:

«It should be noted that a particularly pronounced activating effect of the isotope 25 of magnesium on enzymatic systems was first discovered in experiments on the assimilation by spinach leaves of $^{12}\text{CO}_2$ and $^{13}\text{CO}_2$ involving Mg^{2+} -dependent RuBisCO (24). To date, this has remained the only description of the spin-selective regulation of the function of an enzyme containing Mg^{2+} in the active center.»

So we know that the experiments were conducted with leaves of spinach, but do not know anything about the mysterious Ivanov. We do not know in what institute or university he works. The name Ivanov is very common in Russia and is not sufficient for identifying this author.

The three papers [1, 5, 21] have a total of ten authors, all Russians. Kuznetsov appears three times and is the first author in both the earlier papers [1, 5]. Other authors of both [1, 5] are Arkhangelsky and Orlova. These authors should be aware of the work of Ivanov from which they took the move. In [21] Buchachenko and Kuznetsov, after eight years since 2004, still felt the need to remember the work of Ivanov as a precursor to their series of studies. .

The initials A.A. correspond to an Andrey Aleksandrovich Ivanov who in the 1990s had been the companion of adventures of Kuznetsov. Today this Ivanov works in Moscow at the Vernadsky Institute. In his page on the website of the Institute, the list of his publications begins from 2003 and thus does not include the phantom titles of 2000 and 2002 (nor does it include the papers he had published together with Kuznetsov in previous years). If he had published those pioneering studies on the spinach RuBisCO, he should list them among his publications. I have written to this Ivanov asking if those two publications are his own but there was no reply.

We hope that any of the authors will resolve to provide some information about this Ivanov and to give us the possibility to access the publications containing his major contributions.

§9. *The Foundations of Varese*

In five of the early papers of the series, in the Acknowledgements sections there are these credits:

«This work was partly supported by La Sapienza Biomedica Foundation, Varese, Italy.» [1]

«This work was supported by Cesare Alba Fondazione Biomedica (Varese-Rome, Italy; grant SJ4800614-02/03), by the Russian Fund for Fundamental Research, and by the Russian Ministry of Industry, Science, and Technology.» [2]

«The work was supported by Fondazione Cesare Alba (United European Centre for Biomedical Research, Varese, Italy), grant n. SQ40081194-A/02-03, and by the Ministry of Science of the Russian Federation (grant of leading scientific schools N1P-1221.2003.3).» [4]

«This work was supported by Fondazione Cesare Alba (United European Center for Biomedical Research, Varese, Italy), grant n. SQ40081194-A/02-03.» [5]

«Financial support of the Ministry of Science of the Russian Federation (Grant NSH-1221-2003.03) and the Fondazione Cesare Alba, Italy (Grant SQ40081-A/02-03), is gratefully acknowledged.» [7]

These papers concern the early work that was conducted in 2003 (and perhaps was begun in 2002). The dates of receipt of the first version of the manuscript are February 8, 2003 [1], April 7, 2003 [2], September 16, 2003 [5], 20 February, 2004 [4] (date not specified in [7]).

So there would be two Foundations of Varese, called "La Sapienza Biomedica" and "Cesare Alba", that have financed the Russian group. The authors use Italian names correctly, apart from "Fondazione" which should be "Fondazione".

Varese is a small city in Northern Italy (Lombardy) of slightly over 80,000 inhabitants. (Note 2) It would be strange if there were two Foundations in Varese that give money to a group of Russians for studying the snake venom.

The Foundations cannot be found on the Internet. They are not on the telephone directory. I have written to the Chamber of Commerce of Varese where the Foundations are not on their lists. I consulted the website of the Province of Varese, where there is a list of the Foundations that operate in the province. I searched the website of the Lombardy Region. I also asked some other Foundations of Varese. It was all in vain. The two foundations seem to be nonexistent.

The five papers [1, 2, 4, 5, 7] have a total of ten authors, all Russians, among them Kuznetsov (5 presences), Arkhangelsky (4), Orlova (4).

If the Foundations do exist, the authors can easily prove it. For example it will suffice to provide the email address or street address of the Foundations and then I can apply to them and ask if they have provided funding to the Russians.

§10. *The model codes of the instruments*

The sections of the papers which describe the materials and methods mention the instruments used for the experiments. The brands of the instruments usually exist and are often well known. But along with the brand there is mentioned a code which identifies the particular model of the instrument. Many of these model codes cannot be found on the Internet. Here is a list, perhaps incomplete, of the model codes of instruments or materials which are referred to in the papers but are not to be found on the Internet (they only appear in connexion with the papers we are considering).

Altex 1800 [10, 11, 13, 15, 18]

Bio Quart 6M-800 [4, 5]

Bio Rad OxyAnalyser SJ80 [10, 11, 13, 15, 18]

Carlo Erba VGS Prism 2000 [1, 2, 6, 19]

Carlo Erba Prizm QLT [7]

Compaq 680 ES [5]
Dollax SR.15 [2]
Farrand XB6 [2]
Farrand XL30 [10, 13, 15, 18]
Farrand FarrSpec LQ 400.[5, 7]
Fuji RX40 [10, 13, 15, 18]
Gilson W100 [10, 11, 15, 18]
HP600/RX7 [5]
HP6100-J2A [10, 11, 12, 13, 15, 16, 18]
LKB SK260 [10, 11, 13, 15, 18]
Nanofinder-S16E [10, 11, 13, 15, 18]
Olivetti AS 640 [2]
Olivetti Prism DL600 [10, 11, 13, 15, 18]
Perkin Elmer 266QL HPLC [10, 11, 15, 18]
SANS 2TD [10, 15, 18]
Shimadzu Planigraph PLS - 90E [5]
Sigma Delta Chem AX2000 [10, 11, 13, 14, 15, 18]
Trident-SLC4 [16, 17]
Varian GT800 LC-MS [10, 11, 12, 13, 15, 18]
Varian SQ400 LC-MS [16, 17]
Varian XR860 [7]
Wallac 410B [10, 11, 15, 18]
Wallac 410VB [13]
Zeiss DX800-B6 [10, 11, 13, 15]
Zeiss QL 400 [1, 2, 6, 19]
Zelenograd-ERA M3 [10, 11, 15, 18]

I cannot state that these instruments do not exist because it would be necessary to consult all the catalogues of these brands that have been compiled over the years in all countries. I merely record the very singular fact that these particular models of instruments seem to be an exclusive of our authors. By searching with Google Scholar, one finds these models only in the very papers we are examining. That is, there are no papers by other authors that mention the same models of instruments. (Note 3)

Perhaps in some cases the authors misspelled a model code but often the same code is repeated in several papers without a correction.

In some cases, from one paper to another a model code is written with slight variations, for example, there may or may not be a space between two letters. I have not listed the variants as separate models but of course have always checked on the Internet.

In five papers [10, 11, 13, 15, 18] it is stated that an Olivetti mass spectrometer has been used and in one case [11] the Olivetti company is located in Varese, Italy. The model of the instrument is always indicated as "Prism DL600." For example:

«Estimations of magnesium stable isotopes (^{25}Mg , ^{24}Mg , ^{26}Mg) were carried out in the Olivetti Prism DL600 isotope mass spectrometer (Olivetti, Varese, Italy) suitable for studies on heterogeneous samples of biological origin.» [11]

As far as I can tell, the Olivetti firm has never produced mass spectrometers. There may be an Olivetti computer coupled to a mass spectrometer (of different brand) to collect the data, but the fact remains that the model code "Prism DL600" does never surface on the Internet, neither for mass spectrometers nor for other instruments, neither for the Olivetti brand nor for other brands. In addition, the Olivetti company has never had head offices or manufacturing facilities in Varese. In a paper [2] the Olivetti brand is mentioned for a computer coupled to a spectrometer

manufactured by another company ("Farrand XB6 diffraction detector"):

«All data on the mercury isotopic composition were treated by a processing of the resulting mass spectra in the Olivetti AS 640 computation system.» [2]

The combination of such types of instruments would be plausible, but the particular models for either brands, Olivetti AS 640 or Farrand XB6, are not to be found on the Internet.

In some papers [1, 2, 6, 19] an instrument of the Carlo Erba brand is mentioned as "VGS Prism 2000 elemental analyzer gas-isotope ratio mass spectrometer." For example:

«An isotope mass spectrometry method has been employed for $^{24}\text{Mg}/^{25}\text{Mg}/^{26}\text{Mg}$ ratio values estimation in CK combusted samples using the VGS Prism 2000 elemental-analyser gas-isotope-ratio mass spectrometer (Carlo Erba, Italy).» [1]

Perhaps in this case there might be the coupling of two instruments, one of the Carlo Erba, not detailed, and a mass spectrometer of the firm "VG Isotopes". The latter company produces an instrument called "VG Prism", but I cannot find a "VGS Prism" with the addition of an "S" as a third letter.

In the other cases, I cannot guess where the model codes come from.

Suspicious are increased because in several cases the citation of an instrument is associated with a bibliographic reference to a publication that does not seem to exist, as we shall see in §16.

I mention here the problem of the instruments only provisionally as a clue to possible future investigations. If it will be concluded that some of these instrument models do not exist, the authors will try to provide an explanation. Mention of these instruments or materials are scattered over several papers. In total, the papers that figure in the above list of models are sixteen and involve many authors. The most frequent authors are Kuznetsov (16 presences), Orlova (11), Buchachenko (10), Amirshahi (8), Alyautdin (6), Rezayat (6), Sarkar (6), Arkhangelsky (5).

