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On: 12 December 2007
Access Details: [subscription number 746126554]
Publisher: Taylor & Francis
Informa Ltd Registered in England and Wales Registered Number: 1072954
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Astronomical & Astrophysical Transactions

The Journal of the Eurasian Astronomical Society

Publication details, including instructions for authors and subscription information:
<http://www.informaworld.com/smpp/title~content=t713453505>

The new book: "Astronomy at the sharp turns of the twentieth century history"

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Online Publication Date: 01 March 1998

To cite this Article: Jeremejeva, A. I. and Pustynnik, I. B. (1998) 'The new book:

"Astronomy at the sharp turns of the twentieth century history", *Astronomical & Astrophysical Transactions*, 16:2, 157 - 162

To link to this article: DOI: 10.1080/10556799808208154

URL: <http://dx.doi.org/10.1080/10556799808208154>

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Book Review

**THE NEW BOOK: “ASTRONOMY AT THE
SHARP TURNS OF THE TWENTIETH
CENTURY HISTORY”**

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(Received June 16, 1997)

In April 1995 an international scientific memorial conference dedicated to the 50th anniversary of the victory over Nazi Germany took place in Pulkovo. The conference was convened and organized by the Euro-Asian Astronomical Society jointly with the main astronomical observatory of the Russian Academy of Sciences in Pulkovo, supported also by the Sternberg Astronomical Institute and the Institute of theoretical astronomy. It was a great patriotic war for our country. The war had tragic repercussions for all aspects of life in this country, for science on the whole and perhaps, for astronomy above all.

KEY WORDS History of astronomy, astronomers and political repressions, astronomers and World War II

The conquerer in this war was the people, but also the vital force of peaceful science which redirected radars from military targets to space thus transforming them into radiotelescopes, and devices for night seeing used in warfare into a new effective means for detecting the faintest signals from space (photomultipliers) including IR rays, invisible for human in electronic-optical intensifiers. And perhaps it would be proper here to recall also in a marginal note how the inventors of the optical tube, a prototype of Galileo's telescope, the Dutchmen Hans Lippersheim and Zacharias Jansen had once tried to patent their device as a promising military gadget.

The tragic side of the war for astronomy and astronomers lies in the truth that the most precious equipment – the largest telescopes as well as the unique buildings of the observatories in practical terms-cannot be evacuated and more often than not they are subjected to full destruction in warfare. Astronomy shared unrecoverable human losses with the whole country. However, even here the peculiar nature of this branch of human knowledge manifested itself. The world outlook aspect of astronomy makes its servants one of the most vulnerable targets during the age of political repression under the totalitarian regimes (and a criminal form of such a regime governed this country during the prewar decade and for at least 10 years

after the end of World War II). And once again going back in time we see how the tragic fate of Bruno and Galileo' recurred so many times in this country.

Thus the conveners of the conference – the Euro-Asian Astronomical Society – pursued the uneasy goal of elucidating the complicated interrelations of science and war, the fate of science, specifically, of astronomy in peaceful times, at the sharp turns of the social development in the twentieth century. These factors have dictated the time interval involved for submitted scientific contributions: the prewar decade, the war itself and the first postwar decade which coincided with the new form of confrontation between the two world superpowers – the 'cold war' years.

The book opens with the chapter "Contrasts in the development of Soviet astronomy in the prewar decade" (six contributions) which gives a picture full of contrasts where the "planned" successes of state supported Soviet astronomy alternate with descriptions of the cruel, unjustified political repressions and suffocating dogmatic ideology hampering any progress in science.

The underlying idea of the conference found a broad response, above all from astronomers, war veterans and historians of science. Thus, the memorial part dominated the conference; it included 20 papers, among those nine commemorating the astronomers who perished during the war and 11 in the form of personal reminiscences from the battlefields by astronomers who survived the 50th anniversary of the Great Victory. This portion of materials constitutes the second chapter of the book "Astronomers at the Front". Alas, some of the authors – veterans – in the meantime (at the preparatory stage of the manuscript) have left us forever. Brief obituaries in their honour are given in the footnotes to the chapters.

