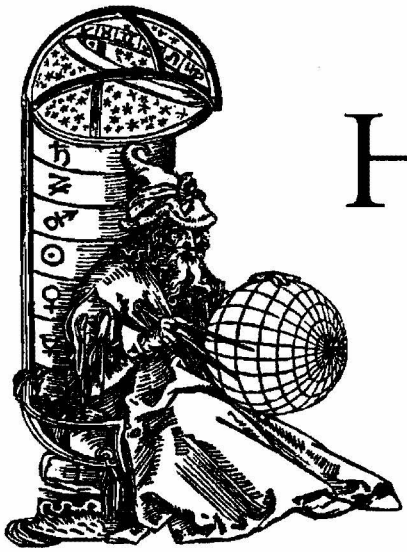

H·A·D NEWS

The Newsletter of the Historical Astronomy Division of the American Astronomical Society

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Washington Meeting

Our next meeting is January 11--12 (Tuesday and Wednesday) in Crystal City, Virginia, just across the 14th Street Bridge from Washington, DC. The official hotel of the AAS meeting is the Crystal Gateway Marriott. However, because the Society has outgrown this hotel, some sessions (ours, in particular) will be held across the highway (or through the Underground, a pedestrian walkway/shopping mall beneath the highway) at the Crystal City Marriott. These hotels are independent, so keep them straight.

The HAD sessions will be in the Crystal City Marriott, Salons A/B. This gives us the advantage of a spacious room, but it is a 5–10 minute walk from most of the other sessions. Both Victor Abalakin's Invited Talk on the history of Russian astronomy and the HAD reception will be held in the Crystal Gateway. Lacking guide dogs, we'll post signs to direct traffic.

Tuesday the 11th will be devoted to the symposium "Astronomy and the State: U.S. and C.I.S. Perspectives," organized by HAD's International Relations Committee. You'll find the program on page 3, with abstracts on pages 4–6.

Wednesday, we have two sessions of papers, an AAS Invited Talk, the annual business meeting, and a reception. The morning session, organized by Brad Schaefer, is devoted to "Celestial Visibility." Victor Abalakin's Invited Talk follows. Over lunch we'll have our annual business meeting (so pick up a sandwich in the Underground), followed by an afternoon of contributed papers. In the evening, HAD will hold a reception. You will find a schedule for the day on page 3. ☆

Class Notes

This is the first in a series of *Class Notes* devoted to historical figures in astronomy. Although they will be firmly based in historical research, these columns will be brief and light enough for easy adaptation into classroom lectures. Perhaps these will help cure the glassy-eyed look so common in lecture halls. Our initial contribution is from David DeVorkin, who recently visited India to participate in meetings commemorating the birth of Meghnad Saha. Our next set of *Class Notes* will feature "Hertzsprung and Russell — Whatta Pair!"

Saha Centennial

David DeVorkin

This year marks the 100th birthday of the physicist Meghnad Saha, who was born on October 6, 1893. Saha was a lower caste Vaishya, born into a poor shopkeeper's family in a rural Bengali village on the periphery of colonial Calcutta. From these unlikely beginnings, Saha became a significant catalyst for the transformation of astrophysics circa 1921, when he showed how the quantum theory could be applied to stellar atmospheres through his theory of thermal ionization equilibrium. He was the first to show, on the basis of physical theory, that the Harvard spectral sequence was a temperature sequence. Though it was Saha who set much of spectroscopic astrophysics along the new path, it was Henry Norris Russell, as well as E. A. Milne, R. H. Fowler, C. H. Payne, and others in the West, who were at the right place at the right time to take it through its course. To-

Class Notes continues on p. 2

AAS Invited Talk

At the suggestion of HAD's International Relations Committee, Victor Abalakin will give an Invited Talk "On Some Aspects of the History of Russian Astronomy" at the January AAS meeting. This is scheduled for noon on Wednesday the 12th, between the HAD sessions on that day.