§11. *Altered bibliographical references*

Not infrequently in the bibliographies of the papers there are minor inaccuracies in citations of the names of authors of publications or in other data. In some cases, however, the changes are so serious as to suggest that they are intentional and not due to accidental errors of inattention or carelessness.

We begin with an example where the alterations might still be explained if there was confusion in transcribing the data. In [3] there is this bibliographical reference:

«Goerg A, Weiss W. 2-D Proteome analysis protocols. In: Link AJ, ed. *Methods in Molecular Biology*. Tomawa, New Jersey: Humana Press; 1999: 112, 235-44.» [3]

At first sight, it seems that the two authors have written the chapter "2-D Proteome analysis protocols" that is included in a book titled "Methods in Molecular Biology". Instead, the correct citation would be:

Angelika Görg, Walter Weiss: Horizontal SDS-PAGE for IPG-Dalt. In: Andrew J. Link (ed.), *2-D Proteome Analysis Protocols*. Humana Press, Totowa, New Jersey, 1999. Pp. 235-244.

So "2-D Proteome analysis protocols" is not the title of a chapter but of the whole book, while it was not necessary to cite "Methods in Molecular Biology" which is the title of the series of volumes to which this one belongs. There is also the mistake of "Tomawa" instead of "Totowa".

Also in the next example a chapter is quoted from a collective volume, but this time the changes are

so important that they do not appear to be explainable by carelessness. This reference is in the bibliographies of several papers [10, 11, 13, 15]:

«R. Mahatoo, Biological membranes and barriers. In: I. Telashima and J.A. Waugh, Editors, *Biomaterials for Delivery and Targeting of Proteins and Nucleic Acids*, CRC Press, Boca Raton, FL (2005), pp. 241–260» [11]

(In three of the citations the place of publication has been moved to New York, but we disregard this.)

The exact reference would be instead:

Yadollah Omid and Mark Gumbleton: Biological membranes and barriers. In: Ram I. Mahato, ed, *Biomaterials for delivery and targeting of proteins and nucleic acids*. CRC Press, Boca Raton, Florida, 2005. Pp. 220-263.

Thus the two titles of chapter and book are exact, as well as publisher, date and place of publication. But Ram I. Mahato (not Mahatoo) is not the author of the chapter but the editor of the book instead of Telashima and Waugh, the latter two names being absent from the book. Chapter 7 (pp. 220-263) has just the title "Biological membranes and barriers" but the authors of the chapter are Yadollah Omid and Mark Gumbleton, two names that are not mentioned in the bibliographical reference we are considering. It seems to me that such substitutions in the names of authors or editors are not accidental errors but are the result of deliberate alterations. Having accurately reported the chapter and book titles, the publisher, the place and the year, our authors had the book at hand or had the correct data available. One wonders why they have totally altered the situation for the names of authors and editors. Certainly it is not for inattention that they have introduced the two names Telashima and Waugh which are not mentioned anywhere in the book. Moreover the same two names appear in other suspects references as we shall see.

Three of the papers containing this references are of 2008 and are signed by the same eight authors, with first author Amirshahi. The fourth paper is of 2009 and has fourteen authors, eight as before plus other six, with first author Rezayat. In all four papers among the authors there are Buchachenko and Kuznetsov. One wonders how is it possible that none of these many authors has noticed the alterations in the reference.

As a third example we have a book in Russian, printed in 2006 in St. Petersburg by the publisher Rostok. In some references the book is cited with the title translated into English:

«Piotrovsky LB, Kiselyov OI (2006). *Fullerenes in biology: on the way towards nanomedicine* (In Russian). Rostok Publication, St. Petersburg.» [10, 13, 14, 15]

Indeed there is a Russian book with a title which if translated into English corresponds to the title cited here, with authors whose names can transcribed from Cyrillic as Piotrovsky and Kiselyov (or Kiselev). Also the year 2006, the publisher Rostok and the place St. Peterburg are correct. This book is properly cited in the bibliographies of four papers [10, 13, 14, 15]. But in two other papers [11, 12] the references are as follows:

«Piotrovsky LB, Kiselyov OI. *Biological Effects of Fullerenes*. Raleigh-Durham, NC: Research Triangle Press;2008.» [11]

«Piotrovsky L.B., Kiselyov O.I. *Fullerenes in Biology: On the Way Towards Nanomedicine*. Durham, NC: Triangle Press, 2006.» [12]

One might think of two successive editions of the book translated into English with slightly

modified titles and published in America. But if these English editions exist, they should be easily found on the Internet, whereas they are not traceable. We shall meet again the publisher "Research Triangle" in other suspect cases.

In both papers [11, 12] the first author is Amirshahi, which is also present (three times as first author) in the four instances where the book is quoted correctly in the Russian edition.

We come to the next example:

«Isel, C., Ehresmann, B., Ehressmann, C., Marquet, R. (1999). *Medicinal Chemistry*. Adler & Adler: Sydney-Melbourne.» [19]

The four authors exist (after correcting Ehressmann to Ehresmann) and have published together (and with other authors) several biology papers. But this book does not seem to exist. The words "Medicinal Chemistry" appear in the title of several books, but not associated with these authors or this publisher. A publisher named Adler & Adler exists but is in America (Maryland), not in Australia. On the other hand the citation of four authors that are associated with each other in various papers suggests that this reference has a basis in some real publication but something in the title or the publisher has been changed. The authors of [19] (six authors with first name Buchachenko) would not have guessed the four names, precise even in the initial, if they had totally invented the reference. Perhaps the publication might be a paper in a journal rather than a book. More than one journal has the words "Medicinal Chemistry" in the title. These authors, Isel et al., have sometimes published in the journal *Bioorganic & Medicinal Chemistry*. In the next example the title of a paper has been changed. In several papers we find this:

«M.M. Bradford, An improved colorimetric technique for protein measurement, *Anal. Biochem.*, 72 (1976) 348-354.» [1, 10, 11, 13, 15, 19]

The correct citation would be:

Marion M. Bradford: A rapid and sensitive method for the quantitation of microgram quantities of protein utilizing the principle of protein-dye binding. *Analytical Biochemistry*, 72, 1976, 248-254.

We see that the title has been changed. The page numbers are shifted by exactly one hundred. Pages 348-354 are in the same journal issue, but with papers by other authors. The one on pages 248-254 is the only paper by Bradford in this journal issue.

In other papers (including [12, 14]) the citation of Bradford is in abbreviated form without the title but with the correct page numbers. In a 2010 paper (not listed here), with first author Buchachenko, Bradford's paper is quoted correctly also in the title.

We close with another example of change of the title. The reference is:

«Galkin, M.A., Syroejkin, A.V. (1999). Molecular mechanisms of the ATP synthase activity control. *Biochemistry (Moscow)*, 64, 1176-1185.» [19]

The exact reference should be:

Galkin M.A., Syroeshkin A.V.: Kinetic mechanism of ATP synthesis catalyzed by mitochondrial $F_0 \times F_1$ -ATPase. *Biochemistry (Moscow)*. 64, 1999, 1176-1185.

The title is different. The original version of this paper was published in Russian and we have to check if the change in the title may be due to an ambiguity in the translation from Russian to English.

This paper appeared in the Russian journal "Биохимия" that publishes original papers in Russian.

The papers are almost simultaneously reprinted in an English translation of the journal with the title *Biochemistry*. The reference to the paper that I have reported as exact is the one as printed in the English version of the journal.

I have checked the original Russian title in the Russian version of the journal. It turns out that the title in the English version of the journal is a literal translation of the Russian original (except that instead of "synthesis" the Russian title has the equivalent words "synthesis reaction"). Therefore the different title in the reference of [19] is not due to the fact that the authors had seen only the Russian version and had given their own translation into English.

The page numbers cited in the reference of [19] are exactly those of the English version of the journal (in the Russian version the page numbers are different). Thus our authors should have had the English version available but have not copied the title.

The name of the second author of the paper is "Сыроежкин" in the original Russian version. In the English version of the journal it is "Syroeshkin" which is the standard transliteration (in English). In [19] our authors write "Syroejkin" and this is wrong. (Note 4) The misspelling of this name is sufficient for misleading the search engines of Internet. If one searches with Google Scholar for the pair of names Galkin and Syroejkin, one finds only the paper [19]. Google retrieves only four more webpages which have nothing to do with biochemistry.

§12. Overall substitution of the titles of papers

We consider the bibliography of a 2006 paper [8] by Buchachenko and Kuznetsov. The bibliography has 26 references. The numbers 1, 5, 11, 12, 13, 15, 18, 22 are in Russian in the original and I have not checked them owing to the difficulty of searching the Internet in Cyrillic. We exclude also n. 17 that was listed as "in press" but does not seem to have been published, at least not with that title.

The remaining seventeen numbers of the bibliography are to papers in English. For these seventeen papers the titles have *all* been changed!

Four of these, the numbers 14, 16, 19 and 20, are references to papers by Buchachenko or Kuznetsov themselves. For these four papers the titles are only a bit changed but remain on topic. For the other thirteen papers, the change is radical and the new titles have no connection with the right title nor with the content of the paper.

In the following list we compare the seventeen references as given in [8] with the correct titles. For each pair of references, the first is the right one, the second (marked BK and with the number as in the bibliography of [8]) is as quoted by Buchachenko and Kuznetsov.

