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To the memory of Konstantin V. Kuimov (13.03.1939–18.03.2017)

On March 18 2017, Konstantin V. Kuimov passed away; he was an outstanding astrometrist, professor at the astronomical department of the Physical Faculty of Moscow State University (MSU), and also head of astrometry and time service department of Sternberg Astronomical Institute SAI MSU.

His main field of scientific research was photographic astrometry. His works on digitalization of the Astrographic Catalogue and the creation, using this base and the HIPPARCOS mission catalogues, of the astrometric catalogues of new generation are widely known. Also, his painstaking work on high-precision determination of the kinematic characteristics of individual objects in the Galaxy should, indeed be mentioned. The list could go on. As a rule, his publications were way ahead of their time; for example, his paper on photo-plate deformation effect on astrometric surveys with the Schmidt telescope started to be in demand 15 years after publication.

Konstantin V. Kuimov (K.V.) was an excellent observer. He worked with AFR-1 telescope, went to Crimea to observe the artificial Earth satellites and made a considerable contribution to the observations.

As university professor, K.V. gave lectures in general astronomy and astrometry, constantly updating the course of astrometry; he conducted practical classes, headed the field practices and composed methodical textbooks. Students have always highly appreciated KV not only for his talent as a teacher, but also for his goodwill, constant readiness and his ability to answer any question.

The K.V. Memorial Conference "Modern Astrometry" took place on October 23–25 2017, at SAI MSU. It was organized by SAI MSU and EAAS. The conference program included talks on various problems of astrometry and a memorial session. In the following text you can find extracts of two memorial talks and three papers on topics that K.V had worked on.

Some recollections of V.M. Chepurova*

A few words about K.V. Kuimov.

I first met K.V. at the Moscow Planetarium astronomical circle when I was still a school student.

My father was an officer and we often moved from place to place following his assignment. So I went to Moscow schools for a short period only. But in the summer and, sometimes, winter school vacations, my mother would take leave from work and we would go to Moscow. I became interested in astronomy, and my mother got in touch with the Moscow Planetarium administrators.

I was permitted to take part in the circle activities during the summer. I was, so to say, a visiting, or from time to time, a circle member and one of a few new

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permanent circle members. In particular, I made acquaintance with two boys one grade behind me, M.L. and K.K., both thin and of middle height, and, like myself, passionately in love with astronomy.

In 1955, I graduated from secondary school and entered the astronomy department of MSU Mech-Math faculty (MM). In 1956, M. and K. entered the same department. Everything seemed OK: just go and study. But in October the astronomy department was moved from MM to the Physical Faculty (PhF).

Many students regarded this as a tragedy. Fortunately, our 2nd year was left to continue the education at MM, but the first year students were to go to PhF. As a result only half the group (13 students out of 26) went to the Physical Faculty. The others remained at MM, taking different specializations.

The choice was painful. Kostya, Misha and others would come to us as old friends to discuss what to do. I then decided that in the case of transfer I would remain at MM, at the department of theoretical mechanics, but Kostya, an ardent observer, was unanimously advised to go to PhF.

Later Kostya and I met at SAI and resumed our friendship. We studied at the same cathedra.

We used to meet often. Kostya had delicate health when young, but he would never complain and, in general, would always try to avoid talking about himself. In a sense he was a "buttoned up" and reserved person. But he would always put his own work to one side when one or other of his friends needed help. He was very kind and attentive, especially with those he thought of as his friends.

When in the second half of 1969 I completed the theoretical part of my PhD thesis and was preparing to defend it, quite unexpectedly the Higher Attestation Commission issued an instruction on the necessity for the results of every theoretical work to be supported (reinforced) by a comparison with numerical integration of the solved equations and, whenever possible, with observational data. So an additional large time-consuming work was to be done on programming my formulas and numerical integration. I could program in absolute coding, but time was pressing. I got night computer time at the MSU computer centre and began to work. The work progressed as it should, but besides the already mentioned programs I was in need of some additional ones, namely, those for transition from one reference system to another (from α, β to the rectangular coordinates x, y, z and back, geocentric as well as heliocentric and planetocentric). The formulae were well known, but I lacked the programs.

Well. One evening while I was preparing to go to the Computer Centre to test my programming, there was a knock at my room door – the polite Kostya, who would never enter without knocking, came in carrying a heap of punch cards and said: "I heard your report. I liked your work. But you need a program for coordinate transition. Here it is. You just need to adjust it to you computations". And he put the cards on my table.

He saved me about a month and a half of work. And I know many people at SAI whom Kostya has provided with additional (service) programs.

Kostya rescued me on another occasion too. At the very end of the past century I became EAAS scientific secretary. Tasks were numerous. I needed help. I tried hard but could find no assistant. And suddenly Sasha Sokolova came to me offering her help, at the request of his superior K. Kuimov. We got on well and worked together for several years. I was very grateful to Kostya, but he would not listen to thanks;

it was in his nature to help people. And that is how many of us remember him – a kind, tactful, modest person always ready to help those who needed assistance.

Some recollections of N.G. Bochkarev*

A few words about K.V. and his early works.

I was a member of the Moscow Planetarium circle in 1960–1964, and it was there that I met Konstantin Kuimov, at the end of the first year of my classes.