Dr. Abalakin is Director of Pulkovo Observatory and Head of the Department of Ephemerides at the Institute of Theoretical Astronomy in St. Petersburg. Although his specialty is celestial mechanics, he has actively studied and promoted the history of astronomy. Well before glasnost he was carrying out research on the Soviet astronomers who were arrested during the Stalinist period. It is largely due to his efforts that the [former] KGB has opened its archives and provided previously secret records concerning arrests, trials, sentences, imprisonments and executions of astronomers. ☆

HAD Reception

HAD will hold a reception on Wednesday, January 12, 7:30–9:00 p.m., at the Crystal Gateway Marriott. Guests of honor will be the historian/astronomers from the Commonwealth of Independent States. To help defray costs of bringing them to the U.S., we are charging $10 per person at the door. In addition to a table of hors d'oeuvres, there will be a cash bar. Please come for an informal evening with our C.I.S. colleagues. ☆

— *Class Notes* —

gether they provided for the first time quantitative knowledge of compositions, density distributions and temperatures, that resulted in binding together physics and astronomy in a manner that persists today. Saha, unable to compete in Calcutta due to indifference from the West and political rivalries at home, could only watch what he had set in motion.

By the 1930s, Saha's political activism, present since 1905 when he was a protester in the wake of the partition of Bengal, emerged as he founded the "Science & Culture" group, centered on a journal bearing the name. Though an ardent believer in independence, Saha nevertheless disagreed with the policies of Gandhi and Nehru, feeling that it was essential for India to acquire, adapt and apply the technical and scientific expertise of the West, and to make it Indian, in order to build a strong, independent nation. Buying technology was not enough; growing a domestic infrastructure was essential. In 1938, Saha turned from spectroscopy to accelerator physics, campaigning that India had to compete in this new arena to become a truly modern, competitive nation when it was freed from British bondage. These sentiments and his continuing activism won him a seat in Parliament after Independence.

Did Saha Meet Boltzmann?

Sometimes I wonder about the quaint conventions the world of science creates—especially that of naming units, effects, theories, equations, etc., after their creators or after those the collective culture deems worthy. Of course, this is merely a reflection of society. Names of government buildings, legislative acts and decrees, amendments, city streets, regions, states, pets, ..., all conspire to anoint individuals who have performed admirably in some way or another. This should be taught from birth, so that when we take astronomy in college, we are not distracted by the labels given to important ideas or useful tools.

Take the Saha-Boltzmann equation, as it is called in many textbooks. In other texts it is simply the Saha equation or the ionization equilibrium equation. In the early 1920s, a few called it the Eggert-Saha equation, and some patriotic Brits even called it the Eggert-Saha-Milne-Fowler equation. At a time when hyphenated names are becoming more common, a student might well wonder.

Being inquisitive and easily distracted from more important work, I naturally wondered about the Saha-Boltzmann relationship—between the people, not between temperature, pressure, ionization potential and the fraction of ionized atoms in a gas. Boltzmann died in 1906, when Saha was about 13 years of age. So much for any personal relationship. Well, the answer is that Milne and Fowler (with the help of G. W. Darwin) rederived Saha's equation using the techniques of statistical mechanics, founded upon Boltzmann's formalisms. This provided a truly physical, as opposed to Saha's chemo-thermodynamical, derivation. Subsequent workers used Boltzmann's statistics, in preference to Saha's heuristic methodology, since it allowed them to get at both the excitation and ionization states at the same time. ☆

Tuesday Program

Astronomy and the State
9:00–5:00
Salons A/B (Crystal City Marriott)

9:00– 9:15 **Introduction**
Robert McCutcheon (Computer Science Corp.), chair

9:15–10:15 **Astronomers and Political Repression**
Political Repression Against Soviet Astronomers in the 1930s – A. I. Eremeeva (Shternberg State Astro. Inst., Moscow)
Political Activity at Harvard College Observatory in the Shapley Era (1921–1952): Controversy and Consequences – B. L. Welther (Harvard/Smithsonian)