War and labour veteran-astronomers at the front and in the rear shared with the audience their recollections of how astronomy as a science assisted in warfare. These materials, four contributions, were included in the third chapter of the volume "Astronomy for the Front".

Chapter 4, entitled "The Destinies of the astronomical centres in the regions of the battlefield, in the blockade and under the occupation", consisting of 14 contributions, depicts a broad view of the dramatic events which took place not only on the territory of the USSR – Leningrad, Crimea, Ukraine, the Baltics but also in Poland and part of the Prussian territory, which later, after the war, was incorporated and went into the jurisdiction of the Soviet Union.

A somewhat different, though uneasy destiny during World War II fell to astronomical centers situated far beyond the line of the Front (or even on other continents). In this country they took the burden of new scientific and important applied tasks which satisfied the needs of astronomy serving for the Front. In addition they became a temporary refuge for astronomers from the western regions destroyed or occupied by the enemy. In this emergency situation the advantages of the state supported organization of science in the USSR and the strong communist party control in the centre and regions fully manifested themselves: they enabled many people to be evacuate, especially from Leningrad, via the famous "life supporting road", to save at least partially precious equipment, and to organize and support work in provincial regions of the country. The fifth chapter of the volume entitled "Astronomy far away from the Front" is devoted to this topic (14 contributions).

Two contributions came from Western astronomers. They describe the situation in the two largest US observatories and specifically the destiny of their staff, conveying a simple truth: a sensible, far-sighted policy in the scientific community can play a crucial role in the destiny of science whatever the nature of the social system.

The last two chapters occupy a special place in this book. Chapter 6 "Military techniques and up-to date technology in the service of astronomy" indeed illustrates the realization of a biblical pacifistic motto "to beat swords into ploughshares". In this chapter engineers, technologists of former secret military plants, as well as scientific researchers from academic institutions, tell the reader about the elaboration of a new technical means of warfare, which after World War II were switched over to peaceful work and served also for astronomy. This chapter includes materials of 11 contributions merged into eight articles (in view of the similarity of their themes).

Chapter 7 "Achievements of astronomy in the war years and in the first post-war decade" (13 contributions) describe the different destinies of science in countries which were affected to different degree by world war II. The concluding chapter of the volume gives a short review of discussions on a very broad range of topics – relations between science and society, responsibility of a researcher for his creation and even the prospects of future contacts with extraterrestrial civilizations (for which the time will come sooner or later, no doubt about that). Because of the very limited space allocated for these topics only some fragments of several relevant reports were reproduced, in which prominent figures in astronomy, cosmology and physics expressed their views on these items. In addition the most urgent problems of the present-day situation in astronomy in different regions of the former USSR after its collapse have been treated. The conclusion is drawn that because of the cosmopolitan nature of astronomy, astronomers of all leading powers (and not only of those living in the different regions of the former USSR) should unite their efforts for the benefit of astronomy of all nations. Thus, the wars, both "hot" and "cold", should be proclaimed an intolerable evil humiliating human beings.

The volume opens with an article by A. Jeremejeva entitled "successes of "planned" state science in the USSR and political repressions" which narrates dramatic and at the same time different stories about the fate of two main astronomical centres in the USSR – in Leningrad (the Pulkovo observatory and the Astronomical Institute of Theoretical Astronomy) and in Moscow (the Sternberg Astronomical Institute). It dwells upon the role of personalities being at odds with each other and on the contrary solidarity within the scientific community, so important even in the darkest periods of repressions. The tragic destiny of prewar astronomy in Leningrad is augmented by the article of D. Polozhentsev dedicated to the former director of the Astronomical Institute, B. Numerov and his fate and a short poem of Numerov's daughter. The next articles, prepared by Bordovitsina and Polosuchina, give on the contrary a relatively prosperous view from the same period in Tomsk and Crimea, and in O. Dokuchajeva's article is described spectacular advances in Soviet astrophotography which were achieved at the same time.

