SOME PAGES OF HISTORY OF THE SPECULA DORPATENSIS,
THE ELDER SISTER OF PULKOV OBSERVATORY

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Abstract. This paper gives an overview of the history of Tartu (Dorpat) Observatory.

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1. INTRODUCTION

The history of the Tartu (Dorpat) Observatory is part and parcel of that of the Dorpat University (Tartu Õlikool). The first university in Dorpat was founded in 1632 by the King of Sweden Gustav II Adolph as Academia Gustaviana Dorpatensis, but it was closed in 1656 due to the Seven Years’ War. In 1690 the new university in Dorpat known as Academia Gustavo-Carolina Dorpatensis was established by the edict of Carl XI, the King of Sweden, but again because of the Great Northern War it moved to the town of Pernau and, in 1710, to Sweden.

The history of teaching the mathematical and natural sciences at both the Academia Gustaviana and the Academia Gustavo-Carolina is closely related to the names of Gebhard Hinsel, Peter Schoemer, Johannes Ericsson, Joachim Schelelinus, Sven Dimberg, Conrad Quensel and others.

The University in Dorpat was re-opened in 1802 by the Edict of the All-Russian Emperor Alexander I, the University Statutes stating that the “University is established for the entire Empire of Russia, especially, for the Knighthood of Livland, Estland, and Curland . . .”. Because the said Knighthood was mainly of German origin and kept its ties with Vaterland through kindred and language, German was the official language for teaching and office work at the University, remaining as such up to the end of the 19th century.

Science is advanced by the pursuit of Truth which is just as pure and sincere as the Nature itself. Taavet Rootsmäe (director of the Tartu Observatory from 1919 to 1948).
The first astronomical observations (the latitude determinations) in Dorpat were initiated in 1795 by Ernst Christoph Friedrich Knorre, and were made from his house by use of his self-made primitive observational means. It was in 1798 that Knorre used the small Hadley’s octant for this end. By that time the new University Rector Georg Parrot had decided to establish the University’s observatory and invited Johann Friedrich Pfaff from Helmstädt to take the Chair of mathematics combined with the directorship of the future observatory, but Friedrich Pfaff recommended his younger brother Johann Wilhelm Andreas Pfaff instead. As a matter of fact, “mathematicorum princeps” C. F. Gauss was twice (in 1803 and 1809) invited as a candidate for the position of Observatory Director. In his observing activities Pfaff was assisted by students of Dorpat University – Carl Williams and Magnus Georg Paucker. At the same time Pfaff had taken an active part in designing the future permanent observatory building and in choosing its site. At that time Heinrich Schumacher, who worked in Dorpat as a house-tutor, turned to astronomy under the influence of Knorre and Pfaff.

As the first cooperative work one should mention determinations of the Dorpat longitude with respect to Moscow, Mitau, and Riga done by Pfaff together with Christian Goldbach, Wilhelm Beitler, and Johann Sand. The works of Pfaff and his colleagues were periodically published in the “Astronomische Beiträge”, established by Pfaff in 1805, and in other editions, too.

After almost a decade of work at two “provisional” observing sites in Tartu, the construction of the permanent Dorpat Observatory was completed in December 1810 (January 1811), its building being accepted by the University commission.

In connection with the second “provisional” observatory one should mention Andreas Lambert, a land-surveyor and a passionate amateur-astronomer, who offered his land parcel and money for its construction. His astronomical observations and scientific papers were published in the “Astronomisches Jahrbuch” published by Bode, and in the “Dörptsche Zeitung” as well.

2. FRIEDRICH GEORG WILHELM STRUVE IN TARTU

The University students were strongly interested in astronomy, and the young Friedrich Georg Wilhelm Struve was one of them. Wilhelm Struve was born in Altona in the Kingdom of Denmark, and in 1799, being only 6 years old, enlisted to the Gymnasium Christianum where his father Jacob Struve had been Director. He did not complete his studies at the Selecta class of the Christianum because he left Altona to escape from the French recruiters of the Napoleonic troops.