It will be noted that, apart from small errors that may be due to carelessness, the names of the authors, the title of the journal, the volume number, the year of publication and the first page are all correct. (For the last page of each paper, there are errors.) Therefore the papers can be identified without ambiguity and Buchachenko and Kuznetsov had to know them if they gave all the correct data apart from the title. But they have replaced each title. For their own papers the changes are slight. As for the papers by other authors, the titles are completely reinvented.

-- George Oster and Hongyun Wang: Why Is the Mechanical Efficiency of F1-ATPase So High? *Journal of Bioenergetics and Biomembranes*, 32 (5) (2000) 459-469.

-- [BK] 2. Oster G., Wang H. 2000. On the protein dynamics shift in enzyme catalytic activity control. *J. Bioenerg. Biomembr.* 32, 459-465.

-- George Oster, Hongyun Wang: Reverse engineering a protein: the mechanochemistry of ATP synthase. *Biochimica et Biophysica Acta*, 1458 (2000) 482-510.

-- [BK] 3. Oster G., Wang H. 2000. Nucleoside inhibitors promoted conformational changes in prokaryotic phosphotransferases. *Biophys. Biochim. Acta*, 1458, 482-494.

- Weber J, Senior AE. ATP synthase: what we know about ATP hydrolysis and what we do not know about ATP synthesis. *Biochim Biophys Acta*, 2000 May 31;1458(2-3): 300-309.
- [BK] 4. Weber J., Senior A. 2000. The substrate binding site topology modifications in recombinant and intact metalloenzymes. *Biophys. Biochim. Acta*. 1458, 300-307.
- Yasuda R, Noji H, Yoshida M, Kinosita K Jr, Itoh H. Resolution of distinct rotational substeps by submillisecond kinetic analysis of F1-ATPase. *Nature*. 2001 Apr 19;410(6831): 898-904.
- [BK] 6. Yasuda R., Noji H., Yoshida M., Kinosita K., Itoh H . 2001. On the rotary mechanism in the bacterial ATPsynthase functioning. *Nature*, 410, 898-904.
- Noji H, Yoshida M. The rotary machine in the cell, ATP synthase. *J Biol Chem*. 2001 Jan 19;276(3):1665-1668.
- [BK] 7. Noji H., Yoshida M. 2001. Potassium pumping in the ATPsynthase activity affected by synthetic non-nucleotide inhibitors. *J. Biol. Chem.*, 276, 1665-1671.
- Sambongi Y, Iko Y, Tanabe M, Omote H, Iwamoto-Kihara A, Ueda I, Yanagida T, Wada Y, Futai M. Mechanical rotation of the c subunit oligomer in ATP synthase (FOF1): direct observation. *Science*. 1999 Nov 26; 286(5445):1722-1724.
- [BK] 8. Sambongi Y., Iko Y., Tanabe M., Omote H., Iwamoto-Kihara A., Ueda I., Yanagida T., Wada I., Futai M. 1999. The eucaryotic ATPsynthase rotary nanomechanics study. *Science*, 286, 1722-1727.
- Rondelez Y, Tresset G, Nakashima T, Kato-Yamada Y, Fujita H, Takeuchi S, Noji H. Highly coupled ATP synthesis by F1-ATPase single molecules. *Nature*. 2005 Feb 17; 433(7027):773-777.
- [BK] 9. Rondelez Y., Tresset G., Nakashima T., Kato-Yamada Y., Fujita H., Takeuchi S., Noji H. 2005. The flexibility of the ATPsynthase molecular motion and the reverse reaction control. *Nature*, 433, 773-777.
- George Oster: Darwin's motors. *Nature*, 417 (2002), 25
- [BK] 10. Oster G. 2002. Towards a novel approach to the energy turnover control in eukaryotes. *Nature*. 417, 25-29.
- Anatoly L. Buchachenko, Dmitri A. Kouznetsov, Stanislav E. Arkhangelsky, Marina A. Orlova, Artyom A. Markarian. Spin biochemistry: Magnetic ²⁴Mg-²⁵Mg-²⁶Mg isotope effect in mitochondrial ADP phosphorylation. *Cell Biochemistry and Biophysics*, 43 (2) (2005), 243-251
- [BK] 14. Buchachenko A.L., Kouznetsov D.A., Arkhangelsky S.E., Orlova M.A., Markaryan A. 2005. Spin biochemistry: mitochondrial phosphorylation as the magnesium-related nuclear spin selective process. *Cell. Biochem. Biophys.*, 2005. 48, 886-894.
- Buchachenko AL, Kouznetsov DA, Arkhangelsky SE, Orlova MA, Markarian AA. Spin biochemistry: intramitochondrial nucleotide phosphorylation is a magnesium nuclear spin controlled process. *Mitochondrion*. 2005 Feb;5(1):67-9.
- [BK]16. Buchachenko A.L., Kouznetsov D.A., Arkhangelsky S.E., Orlova M.A., Markaryan A. 2005. Spin biochemistry: magnesium-related magnetic isotope effect in mitochondrial ATP synthesis. *Mitochondrion*, 2005. 5, 67-70.
- Anatoly L. Buchachenko. Magnetic Isotope Effect: Nuclear Spin Control of Chemical Reactions. *The Journal of Physical Chemistry A*, Volume 105, Number 44, November 8, 2001, 9995-

10011.

-- [BK] 19. Buchachenko A.L. 2001. A survey on the chemical aspects in the nuclear magnetic isotope effect studies. *J. Phys. Chem.*, A105, 9995-10004.

-- Anatoly L. Buchachenko, Dmitri A. Kouznetsov, Alexandre V. Shishkov. Spin Biochemistry: Magnetic Isotope Effect in the Reaction of Creatine Kinase with CH₃HgCl. *J. Phys. Chem. A*, 2004, 108 (5), pp 707–710

-- [BK] 20. Buchachenko A.L., Kouznetsov D.A., Shishkov A.V. 2004. Spin biochemistry: a magnetic isotope effect of mercury in the methylmercury chloride reaction with creatine kinase. *J. Phys. Chem.*, A108, 707-711.

-- Lahiri SD, Wang PF, Babbitt PC, McLeish MJ, Kenyon GL, Allen KN. The 2.1 Å structure of *Torpedo californica* creatine kinase complexed with the ADP-Mg(2+)-NO(3)(-)-creatine transition-state analogue complex. *Biochemistry*. 2002 Nov 26; 41(47): 13861-13867.

-- [BK] 21. Lahiri S., Wang P., Babbit S., Mcleish M., Kenyon G., Allen K. 2001. Dehydration of the creatine kinase nucleotide binding site in the enzyme function control studies. *Biochemistry*. 41, 13861-13868.

-- Weber J, Senior AE. ATP synthesis driven by proton transport in F₁F₀-ATP synthase. *FEBS Lett.* 2003 Jun 12;545(1):61-70.

-- [BK] 23. Weber J., Senior A. 2003. Eucaryotic ATPsynthases. Catalytic domains and the activity regulation. Brief review. *FEBS Lett.*, 545, 61-65.

-- Cohn M. A study of oxidative phosphorylation with O¹⁸-labeled inorganic phosphate. *J Biol Chem*. 1953 Apr;201(2): 735-750.

-- [BK] 24. Cohn M. 1953. Oxygen transfer in oxidative phosphorylation: Orthophosphate and water participation study. *J. Biol. Chem.*, 201, 735-738.

-- Merli A, Szilágyi AN, Flachner B, Rossi GL, Vas M. Nucleotide binding to pig muscle 3-phosphoglycerate kinase in the crystal and in solution: relationship between substrate antagonism and interdomain communication. *Biochemistry*. 2002 Jan 8;41(1): 111-119.

-- [BK] 25. Merli A., Szilagyí A., Flachner B., Rossi G., Vas M. 2002. Pig kidney phosphoglycerate kinase: the catalytic site function. *Biochemistry*, 41, 111-118.

-- Flachner B, Kovári Z, Varga A, Gugolya Z, Vonderviszt F, Náráy-Szabó G, Vas M. Role of phosphate chain mobility of MgATP in completing the 3-phosphoglycerate kinase catalytic site: binding, kinetic, and crystallographic studies with ATP and MgATP. *Biochemistry*. 2004 Mar 30; 43(12): 3436-3449.

-- [BK] 26. Flachner B., Kovari Z., Varga A., Vas M. 2004. Pig muscle phosphoglycerate kinase in the energy metabolism control. *Biochemistry*, 43, 3436-3441.

The paper by Lahiri et al. had already been cited in the bibliography of a 2004 paper [1] by Kuznetsov et al. In [1] the title was correct (apart from the oversight of “*California*” instead of “*Californica*”). Also the year was exact, 2002 and not 2001. There was also the exact name of the author Patricia C. Babbitt, which here is Babbit. The same paper by Lahiri et al. is also quoted in other papers by Buchachenko and Kuznetsov of 2004 [2] and 2005 [6]. Therefore Buchachenko and Kuznetsov were well acquainted with the paper by Lahiri et al.

In the references there are several errors in the number of the last page of a paper, while the first page is usually right. For Oster's 2002 paper in *Nature*, Buchachenko and Kuznetsov indicate pages 25-29, while the paper is all on page 25.

How to explain this behavior by Buchachenko and Kuznetsov? I can only suppose that they were joking. It is a fact that they have substituted the titles of all the papers (in English) in the

bibliography. They had to have the right data of the papers at hand, if they knew the authors, the journal, the volume, the year and the first page. If they copied from a list of references in abbreviated form and lacking the titles, they could easily retrieve the titles by searching the Internet (like I have done).