10:30–11:30 **Post-WW II Astronomy and Rebuilding Astronomical Institutions**
Up the Down Staircase – A. A. Gurshtein (Inst. for History of Science and Technology, Russian Acad. of Sciences)
Post WWII Astronomy and Rebuilding U.S. Astronomical Institutions: The U.S. Perspective – W. E. Howard (Vienna, VA)

11:30– 1:00 **Lunch**

1:00– 2:00 **State Support of Radio Astronomy**
On the Post-War Development of Radio Astronomy in the Former Soviet Union – V. S. Strelnitski (Smithsonian, Nat. Air & Space Museum)
Postwar Radio Astronomy and the US Military – W. T. Sullivan (U. of Washington)

2:15– 2:45 **International Relations During the Cold War**
International Science in the Cold War: The Politics of U.S.-Soviet Astronomy, 1950–1961 – R. E. Doel (Smithsonian, Nat. Air & Space Museum)

2:45– 3:15 **Discussion on International Relations**
Cathy Lewis (Smithsonian, Nat. Air & Space Museum), chair

3:15– 4:00 **Commentaries**
Victor Abalakin (Pulkovo Observatory)
Robert McCutcheon (Computer Science Corp.)

4:00– 5:00 **Panel Discussion**
David DeVorkin (Smithsonian, Nat. Air & Space Museum), chair

Wednesday Program

Session 27: *Celestial Visibility*
10:15–11:45
Salons A/B (Crystal City Marriott)

Building Modern Cometary Models Using Ancient Chinese Data (Invited) – D. K. Yeomans, K. Yau, P. R. Weissman

Comet Panics, Daytime Visibility of Venus and Napoleon's Star (Invited) – D. W. Olson

Two Celestial Visibility Projects: 1) The Brightness of an Eclipsed Moon and 2) The Phase Anomaly of Venus – A. Mallama

Beyond Visibility: The "Crucifixion Eclipse" in the Context of Some Other Astronomical Events of the Times – C. M. Gaskell

Atmospheric Clarity and Tycho's Fake Stars – D. Rawlins

Visual Observations of the Night Sky – *A. R. Upgren*

A Comprehensive Set of Equations for Celestial Visibility Calculations – B. E. Schaefer

Session 28: Invited Talk
12:00–12:50
Salons III/IV (Crystal Gateway)

On Some Aspects of the History of Russian Astronomy – V. K. Abalakin

HAD Business Session
1:15–2:15
Salons A/B (Crystal City Marriott)

Session 34: HAD Contributed Papers
2:15–3:45
Salons A/B (Crystal City Marriott)

George Ellery Hale, Ernest Fox Nichols, and Radiometry at the Yerkes Observatory – R. S. Brashear

Walter Baade and the Southern Hemisphere – D. E. Osterbrock

Back to the Future – D. H. DeVorkin

HAD Reception
7:30–9:00
Room to be Determined (Crystal Gateway)

Astronomy and the State: U.S. and C.I.S. Perspectives, I

Astronomers and Political Repression

Political Repression Against Soviet Astronomers in the 1930s — A. I. Eremeeva

The Soviet government's repression of the Russian intelligentsia in the late 1930s had a devastating effect on astronomy. This period was marked by the strengthening of a rigid ideology in society and a growing atmosphere of suspicion, fear, and spy mania. Under these conditions the international nature of astronomy — in particular the need for foreign contacts — became the excuse for accusations of "wrecking" against astronomers. The fate of individual astronomers and institutions depended greatly, however, on local circumstances.

For example, the general political repression of the 1930s began in Leningrad at a time when Pulkovo Observatory director B. P. Gerasimovich was engaged in a sharp conflict with a small group of junior staff led by V. A. Ambartsumian. In addition, the very first arrest of a Leningrad astronomer — namely the arrest of B. V. Numerov — appears to have initiated a cascading series of arrests that spread like an avalanche through the close-knit community of Leningrad astronomers. These two factors led to the devastating ruin of Pulkovo.