Wilhelm Struve decided to go to Dorpat to his elder brother Wilhelm Carl Struve because Heinrich Schumacher had told him about the students’ life there. Wilhelm Struve was enlisted to the Dorpat University as a student of the philology faculty and as a non-matriculated (external) student for lectures on Physics and Mathematics. Because of his scanty financial means, Struve had to be a tutor in families of Dorpat citizens, particularly, in the family of Count (rukkikrahv) Friedrich Georg Magnus Berg in the estate of Sagnitz (Sangaste). So, living in Dorpat and attending the lectures at the University in the winter time, he could explore the environments of Sagnitz in the summer with future triangulation operations in mind suggested to him, probably, by Schumacher.

In those years Wilhelm Struve had come to friendly terms with Rector Parrot’s son Friedrich (“Fritz”), and the Rector who in his talks with the studiosus Struve
saw in him the gift of a researcher, persuaded him to turn to serious studies in natural sciences.

Wilhelm Struve had graduated *summa cum laude* from the Dorpat University in two and half years, having presented his work “De studio criticus et grammaticis apud Alexandrinos” and receiving the gold medal of the Faculty on Christmas 1810. Wilhelm Struve had declined the proposed position of a teacher of history and started to profoundly study astronomy, mathematics and physics, having been engaged in these studies in 1811 through 1813. He received the University grant paid to him owing to the intercession of Rector Parrot.

Wilhelm Struve often visited the Dorpat Observatory where Professor Johann Sigismund Huth, from Kharkov, was the first Director since 1811, and Magnus Paucker was an observer. Wilhelm Struve trained himself in making astronomical observations and geodetic measurements using a sextant; he has set up the triangulation network in the environs of Dorpat, and determined the geographic coordinates of the Dorpat Observatory using observations made with astrometric instruments available at the Observatory. In 1813 Struve defended his dissertation “De geographica positione speculae astronomicae Dorpatensis”, and was promoted to both M.A. and Ph.D. degrees.

In November 1813 the Professor *extraordinarius* of Mathematics and Astronomy Wilhelm Struve had been appointed an observer of Dorpat Observatory after Magnus Paucker had left Dorpat for Mitau (Jelgava) in June 1813. Here he began to install the Dollond 8-foot transit instrument, the basic instrument of the Observatory, kept in its cases until that time since 1807. The granite pillars for it ordered by Director Huth in 1812 were not yet available, so that Struve had installed the instrument on the brick pillars and performed its adjustment, having successfully and excellently solved his first important problem. It should be noted that Director Huth had given a free hand to Wilhelm Struve, being himself intensively engaged in lecturing at the University.

After having compiled the general program for the Observatory and that for the 8-foot transit instrument, Wilhelm Struve has begun determinations of right ascensions of stars, starting in January 1814 to systematically observe Polaris in its upper culmination and observing gradually other circumpolar stars with the same transit instrument. This work was necessary to eliminate some drawbacks of Piazzi’s catalogue of stellar positions, being in wide use at that time.

Struve observed up to 18 hours daily, making observations of almost 100 stars per night, each observation consisting in timing the star transits through 5 ocular wires. During 1814 and 1815 Struve had observed more than 3000 stars, deriving from these observations the improved right ascensions of 200 stars. Moreover, he made observations of Olbers’ comet using the Troughton achromatic telescope, and had more accurately re-determined the geographic coordinates of the Observatory.

During his right-ascension determinations, Wilhelm Struve became interested in study of binaries, determining the right ascensions of the binary components, estimating their declinations, and computing therefrom the distances between the binary components and the position angles of the satellite stars with respect to the central ones. At that time Struve had observed 16 binaries in this way, and published his results in the *Observationes Astronomicas* in 1817.

In his summer service trips in 1814 and 1815 Wilhelm Struve became acquainted with astronomical works performed at other observatories and got personal contacts with outstanding astronomers like Olbers, Gauss, Bessel, Bode, and...
with telescope-makers Georg von Reichenbach, Joseph Fraunhofer and Baumann.

After the death of Professor Huth in 1818, W. Struve remained for a while on the observer position; it was in September 1820 that he had been appointed Professor of Astronomy and Director of the Observatory of the Dorpat University.

Thanks to hard work and extreme care of Wilhelm Struve, the Tartu/Dorpat Observatory became a leader among the observatories of Russia in the first half of the XIX century, being equipped in the best possible way in 1824–1833 even among some world observatories. Herewith the impetus had been given for the further development of astronomical research in Russia, and, moreover, the Tartu/Dorpat Observatory had greatly contributed to geodesy, too, because the gigantic undertaking known as the Russo-Scandinavian meridian arc measurement had been initiated in Dorpat/Tartu due to the efforts of Wilhelm Struve and Carl Tenner.