The journal where this paper [8] has been published is a Russian journal that publishes both the Russian and the English versions of each paper. I also checked the bibliography of the Russian version and the references are the same, except that the references to papers in Russian are in the original Cyrillic while in the English version of [8] they are translated. The references to papers in English, those we have here considered, are identical in the Russian and English version of [8]. Thus the changes in the titles are not due to problems in the translation stage.

§13. *The list of references to untraceable publications*

I tried to verify the existence of the publications cited in the bibliographies of the papers. It turns out that there are numerous references to seemingly untraceable publications. It would seem that these references have been fabricated.

Of course I cannot be sure that each publication is nonexistent. I can only say that I have thoroughly searched for the publications, using the resources available on the internet, but have not found them. It is quite possible that some publications do exist but have escaped my search.

For publications in book form, if a quote is exact in the names of the authors and the title of the book, it is easy to check its existence on the Internet. We speak of books which are not ephemeral but are worthy of citation in scientific papers and are internationally circulated. So for the references to books it seems likely that, save for exception for special reasons, those listed here are actually fake references to non-existent books.

The situation is more uncertain for papers in scientific journals because there is a huge number of journals and those of minor importance may not be easily traceable. The difficulty increases if the reference is in abbreviated form without the title of the paper. In addition there may be ambiguity in the abbreviations used for journal titles. However I have searched carefully for the names of the journals, the titles of the papers (when mentioned), the combinations of the names of the authors. If I cannot exclude that in some cases an existing paper has escaped my search, I trust that these are rare and isolated cases.

Altogether the situation is such that it is reasonable to doubt that the references are generally accurate and so it seems legitimate to ask the authors to provide evidence for the existence of the publications. If the publications do exist, it will be easy for the authors to prove it. To begin with, they may provide a street address or an email address of the publishers or of the journals that I have not tracked down. For the journals, they may indicate a website listing the contents of the volumes. Some references are repeated several times in the bibliographies of various papers. Sometimes a reference is repeated from paper to paper with some variations. I have not inserted in the list the repetitions when the variations are negligible, while in other cases I have also included the variants. This list does not include the references we have already seen in the two preceding sections (§11 and §12). It can instead include some of the references that will be repeated in the following sections.

Here is the list of the references to seemingly untraceable publications. As usual, numbers in square brackets refer to the list of papers at the end of this text.

The list contains 37 references. Counting also the repetitions in the bibliographies of various papers, the number is 69.

Arno, J. J., Ballot, J. K., Sawell, J., Tomeshima, A. S. & Okada, J. (1996) *J. Appl. Enzymol.* 16, 486-496. [6]

Arno, J.J., Ballot, J.K., Sawell, J., Tomeshima, A.S., Okada, J. (1994). Measurements of the mammalian skeletal muscle PGK specific activity. *J. Appl. Enzymol. Biotechnol.*, 16, 486-492. [19]

H. Bielka, K. Lottmeyer, K. Roetzsch, O. Schumm, D. Wietzel, M. Rauch, The human blood cells biomass in a drug metabolites uptake screening, *Clin. Exp. Pathol.* 16 (1996) 444–458. [10, 11, 13, 15]

Radioimmunoassays and Related Analytical Techniques. Technical manual by Bio-Rad, Bio-Rad Press, Durham, St. Petersburg, 2006. [10, 11, 13, 15]

Bouchet JS, Telashima O. *Metal ions detection in biomedical studies. Fundamentals and applications*. Alba Regia Szeged-Budapest 1999. [1]

Davis, K.L. (1979). *Electrophoresis*. McMillan Publ.: New York-Totonto [sic]-Sydney [6, 19]

Devenyi J, Gergely A. Native and denaturing protein electrophoresis in biophysical enzymology. In: Waugh SE, Leder JD, eds. *Advanced Enzymology*. Vol 2. Budapest-Prague-Ljubliana: Alba Regia; 1989: 476-489. [3]

Dunnett, A. S., Rosenbrough, J. S., Barthels, A. K. & Donowaugh, S. S. (1999) in *Biometrics* (Research, Raleigh-Durham, NC), pp. 100-111. [6]

Dunnett, A.S., Rosenbrought, J.S. (2001). *Biometrics*. Research Triangle Press: Durham, NC [19]

Dupont, T., Berthault, J., Pitot, H. (2002). *Organomercurials*. University of Ghent Publ.: Ghent-Brussels. [19]

Dupret, J. J. and Pitot, H. (1997) *Intern. J. Med. Forens. Chem.* 6, 144–150. [7]

Gergely, A.S., Bardizh, M.S. (1999). *Protocols in Applied Enzymology*. Szeged University Press: Szeged-Budapest. [19]

M. Gergely, I. Lakatos, *Molecular and Cellular Cardiology*, Alba Regia, Budapest, Szeged, 1999. [10, 11, 13, 15, 20]

Gergely M, Molnar J (2006). *Allometric Extrapolation in Drug Safety Studies*. Szeged University Press: Szeged-Budapest [16, 17]

A.P. Gladyshev, R.R. Asmolov, G.V. Trepova, S.K. Larionov, D.T. Sumarokov, Autoradiography of the ⁵⁹Fe-labeled organelle supplemented with an electronmicroscopic track study, *Bull. Exp. Biol. Med.* 58 (1997) 668–674. [10, 11, 13, 15]

Hranic, G. and Milutinovic, Z. (2002) *Acta Biol. Med. Slovenica*, 8, 601–608. [5, 7]

R. Hudson, C. Mallroy, S. Darnell, K.M. Smith, Porphyrin conjugates in photo-immunotherapy, *Br. J. Cancer* 93 (2006) 1442-1450. [10, 11, 13, 14, 15]

Ivanov, A. A. Recent criticisms on the radiocarbon method accuracy in the light of biofractionation of C-isotopes and related molecular phenomena studies. In: *Advances in Archaeological Biomaterials Research* (Ed. T. Baglioni). University Press: Turin, 2000, pp.

70-92 [1, 21]

A. A. Ivanov, *Biofractionation of Carbone [sic] Isotopes and Photosynthesis* (Turin Polytechnical University Press, Turin-Varese-Milan, 2002). [5]

D. A. Kouznetsov and J. J. Brochard, *Progr. Mol. Pharmacol. Toxicol. Res.* 22, 680 (1999). [5]

J. Larchmont, T. Shallborough, O. Telashima and H. Pitot, *Progr. Mol. Pharmacol. Toxicol. Res.*, 1999, 16, 886 [9]

Larsky, O. V., Podobed, K L., Klein, R. G., and Bernstein, R. R. (1999) *J. Pharm. Chem.* 30, 991-998. [7]

Laquettes, J. K., De Dreux, J. T., Berthault-Greouvexelle, A. S., Dupont, T. & Pitot, H. (2002) in *Analytical Techniques in Organomercurial Studies*, ed. Braundt, G. (Antwerp Univ. Press, Antwerp, Belgium), pp. 89-112. [6]

O. J. Lottrell, S. Thaler, and D. O'Neal, *Mol. Cell. Pathol.* 18, 441 (2003). [5]

Lody, K. S., Loevenhaupt, K., Gergely, A. S. (2000) *J. Biophys.* 44 , 261-267. [6]

N. Logham, S.M. Pratt, J.A. Crowdell, A. Rodriguez, T. Drumm, P. Wladczewski, Aromatic and Heterocyclic Derivatives of Fullerene-C₆₀ in the Biological Compartments Distribution Study. Pharmacokinetics and Pharmacodynamics Regularities, in: W. Rattenau, H. Gorowitz (Eds.), *Perspectives in Xenobiochemistry*, Jagellon Academia Press, Krakow, Poznan, 2008, pp. 467-481. [10, 15]

K. Lowenhaupt, S. J. Troll, T. Ornelli, D. Moulin-Rochas, D.A. Kouznetsov. *Canad. J. Gen. Pathol.* 38, 1008-1017 (2003). [5]

Milutinovic D, Slonimski V, Gergeli L (2007). *Population Dynamics in Cell Biology and Toxicology*. Alba Regia : Szeged-Budapest. pp. 101-122. [16, 17]

Moudy J.S., Barthelrough T.O. *J. Pharm. Chem.* 1986. V. 19. P. 610-618. [4, 5]

Niemer A, Liebig G, Barthelrough AH. On the combined affinity and ion exchange sorption processes in preparative chromatography of metalloenzymes. *Prog Royal Acad Sci (Ghent)*. 1998; 58: 661-7. [3]

Okada, O., Telashima, S., Satoh, M., Namura, S., and Matsushita, I. (2000) *J. Japan Pharm. Soc.* 58, 211-218. [4, 5, 7]

Orchaev, S. K., Byrkov, S. T. & Allershayev, S. K. (2003) *Spectrometry*, eds. Ionov, S. K., Levadova, P. S. & Lomonosov, M. V. (Moscow State Univ. Press, Moscow). [6]

Orchaev, S.K., Byrov, S.T., Allershayev, S.K. (2003). *Spectrometry in Inorganic Chemistry. II. Metals*. Sofia University: Sofia. [19]

Rattenau W, Lutze T, Gotlieb D. On the venom kinases vascular and intravascular effects. *Bull Exptl Biol Med.* 2001; 61: 222-6. [3]

L. S. Sarcar and T. Lemke, *Biostatistics* (Alba Regia, Szeged-Budapest, 1980) [5]

B. Sieliwanowicz, L. Skrob, and A. Mlody, in *Mitochondria*, Ed. by R. Novotny and K. Bolek (Jagellonski University Press, Krakov, 1990), pp. 109-132. [4, 5]

T. Waugh, H. Telashima, *Mitochondria*, Research Triangle Publ., Raleigh, Durham, NC, 2004. [10, 11, 13, 15, 18]

§14. *Alba Regia and other publishers*

The above list includes five books of the publisher "Alba Regia" (Bouchet & Telashima; Dévényi & Gergely, Gergely & Lakatos, Milutinovic et al; Sarcar & Lemke). A sixth book (Wallenberg) will be found in the doctoral thesis of Nima Amirshahi (§15).