Completely different circumstances saved GAISh. This was a comparatively young institute whose junior staff had spent its formative years at GAISh rather than joining the staff from outside (as had been the case at Pulkovo). Thus the GAISh staff had a greater degree of homogeneity and solidarity, and this, in turn, may explain why the ideological department at GAISh (the "partburo") conducted itself in a manner that differed sharply from that of the "partburo" at Pulkovo. Thanks to these circumstances not even one arrest occurred at GAISh.

The directors of Pulkovo and GAISh came from very similar backgrounds, but the different conditions at Pulkovo and GAISh led to dramatic differences in their fates: execution for B. P. Gerasimovich in 1937 and "only" the persecution of GAISh director V. G. Fesenkov. The persecution of V. G. Fesenkov included his dismissal from the post of chairman of the Astronomical Council in 1937 and his removal as director of GAISh in 1939.

Political Activity at Harvard College Observatory in the Shapley Era (1921–1952): Controversy and Consequences — B. L. Welther

Soon after Harlow Shapley became director of HCO in 1921, he established himself as a scientist who would speak out and take action on national and international issues. Recognizing the importance of international cooperation in astronomy, he frequently traveled abroad and in turn invited foreign scientists to visit and work at HCO. By the mid-1930s, Shapley was actively rescuing refugee scientists in war-torn Europe and placing them in American universities. Both Harvard and the FBI took note of his activities. Shapley feared intervention of any kind from either academia or the government. Desperate for funding, however, he finally went to Washington and lobbied Congress to set up the NSF. Through 1945, when Truman succeeded Roosevelt, Shapley pursued his political activities freely. That year he travelled to Moscow to represent Harvard at the 220th anniversary celebration of the Academy of Sciences. In Moscow he advocated international cooperation between Soviet and American scientists. Consequently, Shapley was subpoenaed for interrogation in 1946 by John Rankin, who served during the Truman administration as a one-man committee to investigate un-American activities. The ordeal infuriated Shapley. Headlines about it infuriated some Harvard alumni who urged the university to fire him. Although Shapley was nearing retirement, President Conant stood by his right to keep his job. By 1950, when Senator Joseph McCarthy was compiling a list of Communist sympathizers in the State Department, the FBI had a dossier on Shapley. McCarthy subpoenaed Shapley, but could not intimidate him. The Senator continued the witch hunt with Shapley's associates. First he harassed Martha Betz Shapley, then Donald Menzel. Both cleared themselves. Other associates, such as Bart Bok, were spared. Ultimately, the interrogation worked in Menzel's favor. It disassociated him from Shapley's ideology and political activities. When the Harvard Corporation sought the next director of HCO, Menzel became the candidate of choice.

Astronomy and the State: U.S. and C.I.S. Perspectives, II

Post-WW II Astronomy and Rebuilding Astronomical Institutions

Up the Down Staircase — A. A. Gurshtein

The title of this presentation is taken from a well-known novel to emphasize that a renaissance in Soviet astronomy and space research took place after World War II under conditions of national tragedy. After a decade of political repression and war, the Soviet government had resolved that fundamental science should serve as a foundation for Communism, and this policy stimulated titanic new efforts that were intended to benefit Soviet science.

Having been destroyed totally during the war, Pulkovo Observatory was rebuilt on its old foundation according to its original plan. The decision to rebuild Pulkovo can not be justified on scientific grounds, however, because of the proximity of a large city (Leningrad) and generally cloudy weather. Thus the rebuilding of Pulkovo in spite of the most difficult living conditions must be seen primarily as a great symbol.

The Academy of Sciences of the Armenian Republic also was founded in the aftermath of World War II, and its president, Viktor Ambartsumian, introduced astronomy to Armenia with the construction of Byurakan Observatory. (It is noteworthy that concurrently two leaders of republican academies were astronomers: Evgenii Kharadze, director of the Abastumani Observatory, in Georgia, and Ambartsumian in Armenia.) In addition to Byurakan, several other large and well-equipped astronomical institutions were founded after the war — among them the Crimean Astrophysical Observatory and the Principal Astronomical Observatory of the Ukrainian Academy of Sciences near Kiev.