3. TARTU OBSERVATORY AS PROGENITOR OF OTHER PROJECTS

The Tartu Observatory may also be regarded as a starting basis for creation and development of the Pulkovo Observatory because almost all Pulkovo astronomers had been alumni of the Dorpat University, so that the Dorpat Observatory’s role in the contemporaneous astronomical world had been very significant.

The Dorpat/Tartu Observatory had made invaluable contribution to astronomical support of geodetic operations. It is appropriate to remember here the Struve Arc measurement, the trigonometric survey of Livland by W. Struve, determination of the level difference between the Black Sea and the Caspian Sea by A. Savich and G. Sabler, the geodetic support by V. Fedorov of the climbing expedition to the Ararat mountain organized by Friedrich Parrot, the work on determination of the ship position using the method of Lunar distances carried out by W. Preuss in Captain Kotzebue’s round-the-world voyage on the “Enterprise” sloop, the numerous expeditions for exploration of boundless spaces of Siberia undertaken by V. Fedorov, L. Schwarz, W. Abold, the participation of J. Sykora in the Spitzbergen meridian arc measurements.

The Dorpat/Tartu astronomers have constantly improved their astronomical instruments and designed new ones (W. Struve, E. Schönberg, and later A. Kipper). The scientific efficiency of the Observatory, of course, strongly depended upon its directors and its astronomical and geodetic equipment, this measure being very thoroughly taken by the Dorpat University Board. The Dorpat/Tartu Observatory is justly priding itself upon its Directors W. Struve, H. Mäder, Th. Clausen, L. Schwarz, G. Lewitzky, K. Pokrovsky and T. Rootsmäe who have made their possible contributions to the glory of the Observatory. No less had done the immediate creators of the astronomical observation wealth, i.e., the observers-astronomers of the Observatory: W. Preuss, H. Bruns, O. Backlund, E. Hartwig, A. Orlov, E. Schönberg and E. Öpik. The appearance of the Observatory had been changed many times depending upon the personal features and scientific interests of Directors. Thanks to the ebullient energy and forceful vigour of W. Struve the Observatory had been equipped with the newest astronomical instruments. The observations for astrometric goals had become very significant, giving rise to new research directions. The success of efforts of W. Struve in using every possible chance for advancement of astronomy and geodesy in Dorpat/Tartu at that time might be ascribed to his unprecedented authority and to the artful ability to convince the high-rank officials (e.g., Count Carl von Lieven) of the necessity of
financing astronomical and geodetical projects.

4. THE POST-STRUVE ERA

After W. Struve directorship there was a sort of some decline in observing activities of the Dorpat Observatory, and theoretical investigations have gained the grounds over the practical ones. Of course, neither H. Mädler, nor Th. Clausen had had the direct access to the high-rank officials in Saint-Petersburg, and the money means of the Dorpat University were very restricted, too. As a consequence, the Tartu/Dorpat Observatory was gradually loosing its leadership as compared with the Pulkovo Observatory which disposed of a practically unlimited financial potential as the carte blanche in expenses, in accordance with orders and permission of the Emperor Nicholas I.

The pioneering works of W. Struve in measurements of double stars were continued, in spite of unfavourable circumstances, by H. Mädler and E. Õpik; those in the field of stellar astronomy were extended by H. Mädler and L. Schwarz, being continued later by T. Rootsmaë, E. Õpik and G. Kuzmin. The astrophysical observations made at the Observatory and theoretical studies carried out in Astrophysics by E. Schönberg, E. Õpik and A. Kipper had marked a new turn in the scientific orientation of the Observatory. One should mention also positional observations of minor planets and comets made by S. Scharbe and Victor Berg and computations of orbits based on these observations, studies of the physical constitution of comets carried out by K. Pokrovsky and V. Rieves, the fundamental investigations of E. Õpik on meteor astronomy, those by E. Hartwig and K. Pokrovsky dealing with profound studies of the noctilucent clouds. Th. Clausen and T. Banachiewicz in the field of theoretical astronomy and celestial mechanics.