Alba Regia is the ancient Latin name of a Hungarian city now called Székesfehérvár. A publisher with the name Alba Regia is not to be found on the Internet. Considering that it is supposed to have published at least six scientific books that are worthy of international citation, surely the publisher, if it existed, would be traceable on the Internet. But I have not found any mention of a publisher with that name, nor I have found the titles of the books associated with the names of the authors as given in the references.

There is a journal of archaeology with the title *Alba Regia* which is published by a museum of Székesfehérvár, but those cited by our authors are books, not journal papers, and do not deal with archaeology.

The authors place the publisher Alba Regia in "Budapest-Szeged" or "Szeged-Budapest" (Szeged is another city in Hungary). For one book (Dévényi & Gergely) they place Alba Regia in "Ljubljana-Budapest-Prague", that is in the capital cities of three states with three different languages.

The three-capitals book is quoted in a paper [3] by Kuznetsov, Arkhangelsky, Markarian and Orlova. It will be easy for them to provide an address of the publisher for at least one of those cities. It is mandatory for them to provide their readers with a means to access the Dévényi & Gergely book of Alba Regia because the reference in their paper is not a trivial one. They refer to that book for a description of a procedure they used in the experiment. They write.

«To prove the purity and the monomer nature of enzyme isolated, its samples were analyzed electrophoretically in both 0.5% SDS-containing and SDS-lacking 10% polyacrylamide slab gels (0.15 x 8.5 x 8.5 cm) using a standard 35 mM Trisglycine (pH 8.80) separation system.⁷»
[3]

At n. 7 of the bibliography there is just the Dévényi & Gergely reference to a chapter at p. 476-89 of the Alba Regia book edited by Waugh and Leder. (Note 5) Apart from Alba Regia, there are numerous other cases where, for the details of an experimental procedure, the authors refer to a seemingly nonexistent publication, and we shall see some examples in §16 and §17. At least in these cases, it is necessary for the authors to provide some information that allows tracing the publications.

The quotations of the books of Alba Regia extend from 2004 to 2011 in the bibliographies of ten papers. The first authors of the papers are Kuznetsov (5 times), Amirshahi (3), Rezayat (1) and Hosseini (1). For these ten papers the total number of authors is 32. Those more often present are Kuznetsov (9 presences), Orlova (7), Amirshahi (6), Rezayat (5), Alyautdin (4), Buchachenko (4), Sarkar (4), Trushkov (4).

If the publisher Alba Regia really exists, it will be very easy for the authors to prove it. For example, it is sufficient that they provide an address and I will contact the publisher and ask if they have published those six books. Just because it seems unlikely that this publisher exists, it is more urgent that the authors provide a proof of its existence. If they will not give an explanation, we have

a unique case in which 32 authors repeatedly mention several books of a publisher that does not exist.

As a curiosity, I may add that in 2000 Kuznetsov sent me his curriculum including a list of his publications updated to 1999. At n. 38 of the list one finds:

«Kouznetsov, D.A. (1992) Laboratory models and aincient [sic] biomolecules: a quest for epistemological re-evaluation. In: Ageing of materials (Brotashenkova, V.L., Ed.), Alba Regia: St. Petersburg, pp. 45-67 (in Russian).»

So Kuznetsov would have written a chapter of 23 pages for a book published by Alba Regia, but this time the place is not in Hungary but in Russia in St. Petersburg. Thus, so far we have found seven books of a publisher (or of various publishers with the same name) located in five cities of four countries.

On the Internet the name Brotashenkova, the presumed editor of this book, does not appear at all (not even the male form Brotashenkov), at least with this writing in Latin alphabet. I also tried a few variations in spelling, but without success. I tried to reconstruct the word in Cyrillic, getting "Бротащенкова" but this word is totally unknown on the Internet.

I searched for a publisher Alba Regia of St. Petersburg. I also used the name in Cyrillic, which is "Альба Регия". I have not found a publisher but the search in the Cyrillic websites is difficult for me. Surely, nothing is to be found on the Internet by combining, in Cyrillic alphabet, the name Alba Regia and the surname Kuznetsov with his name or his initials.

For two books in the list of §13 (Dunnett et al; Waugh & Telashima), as well as a book we have seen in §11 (Piotrovsky) and one given below in §15 in the thesis of Amirshahi (Leder), the publisher is variously referred to as:

Research, Raleigh-Durham, NC
Research Triangle Press: Durham, NC
Research Triangle Press, Raleigh-Durham, NC
Research Triangle Publ., Raleigh, Durham, NC
Triangle Press, Durham, NC
Triangle Research Park Publ., Durham, NC

"Research Triangle" is a region near the cities of Durham and Raleigh in North Carolina, so named for the presence of numerous research institutes.

There is a small publisher called Research Triangle Publications, but it started publications only very recently. In the past there may have been some similar names of publishers but they are not associated with these books.

We hope that our authors will specify more clearly which publisher they refer to.

Then there are references to books with titles in English but published by small publishers of universities in non-English speaking countries. In the list there are two books that were published by University Press of Szeged, Szeged, Hungary (Bouchet & Telashima; Gergely & Bardizh). I wrote to that publisher and they answered that they have not published those two books. Together with the five books of Alba Regia, we have seven books from Hungary, a strangely high number, Among the authors or editors of the Hungarian books, the name Gergely (with various initials) recurs five times.

I also wrote to the Antwerp University Press (based in Brussels) and they said they did not publish the book mentioned in the list (Laquettes et al).

Two books are cited as published by Jagellon Academia Press, Krakow, Poznan (Logham et al) and by Jagellonski University Press, Krakov (Sieliwanowicz et al). A University of Kracow is named Uniwersytet Jagielloński, or Jagiellonian University in English. Our authors seem to refer to a Jagiellonian University Press, to which I have written without receiving an answer. It is a small publishing house that publishes books in Polish.

I also contacted a website of the University of Ghent asking if they know a book (Dupont et al) published by a "University of Ghent Publ., Ghent-Brussels" which does not seem to be identifiable. I have not yet been answered.

§15. *The doctoral thesis of Nima Amirshahi*

On the Internet there are a few pages with abstracts or partial text of a doctoral thesis in pharmacology defended in 2008 in Russia by Nima Amirshahi. The experimental work for the thesis seems to have been done in Moscow in the two medical universities, the Pirogov and the Sechenov, even if the city of Pyatigorsk (southern Russia) is also mentioned. The advisors for the thesis were other two of our authors, Kuznetsov and Alyautdin, professors respectively at Pirogov and Sechenov.

In this webpage there is an extensive compendium (in Russian) of the dissertation of Amirshahi with a bibliography of 202 titles:

<http://www.dissercat.com/content/porfirin-fullerenovye-nanochastitsy-2251mg21341pmc16-v-korreksii-mitokhondrialnykh-disfunktsii>

The compendium describes basically the same experimental work on pharmaceutical applications of the isotope 25 of magnesium that during the same period was published by Amirshahi and colleagues in some papers of our list. Here we consider only the bibliography.

In the bibliography of Amirshahi there are many references to publications that are seemingly untraceable. Here I consider only some cases which are interesting because of the similarities with the references we have found in the papers we are considering. The examples are numbered as in the bibliography. All the titles that we quote in this section, unless otherwise indicated, are untraceable and might be added to those already listed in §13.

«1. Leder, K.M. Experimental Pathology Models / Leder K.M., Waugh S.J. -Durham, NC: Triangle Research Park Publ., 1980. P. 360.»

Here is another book of the Research Triangle in Durham, after those we have already seen. The editors of this book, Leder and Waugh, in reverse order (and with different initials) are the authors of a book of Alba Regia.

«3. Liu, P.K. The nucleotide synthesis disbalance caused by some oxidative phosphorylation inhibitors in vivo / Liu P.K., Pratt D.J // Progress in Molecular Pharmacology and Toxicology Research. 2002. - V. 4. - P. 1011-1019.»

The journal is the same as for the two papers cited in [5] (Kouznetsov & Brochard) and [9] (Larchmont et al). Here in the thesis the volume 4 of the journal is of 2002, while in the papers volume 16 and volume 22 are both dated 1999. I could not check the archive of the contents because I have not found a website of the journal.

«9. The ATP deficiency related Doxorubicin side effects. A molecular basis for the drug dependent cardiotoxicity in humans / Telashima S. et al. // University of Nagoya J. of Medicine. 2008. - V. 92. - P. 1066-1075.»

The name Telashima occurs five times in the references that we have already met.

«46a. Scheller, I.E. Mitochondria / Scheller I.E. New York; Toronto: John Wiley & Sons, Inc., 1999.»