The second chapter consists of two parts. The first part under the subtitle "Heroes will not die in our memory" (9 essays) is devoted to astronomers who

perished during the war – at Front, in the underground movement or as war prisoners. Many joined the troops voluntarily, leaving behind research or interrupted studies. Even among these, two names stand prominently: a student – an airforce navigator Zhenja Rudneva, a Hero of the Soviet Union (awarded posthumously), an essay written by a pilot from the same regiment, now Doctor of Science in Physics, Moscow University, Professor I. Rakobolskaja; and a well-known investigator of the Tunguska phenomenon, Leonid Kulik, who volunteered in his 58th year and perished in captivity (for details look at the article by Zotkin).

Many members of the staff from the Sternberg Institute perished in the war, among others a promising young scientist Nikolaj Florja, students and researchers from Kharkov University (among them a young guerilla, also a Hero of the Soviet Union, awarded posthumously – Ljalja (Elena) Ubijwovk) and others. All of them were stirred by deep emotion which Zh. Rudneva in her letter addressed to Prof. S. Blazhko expressed succinctly: “There will be no freedom of science without freedom of my motherland”. Many of these heroic figures have been immortalized in the names of newly discovered minor planets and the story has been narrated in the article by the well-known discoverers and researchers of the asteroids, the couple Dr. N. Chernych and Dr. L. Chernych.

The second part of this chapter includes 11 essays – reminiscences of the wartime young days of the veterans from Moscow, Leningrad (now once again St. Petersburg), Odessa, Crimea and Irkutsk. Some of them, like the story narrated by V. Dvorovenko (equally brilliant in its content and literary virtues), vivid stories full of war adventures presented by G. Sitnik, A. Dadaev, R. Tsvetov, reach far beyond their personal fortunes, recreating those unforgettable years when tragedy and despair went side by side with optimism and great deeds. From the very first days of the war astronomical institutions switched from their normal duties to specialized tasks set by the needs of the Front. These included a time service for military forces, monitoring the solar activity influencing transmission of the radio waves, gravitational reconnaissance, and exploration of fossils. This aspect of astronomical activities is reflected in four articles of the third chapter.

Chapter 4 tells us about the destiny of astronomical centres which happened to fall into the regions of warfare that brought about destruction and grief. It carries the reader also to the first postwar years when the observatories, those “stellar castles” (some of them indeed of a very original architectural design) were raised from the ruins by the heroic efforts of the whole country. In this way the observatories in Pulkovo and Semeiz were rebuilt or newly erected like those at the outskirts of Kiev and in the mountains of the Crimea. Amid these essays there is a dramatic story of the astronomer who paid the highest price for proceeding with his scientific activities during the occupation. Perhaps, due to that he preserved his observatory from destruction, even taught a new generation of scientific researchers. Yet he perished after the war in jail branded as a traitor. Such people were rehabilitated only many decades later. Such was the fate of the famous Russian astronomer K. Pokrovski (an essay written by V. Smirnov). The world-renown Bessel observatory in Königsberg paid a heavy price for the war waged by Hitler: it was subjected to severe destruction in the war and finally was wiped from the earth by the short-witted but zealous

politicians and administrators of Königsberg, hastily renamed Kaliningrad (essay by K. Lavrinovich).

Another innocent victim of the war was a small Polish observatory once located at the top of the mountain with the funny name of Pop Ivan (Priest Ivan) – the story was presented by a participant of the conference from Poland, Prof. J. Kreiner. The reader may find many bitter lines in the essays–reminiscences of some Polish astronomers who happened to live in the territories which were arbitrarily recarved in the prewar criminal bargaining between Hitler and Stalin (the authors of the respective essay are Prof. Wilhelmina Iwanowska from Torun and Dr. Helena Jasco from Krakow).

A somewhat brighter picture is given in the final three chapters of the volume where the life and work of astronomers in the rear is reflected. The state of war declared in Moscow was equally applicable to astronomers (they had their night duties upon the roofs of buildings to fight incendiary bombs or making logging at the outskirts of Moscow) and some of those evacuated from Leningrad during the blockade were predestined to die from dystrophy. And yet for the majority life far from the Front was quieter.

Chapter 5 opens with the reminiscences of the former students of Moscow University, E. Kostjakova and T. Galkina (presently working, respectively, as a consultant at the Sternberg Institute and as a research associate of the Crimean observatory) about their student years during the war, when despite all the burdens and perils (or who knows, maybe even due to that) students took to their studies with great enthusiasm, trying to fully exploit the curtailed terms of the curriculum (some time was sacrificed for the benefit of the labour front – the logging).