Astronomical investigations at the Dorpat/Tartu Observatory were fruitfully complemented by astrometric and geophysical works of E. Schönberg (the polar wobble, or the variability of latitudes), R. Livländ (determinations of geographic coordinates of observation sites), A. Orlov (the Earth crust tidal motions) and by the pioneer research works of G. Lewitzky dealing with application of the horizontal pendulum to seismology.

The Dorpat/Tartu University and Observatory, in their history, never failed in preparing the first-class astronomers not only for the Observatory itself but also for many Russian and foreign observatories (Karl Knorre, V. Fedorov, A. Schidlowski, A. Savich, G. Sabler, Otto Struve, G. Fuss, U. Pohrt, A. Wagner, F. Renz, Th. Wittram, J. Seyboth, E. Block, Friedrich Berg, Ludwig Struve, Viktor Berg, Viktor Knorre, Hermann Struve, W. Wanach). It is appropriate to remember also the merits of the Dorpat/Tartu Observatory in dissemination and popularisation of astronomical and geodetical knowledge. Here Professors H. Mädler, K. Pokrovsky and T. Rootsmaë should be mentioned, and the Supervisor of the Observatory Rudolf Pallav as well.

Due to the revival of old Slavophile currents in the Russian Empire the Dorpat University received a new – Russian – name in 1892, becoming Yuryev University. Some students of this University worked at that time at the Observatory, and among them: D. Rootsman (T. Rootsmaë), E Büss, Ivan Alexandrovich Dvukov, J. Busch and others. It would be worthwhile to note that for a short time Grigori A. Shajn and Nicholas P. Barabashov were also students of the Dorpat University.

Due to the outbreak of the WWI the Yuryev University had to be evacuated...
to Nizhni-Novgorod in 1915 (and later, in 1916, to Perm), so that Director K. 
Pokrovsky left Dorpat/Yuryev in 1915 for Perm and never has come back.

In August 1917 the last freight train had left Yuryev for Voronezh with the 
University’s and the Observatory’s property. After this evacuation the remaining 
staff of the Observatory (the observer E. Schönberg, the junior assistant T. Banachiewicz 
and the senior assistant V. Berg) have continued their research work 
(photometric studies of planets, theoretical investigations in celestial mechanics, 
etc.), so that three dissertations for the MA degree were defended in 1917–1918 
(by T. Banachiewicz: “On the Gauss’ equation \(\sin(z - q) = m \sin^4 z\)”, S. Scharbe: 
“T. Oppolzer’s method for determination of the definitive orbit of the Comet 1900 III”; 
and E. Schönberg: “On the illumination of planets”.

In spite of the hardships of these times, dissertations of T. Banachiewicz and E. Schönberg 
had been published in the Observatory’s proceedings which are known 
as Publications de l’Observatoire astronomique de l’Université de Juriev (Dorpat). 
It was in March 1918 that the junior assistant Tadeusz Banachiewicz was ap-
pointed Director of the Observatory, but after the closing of the University in the 
mid of 1918, T. Banachiewicz left Yuryev for Poland, and the Observatory was 
provisionally directed by E. Schönberg.

After the German troops had occupied Tartu/Dorpat in February 1918 the 
University has been declared the German Landes-Universität. The German occu-
pation, however, ended in November 1918, so that in December 1918, after some 
delay, the Tartu University was handed over to the national Estonian authorities. 
There was much to be done for inventory of the University property (the instru-
ments and devices belonging to the Observatory had been accepted by Professor 
Herman Jaakson). An important and difficult problem of inviting to the Tartu 
University new professors and lecturers of the Estonian nationality was also to be 
solved.

In December 1918 Cand. Sci. D. Rootsmann was invited from Tallinn to take 
the position of the Observatory Director; he had defended his dissertation “Com-
putation of the orbit of the planet 1906 WF” in 1913, and in 1916 the Faculty has 
recommended “to leave him at the University for preparation for the professor-
ship”.

5. TARTU ÜLIKOOL

After all reverses of fortune, the Tartu Ülikool (University of Tartu) had of-
icially been opened on December 1, 1919, Professor Heinrich Koppel being ap-
pointed its Rector. The resurrection of the Estonian national university has been 
made possible due to self-sacrificing efforts of people like Professor Peeter Pöld.

