

The Future Utilisation of Schmidt Telescopes
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The Bosscha Observatory Schmidt Telescope

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Abstract. A brief history is presented of the Bosscha Observatory in the 1950s, when the plans for a Schmidt telescope in Lembang materialized.

1. Introduction

The Bosscha Observatory was founded in Lembang (West Java, Indonesia) in 1923 by the Netherlands-Indies Astronomical Society. This society was initially an amateur organization, started in 1920 by the teaplanter and cousins K. A. R. Bosscha and R. A. Kerkhoven and some other well-to-do planters and larger commercial companies in the country. The society raised funds for instrumentation and hired professional astronomers to operate the observatory. As of 1928 the observatory had as major instrumentation a 19 cm Merz refractor, a 37 cm Bamberg-Schmidt refractor and a Zeiss 60 cm double refractor. The Zeiss was at the time of its dedication in 1928 the third largest telescope in the Southern hemisphere (after the 122 cm Melbourne reflector and the 70 cm La Plata reflector). From 1928 onward the society received annual financial support from the Netherlands-Indies Naval Department.

In the aftermath of World War II the observatory had suffered serious damage by the military occupation. Since the society did not have sufficient means for rehabilitation, it granted the loan of the Bosscha Observatory to the Faculty of Science (later *Fakultas Ilmu Pasti dan Ilmu Alam*) of the University of Indonesia in Bandung, founded by the Netherlands-Indies government after WWII. The faculty would in turn finance the rehabilitation and operation of the observatory. At that time the director of the observatory was Chris H. Hins, who was appointed there as a conscript by the military authorities of the Netherlands Indies in November 1946. In 1951 the Netherlands-Indies Astronomical Society was discontinued. The society at that occasion donated the Observatory to the Indonesian government, which transferred it formally to the faculty.

2. Preparations for a new telescope

In 1947 the 2nd General Meeting of the UNESCO was held in Mexico. The astronomer Egbert A. Kreiken attended this meeting as Head of the Department of Higher Education in Jakarta. Kreiken (trained in Groningen and Amsterdam) was a staff member of the Bosscha Observatory from 1928 to 1930, at the time that the Swedish astronomer A. A. E. Wallenquist also was working in

Lembang. From 1931 to 1942 Kreiken had been teaching mathematics in high schools on Java. It must have been through the good office of Kreiken, that UNESCO decided to donate the optical parts for a new telescope to the Bosscha Observatory. This decision must have reached the observatory in 1948.

After I had been at the Bosscha Observatory as an assistant since December 1948, G. Bruno van Albada arrived at the observatory in May 1949, as an assistant with teaching assignments. When Hins left in 1950, I was temporarily appointed as director-in-charge. Van Albada and I married on August 1, 1950. A year later, in October 1951, van Albada was appointed professor of astronomy and director of the observatory. While he was actively rehabilitating the observatory, he was keenly interested in the new telescope project. At the time the new telescope was thought to be a 'light-collector', a reflector designed for photometric observations. A similar instrument was being built in the optical workshop at the Yerkes Observatory of the University of Chicago. Ours would be the second one of its kind.

After some time, however, it became evident to van Albada that the transparency in Lembang was rather variable and therefore not well suited for photometry. Thus a photometric telescope would be of limited use to the Bosscha Observatory. Van Albada informed the director of Yerkes Observatory, Gerard P. Kuiper (also from The Netherlands), of his findings. (By the way, a few years before WWII Gerard Kuiper had been invited to become the director of the Bosscha Observatory. He had already accepted, but changed his mind after receiving a similar invitation from Yerkes Observatory.) Kuiper accepted van Albada's judgement and very generously offered to replace the optical parts for the light-collector-to-be by those of a 50-70 cm Schmidt telescope ($f/2.5$, designed for observations up to 9000 \AA), that was available in the Yerkes Observatory optical workshop; the parts included a 6° objective prism. This was a tremendous offer, since a Schmidt telescope is known to be the very instrument for stellar statistics, and the Milky Way stands high in the Indonesian sky.

3. Fund raising and construction

UNESCO agreed to the change that involved a somewhat higher price, and contacted the government of the Republic of Indonesia about the matter. The government was told that UNESCO was willing to donate the optical parts of a Schmidt telescope for the Bosscha Observatory, on the condition that the government would guarantee in writing the costs of constructing the mounting and operating of telescope. Before accepting this obligation, the officials dealing with the project sought information about the probable costs of the mounting. Based on a completely inexperienced estimate of US\$ 16,000 the government accepted the offer from UNESCO and signed the contract, to our great satisfaction.