This book, *Mitochondria* by Immo E. Scheffler (not Scheller), exists and is well known. It is the reference text on mitochondria. It was published for the first time in 1999 and has had subsequent editions.

The papers that we consider often refer to the mitochondria, organelles inside the cell. It is in the mitochondria in particular that ATP is synthesized and plays its role. It is therefore natural to expect that in the bibliographies there are references to some texts on the mitochondria. In fact in the list of §13 there are two books with the title *Mitochondria* which appear in a total of seven different papers. In five cases there is a book of Research Triangle (Waugh & Telashima), in two cases of the Jagiellonian University Press (Sieliwanowicz et al). The two books, with those authors and those publishers, are not traceable.

Amirshahi is among the authors of four papers containing references to the *Mitochondria* by Waugh & Telashima of Research Triangle [10, 11, 13, 15]. Three papers are of 2008 and one of 2009.

Amirshahi is the corresponding author in all four papers and the first author in three of them. The thesis of Amirshahi is of 2008 and treats the same subject-matter and the same experimental work of those four papers. Now, if in his thesis Amirshahi cites the *Mitochondria* by Scheffler, the real one, why in the papers written simultaneously and on the same experimental work does he cite the phantom *Mitochondria* by Waugh and Telashima? We hope that he will give an explanation.

In the same four papers by Amirshahi [10, 11, 13, 15] there is also a reference to a book that we have seen in §11:

«R. Mahatoo, Biological membranes and barriers. In: I. Telashima and J.A. Waugh, Editors, *Biomaterials for Delivery and Targeting of Proteins and Nucleic Acids*, CRC Press, Boca Raton, FL (2005), pp. 241–260» [11]

As we saw in §11, the true name of the book's editor, Mahato, was replaced with the two fake names Telashima and Waugh. I suggest the hypothesis that there has been an analogous substitution also for the book *Mitochondria*. The name of the real author, Scheffler, has been changed to the fake names of Telashima and Waugh. The hypothesis seems plausible because the two fake names are the same for both books, only in reverse order. In all four papers for four times the authors invent the names Telashima and Waugh and for four times invent the names Waugh and Telashima. As to the publisher of the book *Mitochondria* by Waugh and Telashima, which would be the Research Triangle, in the paper [11] by Amirshahi et al. there is a reference to a book of that publisher (Piotrovsky, see §11) and we have seen above that a book (Leder) of the same publisher is also found in the thesis of Amirshahi. Therefore Amirshahi, or whoever, did not use much imagination in inventing the names of authors or publishers.

We do not know whom to attribute the direct responsibility of the substitutions of the names, but Amirshahi was the corresponding author for the four papers [10, 11, 13, 15] and it was his duty to check the texts. It is to be expected that he will offer an explanation.

Of these four papers, the three of 2008 [10, 11, 13] all have the same eight Iranian and Russian authors including Buchachenko, Orlova, Kuznetsov and Alyautdin (the latter two as we know are the advisors for the thesis of Amirshahi). The 2009 paper [15] has fourteen authors, the same eight as before plus other six. It is difficult to think that nobody noticed the changes of name of the author and of the publisher of the well-known book *Mitochondria* by Scheffler. (Note 6)

We come back to the references in the thesis of Amirshahi

«46b. Wallenberg, D. Urgent Pharmacology / Wallenberg D., Shatsky B.K. Szeged; Budapest: Alba Regia, 2001. - P. 623.»

This is the sixth book of Alba Regia. In papers where Amirshahi is among the authors, two books of Alba Regia are cited for a total of six citations. Here in the thesis Amirshahi adds a new one.

«40. Skrypczak, O. Occupational Hazards. Toxicity and Treatment / Skrypczak O. et al. Krakow: Jagellon Academia Press, 2000. - P. 397.»

«118. The pharmacophore properties belonging to the fullerene-C60 derivative based medicinal nanoparticles / Bremmer K. et al. // *Studia Pharmacologica Academiae Jagelloniae*. 2007. - V. 56. - P. 883-892.»

Amirshahi also adds these two new titles related to the Jagiellonian University Press of Kracow. We have seen that in the list of §13 there are two books referable to the Jagiellonian (Sieliwanowicz et

al; Logham et al). One of these (Logham et al) is in the bibliographies of two papers where the corresponding author is Amirshahi.

«122. Bradford, M.M. An improved colorimetric technique for protein measurement / Bradford M.M. // Analytical Biochemistry. 1976. - V. 72. - P. 348-354.»

«145. Bradford, M.M. A rapid and sensitive method for quantitation of microgram quantities of protein utilizing the principle of protein-dye binding / Bradford M.M. // Analytical Biochemistry. 1976. - V. 72. - P. 248 – 254.»

In §11 we saw that in several papers the authors cite a paper by Bradford changing the title and shifting the page numbers of one hundred. Amirshahi in the thesis includes both versions, the wrong one and right one.

«100. Fullerene-C60 coexistence with the human leucocytes in vitro/ Umantsev G.S. et al. // Investigations in the Blood Cells Metabolism (Deveny T. & Ruthwell J., Eds.). Sydney; Melbourne: Adler & Adler Publ., 2006. - P. 772-781.»

In §11 we have seen a book (Isel et al) of the supposed Australian publisher Adler & Adler. Here in the thesis Amirshahi has another book of the same publisher, always located in Australia:

In conclusion, I think that Amirshahi should give some explanation for the similarities between the references to seemingly non-existent publications in the bibliography of his thesis and those recurring in the series of papers we are considering. One wonders if his bibliography was compiled by Amirshahi himself or by somebody else (for example by the two advisors of the thesis, Kuznetsov and Alyautdin).

§16. *Suspect bibliographical references associated with suspect models of instruments*

It happens that in the text of a paper the mention of one of the instruments listed in §10 is associated with a bibliographical reference to a seemingly nonexistent publication. In the examples of this section, both the models of the instruments and the publications referred to do not seem to exist. In the quotations that follow, when quoting a sentence from a paper, beside the number that refers to the bibliography I have inserted the data (name of the first author) that permits to identify the publication in the list of §13. For example, in the 2004 paper [1] where the isotopic effect was first announced, the authors say:

«An isotope mass spectrometry method has been employed for $^{24}\text{Mg}/^{25}\text{Mg}/^{26}\text{Mg}$ ratio values estimation in CK combusted samples using the VGS Prism 2000 elemental-analyser gas-isotope-ratio mass spectrometer (Carlo Erba, Italy). To determine the total Mg amount in a water-redissolved acetone powder sample, atomic adsorption spectrophotometry was applied (18 = Bouchet & Telashima) (QL 400 spectrophotometer, Carl Zeiss Jena, Germany).» [1]

As can be seen in the list of §13, Bouchet & Telashima is a books of the nonexistent publisher Alba Regia. The bibliography in [1] specifies the pages 116-130 of the book. Thus the five authors of [1] should have used a method described on pages 116-130 of a non-existent book.

The same two instruments are cited in [6] with references to other untraceable publications:

«For Mg isotope ratio monitoring, isotope mass spectrometry was applied by using the VGS Prism 2000 elemental analyzer/gas-isotope ratio mass spectrometer (Carlo Erba Reagenti, Milan) (18 = Laquettes et al). To determine the total amount of Mg, atomic absorption spectrometry was performed with a QL 400AA spectrophotometer (Zeiss) (19 = Orchaev et al, Moscow).» [6]

The first reference is to a nonexistent book that is supposed to have been published by the University of Antwerp. In the bibliography the pages 89-112 are indicated. The second reference is to a book published in Moscow.

As we shall see in the next §17, the very same experiment described in [6] is again described in [19]. This time to similar sentences in the text are associated references to two books with somewhat different data, with the places of publication moved from Antwerp to Ghent and from Moscow to Sofia.

«For magnesium isotope ratio monitoring, an isotope mass spectrometry has been applied using the VGS Prism 2000 elemental analyzer/gas-isotope-ratio mass spectrometer (Carlo Erba) (Dupont et al). To determine a total amount of magnesium, atomic absorption spectrometry was performed in QL 400 AA-spectrophotometer (Carl Zeiss Jena) (Orchaev et al, Sofia).» [19]

In another 2004 paper [4] for two experimental procedures there are references to untraceable publications (Okada et al; Sieliwanowicz et al). Then for the determination of the amount of magnesium, in place of the Zeiss instrument of the previous examples, a Farrand instrument was used with reference to another untraceable publication:

«Concentration of magnesium in solutions was measured by the method of adsorption spectrophotometry (12 = Moudy & Barthelrough) using a Farrand Optical's Farr Spec LQ400 system (the United States).» [4]

In another paper [7] there is still the Farrand instrument but the reference is to another publication, always in the list of §13:

«For magnesium content monitoring, atomic absorption spectrophotometry was employed (17 = Dupret & Pitot) using the FarrSpec LQ 400 system (Farrand Optical's).» [7]

In the same paper a sentence refers to other two publications:

«In these experiments, ATP, ADP, phosphocreatine, creatine, and creatinine were identified by a standard field desorption/field ionization mass spectrometry (Varian XR860 System) (18 = Larsky et al) and by chromatographic calibration with pure standards (17 = Dupret & Pitot).» [7]

In [7] the mass spectrometry of the isotopes of magnesium is done with a Carlo Erba instrument with a different symbol, Prizm QLT. A mistake of Prizm for Prism is understandable for people used to write in Cyrillic, but also the model "QLT Prism" is itself untraceable.