In September 1919 Professor David Rootsmann (Taavet Rootsmäe) was ap-
proved as the acting Director of Tartu Observatory. The Observatory was almost 
empty: it included only of the old Fraunhofer refractor installed in the tower of 
the Observatory and the old Dollond transit instrument placed in its Eastern hall. 
Besides, there was the Heyde reflector, having been presented to the Observatory 
by a private person, so that the restoration of the research work at the Observa-
tory and the restitution of the removed Observatory property and of expropriated 
Observatory’s buildings as well has begun.

All evacuated instruments and the library of the Observatory had returned 
in 1921, except the Herbst transit instrument and the Repsold zenith-telescope.
Moreover, the Observatory had obtained the equipment of the liquidated Naval Observatory in Tallinn. All these instruments, however, were not adequate for a serious astronomical research, so that Tartu astronomers – A. Kipper, R. Livländner, O. Silde, P. Simberg – began adapting the old equipment available to the observation activities in accordance with minimum modern scientific requirements. So, one new instrument more was made out of the Zeiss refractor combined with the Petzval astrographic camera. It was the Petzval astrograph mounted upon the tripod of the Repsold heliometer and with the Troughton telescope as the guiding tube. This work was skillfully performed by the Tartu mechanician P. Siilbaum (Vaigro).

Some minor changes in the Observatory’s staff nomenclature introduced in 1931 were made again. At the Observatory in 1919–1940, under leadership of the Head of the Observatory T. Rootsmäe, were working the observers E. Opik (1924–1933; 1934–1940), R. Livländner (1933–1934), the Senior assistants (the assistants) R. Livländner (1927–1933), A. Kipper (1933–1940); the Junior assistants (the subassistants) A. Pohla (1920–1925), H. Muischneek (1931–1934), R. Livländner (1925–1927), R. Pöder (1934–1936), O. Silde (1927–1929), H. Keres (1936–1938), A. Kipper (1930–1931), V. Riives (1938–1940), the auxiliary employées (the technicians-assistants) P. Simberg (1922–1939), G. Kuzmin (1939–1940). There were also several calculators who were mainly hired from the University students. So, for instance, J. Gabowicz and G. Kuzmin have worked as calculators in 1937–1939 and in 1938–1939, respectively.

In spite of some “refreshments” mentioned above the observational basis of the Observatory remained in a miserable state, so that the emphasis has been laid on theoretical studies based on use of observations made at other observatories and on teaching activity. According to the curriculum students-astronomers of the department of physics and mathematics of the faculty of natural sciences and mathematics attended lectures on General Astronomy, foundations of Celestial Mechanics, Physics of Stars, Stellar Astronomy, Stellar Statistics and Stellar Dynamics, Practical Astronomy and Astrophysics, the lecturers being Professor T. Rootsmäe and Dr E. Opik. The optional lectures were delivered also by the assistant R. Livländner and the assistant professor W. Anderson. J. Gabowicz, G. Kuzmin and V. Riives have started their scientific careers when they were still students of the Tartu University.

Astronomical investigations at the Observatory followed the three major directions: 1. Meteor Astronomy, 2. Stellar Astronomy and stellar evolution, and 3. Astrophysics, in addition to the traditional astrometric work. Generally speaking, it was the beginning of the advantage of Astrophysics over Classical Astronomy. Tartu astronomers had also used their own observations for the pure theoretical research work. These observations were concerned with photographic determination of the brightness and the rotation period of Neptune, colorimetric studies of Mars, dependence of the light aberration on the wavelength of light emission. Theoretical works were dealing with the Cepheids pulsations, the oscillations of Mira Ceti, the cosmic gas dynamics. A. Kipper defended his Ph.D. dissertation “On the motion of gas in the atmosphere of pulsating Cepheids” in 1938. In the same year Dr. E. Opik had carried out his research work in the field of internal constitution and evolution of stars. There were several works concerned with the energy source in white dwarfs, the interstellar absorption and the surface brightness of nebulae, the dependence “mass vs. luminosity” and other aspects of theoretical astrophysics.
The most active in these investigations were E. Öpik, T. Rootsmäe, A. Kipper, J. Gabowicz, V. Rüves and G. Kuzmin. A series of studies has been carried out on the relativistic astrophysics and cosmology by W. Anderson and J. Nuut. The results of gravimetric investigations of E. Mielberg were posthumously published.