As a natural consequence of this institution-building, the General Assembly of the IAU held its 1958 meeting in Moscow. Indeed, this meeting was the first large international scientific event in the Soviet Union following Stalin's death. At the time of the Assembly the Soviet government declared, as a counterpart to the launch of the first sputnik, its ambitious program to build the largest optical telescope in the world.

Post WWII Astronomy and Rebuilding U.S. Astronomical Institutions: The U.S. Perspective — W. E. Howard, III

A belief that technology contributed substantially to the winning of World War II spurred the formation of ONR, then NSF which was formed in ONR's image. NASA's space support, cold war competition, and ARPA's funding of high risk, high payoff technologies led to state-of-the-art instrumentation in astronomy. Limits on funding for instrumentation at individual institutions led to the concept and growth of national astronomy observatories that made observing time available to the best ideas from astronomers who had no access to big telescopes at home. Success of these major observatories lay also in their treatment of visitors who were made to feel a part of the institution. As federal funding became available several issues were heavily debated, among which were overhead costs on grant awards, what the breakdown of responsibility should be for institutional vs. federal funding, spreading vs. concentrating the available funding, the role of the AAS and advisory groups, federal vs. researcher specification of the research program, and the roots of the modern debate concerning research relevance. U.S. astronomers are unique because of our eclecticism, our development of a winning system of workplaces, our peer review system, our united front presented by our projective planning and our periodic decade reviews, our international orientation, all in the context of national support that is preeminent in the world. These features operate within an economic system that enables us to communicate and travel easily, and scientific and academic administrations that permit astronomers to concentrate on their research without excess internal or external politics.

Astronomy and the State: U.S. and C.I.S. Perspectives, III

State Support of Radio Astronomy

On the Post-War Development of Radio Astronomy in the Former Soviet Union — V. S. Strelnitski

A short review of the post-war history of observational radio astronomy in the former Soviet Union will be presented, with an emphasis on the role of the national industry in the development of the radio telescopes and receivers.

Postwar Radio Astronomy and the US Military — W. T. Sullivan, III

The course of radio astronomy in the United States during the period 1945–60 was greatly influenced by the funding and requirements of the US military. The scientific researchers and their military patrons continued the intimate relationship that had been so successful for the development of radar and communications during World War II. The result was a very high level of funding that led to large-scale projects, a concentration on the microwave portion of the radio spectrum, and primary interest in the sun, moon and planets. These effects, however, ironically significantly contributed to the lag in US radio astronomy relative to that in Australia and England. Unlike the American approach, the strategy of the groups in Sydney, Cambridge and Jodrell Bank, reasoned that the most fruitful way to approach the radio sky at the time was with relatively simple equipment (largely revamped war surplus) operating at the lower frequencies. Other factors, such as the strength of optical astronomy in the US, also played important roles. By the mid-1960s, the microwave expertise that had been developed in the US finally paid off such that US radio astronomy was at least able to assume a position of more parity. Some similarities in the development of postwar Soviet radio astronomy will also be discussed.

Astronomy and the State: U.S. and C.I.S. Perspectives, IV

International Relations During the Cold War

International Science in the Cold War: The Politics of U.S./Soviet Astronomy, 1950–1961 — R. E. Doel

During the height of the Cold War, scientific relations between American and Soviet astronomers grew deeply strained. Polemical statements by Soviet astronomers in the early 1950s caused American astronomers, including Otto Struve, Fred L. Whipple, and Leo Goldberg, to worry that political coercion had breached the integrity of the Soviet astronomical community. At the same time, Struve, Goldberg, and other U.S. astronomers faced growing pressure from State Department officials to adhere to American foreign policy objectives, including restrictions on contacts between American and Soviet scientists. By the late 1950s, American astronomers participated in a significant yet little-known effort to challenge State Department policy towards international science. Nevertheless, the close relation between U.S. scientists and the state after 1945 limited the options that American astronomers had in maintaining international cooperation in astronomy. Understanding this political and intellectual framework provides new insights into how the Cold War influenced American astronomy in the 1950s. Priority debates, competition over disciplinary leadership, and national loyalties also strongly shaped international scientific cooperation during this period.