By then, he was already an experienced member of the circle and had led classes in the circle for several years. The acquaintance began during the test on knowledge of telescope and K. was the examiner and I was the examinee. Kostja was a very kind examiner, briefly clarifying the uncertain parts of my answers.

In 1965 I entered the MSU astronomy department. K.V. was appointed curator of our student group. He used to spend a lot of his time with us trying to help us in the solution of current problems, of which there were many. In August 1966 we practiced astrometry at the SAI astro-site at Lenin Hills. K.V. taught us to work with universal instruments and use practical methods for determining celestial body azimuth and also the geographical coordinates of our location.

He used to spend all the nights through with students, helping them to master the astronomical theodolite and to obtain and process the observational data. The data processing was carried out with old, "out of date" calculating devices. We called them "the Iron Felix". But I was permitted by K.V. to use the next generation calculating machine – an automatic electro-mechanic calculating device, product of Rheinmetall company, which eased the processing very much.

Although I did not aim to specialize in astrometry, all of the information and skills that I learnt while practising it proved useful to me in my student years during expeditions to observe the full solar eclipse. Based on that experience, I was twice appointed as responsible for determining the coordinates and precise location of the expedition and fixing the meridian (markings on the cardinal points).

Well, I coped with the task by recollecting the detailed and extremely clear explanations, directions and instructions given to me by the always caring K.V., during the summer practice in astrometry. His explanations were so precise that I remembered them for many years to come and thanks to them could cope with tasks I had to perform.

A year later, in 1967, during my meetings with the supervisor of my first student research, M.A. Livshits, I could witness M.A. and K.V. ardently discussing the technique that would allow a precise determination of the coordinates of solar spots.

Later, I understood that it was important for processing the data from radioastronomical observation of solar eclipse with the aim of determining exactly, which regions of the Sun, or rather, of sunspots, emit in the radio range, on different wave lengths. Kuimov's first scientific paper[1] was based on that work with M.A. Lifshitz.

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[1]Kuimov, K.V.; Livshits, M.A.; Men'shikova, S.B. Determination of precise coordinates of sunspots from photographic plates of partial eclipse phases. In: Radio astronomy observations of the solar eclipse on 20 May, 1966, pp. 23– 33.

K.V.'s next scientific work[2] was performed in co-authorship with D.K. Karimova and E.D. Pavlovskaya, well known specialists in investigation of proper motion of stars. In that work the authors determined for the first time all the three components of space velocity of the X-ray source Cyg X-1. The object was the first candidate to be a black hole and is still intensively investigated. Later K.V.'s results were confirmed by the astrometry space observatory HIPPARCOS.

The third work published by K.V. and presented in NASA/ADS database is "Experience of investigation of wide-angle astrometry objective based on computation of its characteristics"[3] . In that paper for the first time (in any case, in Soviet scientific literature) investigation of the astrometric objective was carried through using not only an analysis of performed observations but also a method for detailed calculation of point-spread function.

SAI wide-angle astrograph (AFR-1) aberrations were scrupulously investigated in a number of papers (see, e.g., the paper by V.V. Podobed et al.[4] and references therein). However, the results obtained for certain aberrations, for example, for objective distortion, did not agree one with another. The ray propagation modeling carried out in [3] allowed us not only to determine the distortion distribution over the field of view, but also to compute the chromatic aberration value and its dependence on the image structure.

The three early works of K.V described above demonstrate that his potential as an investigator was not restricted to just the classical astrometry tasks.

Those three first publications of K.V allowed us to track his formation and ability as a wide-field scientist capable of coping with problems of different nature and covering different fields of application of astrometry methods, first of all, astrophysics. Probably his move from MM to Physical Faculty, described by V.M. Chepurova (see above), played its role.

At the same time, those three papers demonstrate his ability to work in teams, his friendly attitude and his eagerness to help everyone seeking his assistance.

His wide and deep knowledge which covered both the rapidly developing methods of astrometry, and the field of their application, allowed him not only to accomplish so much in science, but also to become an indispensable expert whose advice and assistance were very necessary to all who knew him, as well as to educate students who continue his work.

It was possible to come to K.V. with any question on astrometry and get a complete answer. During the consultations, he provided all the interested persons with results brought to numerical value. For example, if he was asked what was the elevation of the Sun as observed from the Moon at a given time, the inquirer would leave with an accurate and concrete result.

What is more, K.V. often supplied people with programs for computing magnitudes of their interest, carefully helping to ensure the efficiency of the offered algorithm

[2]Karimova, D.K.; Kuimov, K.V.; Pavlovskaya, E.D. The motion of Cyg X-1. Astronomicheskij Tsirkulyar No 883, 1975, p. 1.

[3]Bochkarev, N.G.; Kuznetsova, E.V.; Kuimov, K.V. Experimental investigation of a wide-angle astrograph based on calculation of its characteristics Astrometriia i Astrofizika, No. 38, 1979, pp. 56-61 (in Russian).

[4]Podobed, V.V.; Ponomarev, D.N.; Frolova, N.B.; Shokin, Iu.A. The GAISh wide-angle astrograph, its investigations and possibilities. Astrometriia i Astrofizika, 1979, No. 38, pp. 76–83 (in Russian).

on the computer of those asking for assistance, whoever they were, whether SAI staff members, astronomers from other institutions, or just amateur astronomers.