Investigations in meteor astronomy had been based on observations made by Dr. E. Öpik at the Tashkent Observatory in 1920–1921, in the Arizona expeditions in 1930–1932 and at the Tartu Observatory as well. In 1932–1934 the observation materials obtained in the Arizona expeditions have simultaneously been treated by calculators of the Tartu Observatory and by those from the Harvard Observatory (the “special task” calculating bureau) under the guidance of Dr. E. Öpik. The scope of these investigations has been extraordinarily wide encompassing the statistics of meteor frequencies, velocities and heights, meteoroid stream orbit calculations, theories of meteor luminescence, theories of meteoroid cratering. T. Rootsmäe has taken active part in these research works, too.

It should be noted that E. Öpik has, particularly, come to conclusion on the interstellar origin of sporadic meteors. He invented and designed an original camera for measuring the meteor velocities which was based on use of the “rocking” (also: vibrating) mirror. He was very active also in carrying out theoretical studies in stellar astronomy concerned with statistical investigations of stars; these works have been performed also by participation of T. Rootsmäe and H. Keres, who defended in 1937 his M.A. thesis “Dynamics of the eclipsing variables”. Investigating the proper motions of stars, E. Öpik determined the star luminosity distribution and that of the stellar spatial density.

E. Öpik’s studies of double stars resulted in the determination of the spatial frequency distribution of the stars-satellites of binary systems. He derived the law of distribution of stars-satellites as a function of their luminosities, and compiled a catalogue of binaries.

The Observatory had officially been entrusted with providing the exact time in 1921. The time signals were transmitted per telegraph to all institutions of the Republic of Estonia, the time-keeper being the Löbner’s pendulum clock; this task was performed by R. Pallav.

Another official mission of the Observatory consisted in determination of co-ordinates of all observing sites of the Estonian part of the triangulation network along the Baltic Sea coast. This happened in the framework of the international programme proposed by the Baltic Geodetic Commission and in cooperation with the Topography and Hydrography Department of the General Staff of the Estonian Army, this work being done by R. Livländ.

6. THE WORLD WAR II ERA AND ITS AFTERMATH

The happy scientific work and human dignity of scientists of the Tartu University and of astronomers of the Tartu Observatory had considerably been severed first by invasion of the Red Army in 1940 into the Estonian Republic following the Stalin–Hitler agreement of August 1939, and then in June 1941 when the Soviet Union was assaulted by the Wehrmacht.

In spite of these events the activity of the Tartu Observatory and that of Tartu University continued: after the vacation period of 1940 the staff of Tartu Observatory – consisting of Director Prof. T. Rootsmäe, observer Dr. E. Öpik, assistant Dr. A. Kipper, sub-assistant V. Rüves, laboratory technician R. Hallimäe, super-
intendent R. Pallav, calculators M. Koppel and G. Kuzmin – worked as usually.

As a consequence of changes in the University structure in the early 1941, the Chair of Astronomy was introduced, its head being Prof. T. Rootsmaä. The official positions were renamed as docent (assistant professor) (E. Opik), assistant (V. Riives and G. Kuzmin), senior laboratory assistant (R. Preem), laboratory assistant (R. Hallimäe), senior and junior preparators (R. Pallav and M. Koppel). Dr. A. Kipper was appointed the Professor of Physics of the University.

Astronomers continued their investigations concerned with stellar statistics, theoretical astrophysics, meteor astronomy (corresponding observations of meteors in Tartu, Valga, Petseri) and published several papers (e.g. on comet observations by V. Riives). G. Kuzmin prepared a paper on the dynamics of dust particles in the Galaxy. The next issue of the “Tähetorni Kalender” for the year 1941 was compiled.

After Estonia had been occupied in July 1941 by the Wehrmacht, everything at the University was drastically changed again. It was named “Ostland Universität in Dorpat”; the main building becoming the “Feldkommandantur Nr. 817”, the Chairs were abolished, the requirements for the obligatory “Reichsarbeitsdienst”, then for “Hilfswillige”, for “die Anwendung der Wissenschaft für Militärwesen”, and for “Umsiedlung” were introduced.

In spite of hardships of the war time and the status of the occupation the life at the Tartu Observatory gradually returned to almost usual course.