«For ^{25}Mg , $^{24}\text{Mg}^{2+}$, and $^{26}\text{Mg}^{2+}$ content monitoring, the isotope mass spectrometry has been applied using the Prizm QLT Element/Isotope analyzer (Carlo Erba) (19).» [7]

Here the reference n. 19 is to the paper [1] by our authors. But if we check in [1] we find the above quoted sentence, where the spectrometry is done with another instrument of Carlo Erba (VGS Prism 2000) and there are no details nor a further bibliographical reference, so there was no reason to refer to [1].

In a sentence of [13] the bibliographical reference is inserted between the mentions of a material and an instrument, although not directly linked to them.

«For ^{59}Fe -autoradiography of isolated organelles, Fuji RX40 films were used. The negatives were subjected to microdensitometry [19 = Gladyshev et al] and the transmission electron

microscopy using a Farrand XL30 microscope.»

It may be added that in the various papers where the mass spectrometer of Olivetti is mentioned, the corresponding references are to publications by the same authors, mainly [6] and [7]. But we have just seen that in [6] spectrometry was done with an instrument of Carlo Erba (VGS Prism 2000) and with a reference to a publication that does not exist. In [7] a different instrument of Carlo Erba (Prizm QLT) was used and there is a reference to [1] where one find the VGS Prism 2000 again. In these two papers [6] and [7], there is no mention of any Olivetti instrument and one does not see the reason for refering to these papers in connection with the use of a mass spectrometer of Olivetti.

§17. *Suspect bibliographical references in a comparison between the papers [6] and [19]*

We return to the two papers [6] of 2005 and [19] of 2011 where the authors thank a Dr. L. Gergely of Szeged for having supplied the enzyme phosphoglycerate kinase (PGK) as we saw in §5. In the section "Experimental Procedures" of the 2005 paper, there are seven bibliographical references for as many steps of the procedures. Apart from a reference to the paper [1] by Kuznetsov et al, the other six references are to books or papers that do not seem to exist. In the section "Materials and Methods", subsection "PGK" of the 2011 paper, the same experiment is described. It is the very same experiment as in the 2005 paper because the graphic of the results is identical (Figure 2 of 2011 is identical to Figure 1 of 2005). Indeed the 2011 text in this subsection is practically the same as in the 2005 paper and there are, at the same points of the text, the bibliographical references. Therefore the references of 2011 should be the same as in 2005. In fact they are about the same but there are some discrepancies. Here I quote all the six pairs of references. For each pair of references, the first one is from the 2005 paper [6], the second one from the 2011 paper [19]. As one can see, in some cases there are significant differences. Also for the books or papers in the references of the 2011 paper, I cannot find any indication of their existence.

-- Lody, K. S., Loevenhaupt, K., Gergely, A. S. (2000) *J. Biophys.* 44 , 261-267. [6]

-- Gergely, A.S., Bardizh, M.S. (1999). *Protocols in Applied Enzymology*. Szeged University Press: Szeged-Budapest. [19]

The references are completely different. The first one would be to a journal paper, the second one to a book. The authors are changed, except one. The year is changed.

-- Davis, K. L. (1979) in *Electrophoresis* (McMillan [sic], New York), pp. 45-67. [6]

-- Davis, K.L. (1979). *Electrophoresis*. McMillan [sic] Publ.: New York-Totonto [sic]-Sydney [19]

In the first reference there is an "in" before the title and this would mean that Davis is the author of a chapter in the book, not of the whole book. (Note 7)

-- Arno, J.J., Ballot, J.K., Sawell, J., Tomeshima, A.S. & Okada, J. (1996) *J. Appl. Enzymol.* 16 , 486-496. [6]

-- Arno, J.J., Ballot, J.K., Sawell, J., Tomeshima, A.S., Okada, J. (1994). *Measurments of the mammalian skeletal muscle PGK specific activity*. *J. Appl. Enzymol. Biotechnol.*, 16, 486-492. [19]

There are small differences in the year, in the journal title and in the number of the last page.

-- Laquettes, J.K., De Dreaux, J.T., Berthault-Greavexelle, A.S., Dupont, T. & Pitot, H. (2002) in *Analytical Techniques in Organomercurial Studies*, ed. Braundt, G. (Antwerp Univ. Press, Antwerp, Belgium), pp. 89-112. [6]

-- Dupont, T., Berthault, J., Pitot, H. (2002). *Organomercurials*. University of Ghent Publ.:

Ghent-Brussels. [19]

There are numerous differences. Two authors disappear. A.Ş. Berthault-Greuvexelle becomes J. Berthault. The title changes. In one case it is a chapter in a book with another editor. The publisher moves from Antwerp to Ghent.

-- Orchaev, S.K., Byrkov, S.T. & Allershayev, S.K. (2003) *Spectrometry*, eds. Ionov, S.K., Levadova, P.S. & Lomonosov, M.V. (Moscow State Univ. Press, Moscow). [6]

-- Orchaev, S.K., Byrov, S.T., Allershayev, S.K. (2003). *Spectrometry in Inorganic Chemistry. II. Metals*. Sofia University: Sofia. [19]

The title is not identical. The three editors disappear. The publisher moves from Moscow to Sofia.

-- Dunnett, A.S., Rosenbrough, J.S., Barthels, A.K. & Donowaugh, S.S.(1999) in *Biometrics* (Research, Raleigh-Durham, NC), pp. 100-111. [6]

-- Dunnett, A.S., Rosenbrought, J.S. (2001). *Biometrics*. Research Triangle Press: Durham, NC [19]

Two authors disappear. The year is changed. The "in" before the title drops out. The publisher is not written identically. The second reference lacks the city of Raleigh and the indication of the page numbers. (Note 8)

All these publications are seemingly non-existent. Moreover, as we saw in §16 above, in relation to two of the references there is mention of instruments with unknown codes.

It is to be hoped that the authors will provide an explanation for these inconsistencies, otherwise we are led to suspect that they have experimented with samples of enzyme provided by a Dr. L. Gergely of Szeged who does not exist and have followed procedures described in publications that do not exist and using instruments that do not exist.

Here, as for the substitutions of titles in [8] that we have seen in §12, we have to suspect that the discrepancies between the references of papers [6] and [19] have been intentionally inserted by the authors of [19]. In fact, the authors of [19] have copied from [6] almost word by word the text relative to the experiment with the enzyme PGK and have reproduced the same graphic of the results. Therefore they had to have before them the paper [6] and it would have been easier for them to copy the same bibliographical references rather than to rewrite them with modifications.

As we noted in §5, the principal authors of these two papers [6] and [19] are Buchachenko and Kuznetsov. Buchachenko is the first author in both papers and is the corresponding author of [6] where it is also explicitly stated that he had written the text of the paper. Kuznetsov is the corresponding author of [19] and thus, at least formally, it was he who had sent the manuscript to the journal, had received any comments from the reviewers and had licensed the final version of the text. (Note 9)

Buchachenko and Kuznetsov are the principal authors of this whole series of researches on the magnetic isotope effects in the synthesis of ATP. I think that they cannot abstain from giving an answer to the many questions that I have presented here.

Notes

(1) A note at the end of [6] specifies what were the roles of the four authors:

«Author contributions: A.L.B. designed research; D.A.K., M.A.O., and A.A.M. performed research; A.L.B., D.A.K., M.A.O., and A.A.M. analyzed data; and A.L.B. wrote the paper.»

That is, Buchachenko designed the experiment, the other three authors performed it, all discussed the data and Buchachenko wrote the paper.

(2) The city of Varese is also mentioned in connection with a publication of Ivanov (§8) and with

the brand Olivetti (§10). One wonders how the name of this small Italian city can be known by Russian or Iranian authors. But one of authors, Kuznetsov, surely knows it. In 1996 Kuznetsov held an acclaimed lecture in Varese concerning the Shroud of Turin, a Catholic (fake) relic.

(3) For the electron microscope Farrand XL30, from the Internet one retrieves also a 2012 paper by Marina Orlova et al. which is not on our list. I have not inserted it in the list because it still deals with magnetic isotope effects but on a slightly different line of research. Orlova is one of the most frequent authors in our series. That paper was published in a journal with Kuznetsov as Chief Editor and several of our authors (Alyautdin, Amirshahi, Buchachenko, Chekonin) as Associate Editors. In relation to Farrand XL30, Orlova refers to the the paper [10] by Amirshahi et al., where she is among the authors.

(4) Take for example the name “Пушкин” which is identical in the last four letters. In texts in English it is usually written “Pushkin”. In other languages it may be Puškin, Puskin, Pouchkine, Pusjkin, Puszkin but never Pujkin (save for possible exceptions).

(5) The names Waugh and Leder recur other times, together or separately, in this series of papers and in the thesis of Amirshahi. It is curious that by searching for the names Waugh and Leder with Google Scholar one finds some old papers by Kuznetsov. In five paper by Kuznetsov and others that were published between 1986 and 1990, there are references to four distinct publications with both Waugh and Leder among the authors. Needless to say, all these references are to seemingly non-existent publications. Other times the names appear alone. It is to be noted that the number of references may be underestimated because it seems that only a few of the many papers published by Kuznetsov before 1990 have been put on the internet.

We cannot think that there are two particular authors, with surnames Waugh and Leder, who have published many papers together, because the initials of the names, as reported, are almost always different. Altogether, considering the old and the recent papers, the initials for Waugh are CHJ, CS, I, JA, JG, RL, SE, SJ, while the initials for Leder are B, DK, GM, JD, KM, L.