Van Albada was then asked to find a construction company for the mounting. He contacted various well-known telescope construction companies, who offered to build the mounting for a mere (sic!) US\$ 150,000 to 200,000. Gone was our satisfaction... Van Albada in his despair contacted Jan H. Oort, director of Leiden Observatory. Oort at that time was also chairman of the Leiden Observatory Foundation, a foundation, however, that in no way could make up for the difference. Oort discussed the problem with the company of Rademakers in

Rotterdam, a factory of high-precision tools, including cog-wheels. The director of that firm took a great interest in astronomy, and the firm had worked for the Leiden Observatory and Mt. Palomar Observatory. In his explorations to reduce the cost of the mounting, Oort also contacted the director of the Mt. Wilson & Mt. Palomar Observatories. Mt. Palomar just had at its disposal the 'big S', at that time the largest Schmidt telescope in existence. Its director obliged us greatly by allowing Rademakers the free use of some of the designs for the 'big S', among which was that of the plateholder. Rademakers for its part would not charge us for a variety of other designs. And thus the marvel materialized that in 1953 Rademakers made the offer to build the mounting for US\$ 16,000, or a little more. In case the cost would exceed US\$ 18,000, the Leiden Observatory Foundation would provide up to US\$ 4,000 (in the end the Foundation had to provide only US\$ 1,000), and UNESCO too promised an additional US\$ 2,500.

All that remained to be done, in 1954, was for the Indonesian government to sign a contract with the firm of Rademakers for the construction of the telescope mounting. Each and every one of the officials at the Department of Education in Jakarta that was party to the contract expressed great satisfaction with the offer. But the signing of the contract did not come about. It took us years to find out why, and in 1955, after a leave-of-absence, we almost decided not to return to Indonesia unless the contract was signed by the Indonesian government. Finally one of the Bandung university assistants discovered why and how: two of the government officials in Jakarta who were supposed to sign the contract were not on speaking terms with each other! We then easily passed this bottleneck by carrying in person the contract from one to the other. Meanwhile it was June 1956.

Rademakers had already done much of the preparatory work, started the actual construction of the mounting in 1957, and finished it in March 1958. The large cases containing the mounting arrived by ship in Tanjung Priok, the harbour of Jakarta, in May 1958. Van Albada and his student Santoso personally went to Jakarta to oversee the careful handling of the precious shipment. It took them three or four days of custom formalities, bureaucracy and some friendly gestures to get the cases from the harbour. On the final stretch to Lembang all that could go wrong went wrong. Out of gas, the crane that was to unload the truck broke down, and it turned out that the large cases with the mounting could not pass through the doors of the telescope building. But, as always, solutions were found.

4. Changing of the guard

In 1958 an official boycott by the Indonesian government against The Netherlands and the Dutch people in Indonesia was in force. Even though we were not yet being harassed ourselves, we did not feel at ease anymore. Moreover, after nine years in Lembang, scientific isolation became a problem, and suitable schools for our young children were disappearing. Thus Bruno and I decided not to renew our contracts with the Indonesian government and to leave for Holland in July 1958.

At the time there was no formally qualified successor as observatory director. Gerard Kuiper at Yerkes Observatory therefore refused to send the precious

optical parts to Lembang, since there was no one to take responsibility for the Schmidt telescope. However, just before our departure, the first Indonesian student in astronomy that had been trained by van Albada, Pik-Sin Thé, passed his doctoral exams, that were on the same level of scientific quality as those in The Netherlands. The United States government made fellowships available to gifted Indonesian students, among them Pik-Sin Thé. Van Albada had been working for two years at the Warner and Swasey Observatory of the Case Institute of Technology in Cleveland, Ohio. At his recommendation Pik-Sin Thé was admitted to the Graduate School of that Institute to work towards his PhD degree. Due to his abilities and very hard work, Pik-Sin Thé succeeded in obtaining his degree within one year! When he returned to Lembang in 1959, he was appointed director of the Bosscha Observatory. In view of Thé's accomplishments, Gerard Kuiper had full confidence that the new Schmidt telescope would be in trusted hands, and he therefore had the optical parts sent to Lembang. They arrived in December 1959. Victor Blanco, whom Pik-Sin Thé knew from Cleveland and who had experience with the Schmidt telescope of Warner and Swasey, joined Pik-Sin Thé in mounting the mirror and corrector plate. And so, in May 1960, the completed Bosscha Observatory Schmidt telescope was officially handed over by the UNESCO representative in Indonesia, Dr. Mattson, to the Indonesian authorities.

5. Epilogue

During his stay in Lembang, van Albada had suggested naming the new Schmidt telescope *Bima Sakti*. Bima is the giant in the Mahabarata traditional legends. In the Milky Way a group of dark nebulae happens to have the shape of the *wayang* puppet of this hero, and the Milky Way is called Bima Sakti in Indonesia. Since the telescope was going to be used mostly for galactic research and because it is so powerful, this name was very well suited. By the way: the constellation Bima Sakti is the only one that is shaped by the absence of stars! The initials *BS* also stand for *Bosscha-Sterrenwacht* and for *Bernhard Schmidt*. Unfortunately Bruno van Albada has never used this telescope himself.

A last remark: in hindsight it was only fortunate that initially the cost of the telescope mounting had been so gravely underestimated. Had the Indonesian government known the real cost mentioned to us by regular telescope construction companies, the Bosscha Observatory Schmidt telescope *Bima Sakti* would never have materialized.

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III

THE USE OF CCDs IN SCHMIDT TELESCOPES