Several of the following articles describe the life and work of astronomers deep in the rear, in the Ural region (in Sverdlovsk, now again Catherinburg), in Central Asia, in Kazakhstan (Alma-Ata), Uzbekistan (Tashkent), Turkmenistan (Ashabad), and Tajikistan (Dushambe). There local astronomers well received their colleagues evacuated from St. Petersburg and Moscow, the life was difficult but the spirit of friendship and solidarity was high, the burdens of everyday life were often ridiculed in amateurish verses. And thus the luminous light of astronomical knowledge reached far away places. In this way the new Institute of Physics and Astronomy was founded by academician V. Fesenkov and later on was reorganized into the Astrophysical Institute of the Kazakh Academy of Sciences (now named after his founder). In fact this event meant a new start for modern astronomy in Kazakhstan.

In a small fragment of recollections compiled by Dr. Sh. Darchia and dedicated to the member of the Kazakh Academy of Sciences and the USSR Academy of Sciences Dr. G. Tikhov, one can find several vivid pages describing the origin of a new scientific branch – cosmic biology.

Progress in astronomical research and the destinies of astronomers during the war appear before us in a thorough article by Kuklin, S. Yazev and K. S. Mansurova (the name of the third coauthor, the mother of Sergei Yasev, deceased several years ago, has been added to honour her long standing record of astrometric work and also of the director of the Irkutsk observatory who collected at one time plenty of historic material relevant to this astronomical centre of Siberia).

One of the few articles in this volume written by Western astronomers, by Dr. Osterbrok entitled "We are still carrying on": (a quotation from one of the wartime letters) California in World War II' transfers the reader to the USA and shows how the echo of the war "rolled over the ocean" to California. Sad news lines about the death of their colleagues also reached the famous Mount Wilson observatory, though, naturally, the scale of human loss was incomparable. American astronomers, among them the world-reknowned observer Edwin Hubble, also switched over to the tasks set by the war needs. But thanks to the intelligent policies of the observatory administration, the observatory could resume its research activities after the war with almost intact staff. This has been reported in the Summary "The astronomers and engineers of Palomar and Mount Wilson: waiting out the war" by R. Florens (Stonington, USA). Comments and supplementary remarks to these two contributions have been written by Pulkovo observatory director Prof. V. Abalakin.

Chapter 7 introduces the reader to the discoveries and inventions in astronomy during the war. Their range is very broad, from elaboration of a new cosmogonic concept by academician O. Schmidt (the articles by F. Tsitsin and V. Safronov) to the very first successes of Soviet radioastronomy. Here we see once again how different were the circumstances in which astronomers found themselves during the war, here in Russia and in the USA (see the article by Yu. Jefremov).

The closing Chapters 6 and 7 encompass a different temporal stage and they are distinguished in content from the preceding ones. They reproduce briefly the history of creating military top secret optical and radio equipment and instruments which already, by the end of the war, started to work for peaceful science including astronomy. It is the history of creating photomultipliers, electronic-optical intensifiers (articles by L. Leiteisen, P. Scheglov and others), radiotelescopes (N. Kajdanovscij, R. Sorochenko), and advances in radioastronomy itself. Finally it is an elaboration of the TV technology which paved the way for a new branch – extraterrestrial astronomy – performed with the aid of artificial satellites beyond the Earth's atmosphere (articles by N. Dunaevscaja and V. Urvalov, and V. Prokof'eva). Some articles dealing with the early history of investigations with man-made satellites have been postponed till the future conference which will commemorate the last 40 years since the start of the cosmic era).

As we have mentioned at the beginning of this review article, there are many topics centred around the manifold relations between science and society, reflecting contradictory trends in social life and their effect upon scientific research.

Reflections on these problems, views of the leading figures of contemporary physics, astronomers and cosmologists, like G. Gamow, A. Sahharov, A. Zelmanov, as well as of the authors of the contributions – such is the content of the closing chapters of the volume.