Another frequent name is Telashima. In the papers it recurs in the references to five different publications for a total of 14 citations. It is also mentioned once in the thesis of Amirshahi. The same name Telashima is in the bibliographies of three old papers by Kuznetsov et al of 1986-1990. The initials for the name of Telashima are H, I, O, S, W. No one of the presumed publications by Telashima can be traced.

(6) A reference to the *Mitochondria* by Waugh and Telashima recurs again in a paper in 2010 [18] where Amirshahi is not among the eight authors but there are as usual Buchachenko, Kuznetsov, Orlova.

More strange is the reappearance of the same reference in this 2010 paper that I have not listed because it deals with a subject-matter which is not in line with the research in our series:

«S.V. Shetab-Boushehri, M.A. Samavati-Sharif, A.A. Ravasi, M.R. Kordi, E. Javadi, B. Minaii: Effect of Oral Iron Supplementation and Endurance Training on Cytochrome C Oxidase Activity in Rat Soleus Muscle. *International Journal of Pharmacy and Pharmaceutical Sciences*, 2, 2010, 33-35.»

The six authors are all Iranians. Only two of the authors (the first author Seyed Vahid Shetab-Boushehri and the corresponding author Bagher Minaii) also appear among the authors of our series. In particular, they are among the authors of the paper [18] which has the reference to the book by Waugh and Telashima.

(7) This bibliographical reference is difficult to check because Davis is a very common name, the publisher Macmillan (not McMillan) has published many books and the word "electrophoresis" is ubiquitous in texts of biochemistry. However I have not found a book with that title and that author, neither with the publisher Macmillan nor with other publishers. In the first reference the "in" before

Electrophoresis suggests that Davis is the author of a chapter in a book with various authors, but in this case there should be the name of the editor of the volume. There is a book with the title *Electrophoresis 1979* by Bertold J. Radola, published in 1980 by another publisher (De Gruyter), not Macmillan, with the Proceedings of a 1979 Conference in Munich (Germany). It does not seem that the book contains a chapter by a Davis. Moreover it does not seem that in the literature of that period there was a Davis with the initials KL who specifically published about the subject of electrophoresis. Instead there was a Davis BJ (Baruch Joel) who was known for a much-quoted text of 1964 with the title *Disc Electrophoresis*. There is also a journal with the title *Electrophoresis*, but it started publication in 1980. The publisher Macmillan started only in 1988 the publication of the journal *Applied & Theoretical Electrophoresis*. But if our authors intended to refer to a journal, they had to indicate the volume number.

(8) It is curious that what would seem to be the same book is mentioned in the bibliography of this paper:

A.A. Markaryan, V.A. Dubinskaya, T.D. Dargaeva: Peroxide-eliminating oxidoreductases as biosensors of antioxidant components of medicinal plants. *Bulletin of Experimental Biology and Medicine*, 142, 2006, 55-56.

Artyom Markaryan works in Moscow at the Sechenov medical university. He is an author in five of the papers we are considering but the subject-matter of this paper is not related to that series.

As given in this paper, the reference is:

«J. Dunnett, *Biometrics*, Raleigh (1986), P. 48-56.»

As compared with the above references in [6] and [19], there are several differences, but the coincidence of three words (Dunnett, *Biometrics*, Raleigh) can hardly be casual.

There has been a Dunnett who has sometimes published in the journal (not book) *Biometrics* and whose name is associated with a statistical test he presented in 1955, but his initials are C.W., not A.S nor J.

(9) These procedures had to be easy for Kuznetsov because he was also the chief editor of the journal where the paper [19] has been published (and Buchachenko was one of the associate editors). We can read in the paper that the manuscript was received on 8 December 2010 and was accepted on 18 December, therefore the procedures of peer review were conducted in a very short time.

List of the examined papers

These are the 21 papers of which we have discussed. An asterisk indicates the corresponding author (though in some cases it is not clearly specified). Almost all the papers are online on the Internet and can easily be retrieved by searching for some words of the titles or names of the authors.

[1] *D.A. Kouznetsov, S.E. Arkhangelsky, A.G. Berdieva, P.Z. Khasigov, M.A. Orlova: A novel electrophoretic technique designed to modify the ratio of magnesium isotopes inside the creatine kinase active sites. *Isotopes in Environmental and Health Studies*, 40, 2004, 221-227.

[2] *A.L. Buchachenko, D.A. Kouznetsov, A.V. Shishkov: Spin Biochemistry: Magnetic Isotope Effect in the Reaction of Creatine Kinase with CH_3HgCl . *J. Phys. Chem. A*, 108, 2004, 707-710

[3] *D.A. Kouznetsov, S.E. Arkhangelsky, A.A. Markarian, M.A. Orlova: The instant death symphony is likely to be orchestrated by creatine kinase of the Mid-Asian *Viperidae* venom. *Arch Iranian Med*, 7, 2004, 93-97

- [4] *A.L. Buchachenko, D.A. Kuznetsov, S.E. Arkhangelsky, M.A. Orlova, A.A. Markaryan, A.G. Berdieva, P.Z. Khasigov: Dependence of Mitochondrial ATP Synthesis on the Nuclear Magnetic Moment of Magnesium Ions. *Doklady Biochemistry and Biophysics*, 396, 2004, 197-199.
- [5] D.A. Kuznetsov, S.E. Arkhangelsky, A.G. Berdieva, A.A. Markaryan, P.Z. Khasigov, T.M. Gatagonova, S.A. Ktsoeva, *M.A. Orlova: Stable Isotopes of Mg^{2+} as Activators of the Suppressed ATP-Generating Function of Mitochondria. *Biophysics*, 50, 2005, 74-79
- [6] *A.L. Buchachenko, D.A. Kouznetsov, M.A. Orlova, A.A. Markarian: Magnetic isotope effect of magnesium in phosphoglycerate kinase phosphorylation. *Proceedings of the National Academy of Sciences (USA)*, 102(31), 2005, 10793-10796.
- [7] *A.L. Buchachenko, D.A. Kouznetsov, S.E. Arkhangelsky, M.A. Orlova, A.A. Markarian: Spin biochemistry: Magnetic ^{24}Mg - ^{25}Mg - ^{26}Mg isotope effect in mitochondrial ADP phosphorylation. *Cell Biochemistry and Biophysics*, 43, 2005, 243-251.
- [8] *A.L. Buchachenko, D.A. Kuznetsov: Magnesium magnetic isotope effect: A key to the mechanochemistry of phosphorylating enzymes as molecular machines. *Molecular Biology*, 40, 2006, 9-15.
- [9] *A.L. Buchachenko, D.A. Kouznetsov: How mechanical energy of phosphorylating enzymes transforms into the energy of chemical bonds? *Mendeleev Communications*, 18, 2008, 63-66
- [10] *N. Amirshahi, R. Alyautdin, S. Sarkar, S. Rezayat, M. Orlova, I. Trushkov, A.L. Buchachenko, D.A. Kuznetsov: New porphyrin adduct of fullerene- C_{60} : A promising nanotool for medicinal use in the heart muscle hypoxia cases. *International Journal of Nanoscience*, 7, 2008, 113-135
- [11] *N. Amirshahi, R.N. Alyautdin, S. Sarkar, S.M. Rezayat, M.A. Orlova, I.V. Trushkov, A.L. Buchachenko, D.A. Kuznetsov: Fullerene-based low toxic nanocationite particles (porphyrin adducts of cyclohexyl fullerene- C_{60}) to treat hypoxia-induced mitochondrial dysfunction in mammalian heart muscle. *Arch Med Res*, 39, 2008, 549-59
- [12] N. Amirshahi, R.N. Alyautdin, A.P. Orlov, A.A. Poloznikov, D.A. Kuznetsov: A fullerene C_{60} -based ligand in a stationary phase for affine chromatography of membrane porphyrin-binding proteins. *Russian Journal of Physical Chemistry A*, 82, 2008, 1952-1957.
- [13] *N. Amirshahi, R.N. Alyautdin, S. Sarkar, S.M. Rezayat, M.A. Orlova, I.V. Trushkov, A.L. Buchachenko, D.A. Kuznetsov: Porphyrin-fullerene nanoparticles for treatment of hypoxic cardiopathies. *Nanotechnologies in Russia*, 3, 2008, 611-621.
- [14] *N. Amirshahi, R.N. Alyautdin, S.M. Rezayat, S. Sarkar, M.A. Orlova, A.P. Orlov, A.A. Poloznikov, D.A. Kuznetsov: Fullerene-Interfaced Porphyrin Ligand in Affinity Chromatography of Membrane Proteins. *Chromatographia*, 68, 2008, 295-297.
- [15] S.M. Rezayat, S.V. Boushehri, B. Salmanian, A.H. Omidvari, S. Tarighat, S. Esmaeili, S. Sarkar, *N. Amirshahi, R.N. Alyautdin, M.A. Orlova, I.V. Trushkov, A.L. Buchachenko, K.C. Liu, D.A. Kuznetsov: The porphyrin-fullerene nanoparticles to promote the ATP overproduction in myocardium: $^{25}Mg^{2+}$ -magnetic isotope effect. *Eur J Med Chem*, 44, 2009, 1554-69.
- [16] *D.A. Kuznetsov, S.A. Roumiantsev, M. Fallahi, N. Amirshahi, A.V. Makarov, K.S. Kardashova: Non-Markovian Population Dynamics: Does it Help to Optimize the