Dr. A. Kipper returned to the Observatory as an assistant and continued his studies in astrophysics. V. Riives got the position of a sub-assistant. G. Kuzmin was preparing his M.A. thesis. Professor T. Rootsmaä continued his studies in the field of Stellar Astronomy dealing with relationships between kinematical and physical parameters of stars. Dr. E. Opik published in 1943 his paper “On the composite stellar models” in the “Publications of the Tartu Observatory”, volume XXXI, issue 1.

In the course of heavy fights in 1944 the building and the equipment of the Tartu Observatory were partly damaged. It was R. Pallav who had rescued the Observatory’s building, having extinguished the fire in it. After the retreat of the Wehrmacht from Tartu in September 1944 the recovery of the Observatory has begun, the Chair of Astronomy being restored.

Dr. A. Kipper had taken the position of Professor of Physics and been elected vice-rector of the Tartu University. In October 1946 Professor A. Kipper was elected the Vice-President of the recently organised Estonian Academy of Sciences. The Tartu Observatory remained the working place for him, T. Rootsmaä and G. Kuzmin, and for other colleagues as well who had moved to other institutions (e.g. V. Riives who moved in 1947 to the Institute for Physics, Mechanics, and Mathematics). Investigations followed almost the old scientific directions, i.e., stellar statistics with emphasis laid on evolution of individual stars and of the galactic system as a whole, on dynamics and physics of minor planets and comets. The Observatory arranged the observation campaign of the solar eclipse of July 9, 1945; Professor A. Kipper made his observations with a group of astronomers and physicists in Tartu, whereas R. Hallimäe observed in Rakke (about 80 km from Tartu). After the Petzval-Astrograph had been activated, H. Albo and H. Raudsaar determined the positions of asteroids, V. Riives started the photographic observations of asteroids and comets, and G. Kuzmin had photographed the selected regions of the Milky Way aiming at studies of variable stars. V. Riives

There were some great plans for reconstruction of the Tartu Observatory, retaining the old building and the W. Struve house, and erecting a new building near the old site and mounting the Zeiss refractor at the new observing site near Kunste. These plans, however, never have been realised.

On June 30, 1948 the old Tartu Observatory was handed over to the Institute for Physics, Mechanics, and Mathematics of the Estonian Academy of Sciences. V. Riives was appointed its Head (Director).

7. THE TARTU/TÕRAVERE OBSERVATORY

A new turn in the life of the Tartu Observatory occurred in 1964 when the new astronomical observatory of the Estonian Academy of Sciences had been inaugurated at Tõravere and the Museum being established in the Old Tähetorn on the Toomemägi exhibiting all ancient astronomical instruments and devices.

The Tartu/Tõravere Observatory was equipped with the powerful 1.5-m reflector for star surveys and the AZT-8 reflecting telescope with 70-cm mirror for spectrophotometric studies using electronic-optical transformers, two distant-controlled and synchronised AZT-14 reflectors with mirrors of 47 cm in diameter for photoelectric investigations of star light, the Maksutov 20-cm reflector for the astroclimate monitoring, the special camera for the Artificial Earth Satellites (AES) observations and with many other auxiliary apparatus and devices.

The scope of scientific interests of the Tõravere Observatory is almost similar to that of the Tartu Observatory: stellar astronomy (Jaan Einasto and others), astrophysics (Arved Sapar and others), cosmology and theory of gravitation, exploration of the solar system, observations of the noctilucent clouds initiated in the Tartu Old Observatory by E. Hartwig, and continued by Ch. Villmann and others, observations of the AES, geodesy, physics of the Earth’s atmosphere, astronomical instrument design and manufacturing, problems of computational methods and techniques, and history of science. The eminent scientists of the Tartu/Tõravere Observatory are continuing to increase the publicity capital of their Observatory and that of their Alma Mater.

Now after the free Republic of Estonia has been proclaimed in 1991, we are eyewitnesses of new scientific achievements of the successors of the Old Generations of Tartu astronomers in challenging fields of modern astronomy (galactic and extragalactic astronomy, models for galaxies and galactic super-clusters, Dark Matter, optical and X-ray clusters, geophysics etc.) under the leadership of its Directors Dr. Tõnu Viik, Dr. Laurits Leedjärv and Dr. Anu Reinart.