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ONE HUNDRED YEARS OF BOSSCHA OBSERVATORY, INDONESIA: DEVELOPMENTS SINCE 1939

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Abstract: The previous paper in this journal, by K.A. van der Hucht, described the events leading to the foundation of the observatory in 1923, and its history until the outbreak of the Second World War in 1939. This article briefly summarizes its further history until the present time, and its relations with the University of Amsterdam.

Keywords: Indonesia; Bosscha Observatory centennial; J. Voûte; A. de Sitter, M. Miyaji; C.H. Hins; G.B. van Albada; E. van Albada; Pik Sin Thé; E. Kreiken; Bosscha Schmidt telescope; B. Hidayat; LAPAN; P. Premadi.

1 INTRODUCTION, THE WAR YEARS

For an excellent review of the development of Indonesian astronomy, broader than just the history of the Bosscha Observatory, I refer to Hidayat et al. (2017).

In 1939 the first Director of the Observatory, Joan Voûte (1879–1963), reached retirement age and was succeeded by Dr. Aernout de Sitter (1905–1944), son of famous Leiden Observatory Director and cosmologist Willem de Sitter. From 1941 on, de Sitter was assisted by Dr. W. Christiaan Martin (1910–1945) who, like de Sitter, had been a PhD student of Leiden Professor Ejnar Hertzsprung (1873–1967). After the Japanese invasion, subsequent occupation of the Netherlands East Indies and surrender of the Dutch commander on 9 March 1942, both were interned in concentration camps, like all the other 300,000 or so Dutch citizens in the colony. De Sitter and Martin were first interned in camps on Java and later transferred to Sumatra, to Japanese labor camps, where they died from hunger and exhaustion in September 1944 and June 1945, respectively (Blaauw, 2004). During the Japanese occupation, Japanese astronomer Masashi Miyaji (1902–1986) was Director of the Observatory. After the war he became Director of Tokyo Observatory. Hidayat et al. (2017) mention that Miyaji was able to appoint former Director Voûte to assist him at the Observatory because of his administrative knowledge and that, after the Japanese surrender in August 1945, he transferred the Directorship of the Observatory back to Voûte. It remains a mystery why Miyadi chose Voûte to assist him, and not the Observatory's real Director, de Sitter. Also, there is the question of whether Voûte could have done more to try and save de Sitter and Martin. After the war, both Miyadi and Voûte kept silent about these matters. Of course, circumstances during the war were very delicate, and these questions will remain unanswered forever.

2 RESTART: THE FOUNDING OF THE DEPARTMENT OF ASTRONOMY AT THE UNIVERSITY OF INDONESIA IN BANDUNG

In 1946 Dr. C.H. Hins (1890–1951), staff member of Leiden Observatory, was appointed as Director of the Observatory. He came as a member of the Netherlands Army, with a military rank, and with an assignment to get the Observatory back in order again. It had been heavily damaged during the war. From December 1948 on he was assisted by Dr. Elsa van Dien (1914–2007), who had a three-year contract with the Netherlands government. She had graduated in 1939 at the University of Amsterdam with Professor Anton Pannekoek (1873–1960). Being Jewish, she had been in hiding during the War in Leiden, as a maidservant of the widow of a protestant minister. Immediately after the War she had been granted an American Fellowship for graduate studies at Harvard University, where she obtained her PhD in 1947 with Professor Donald Menzel (1901–1976). Her PhD work concerned studies of the spectra and atmospheric structure of hot stars (A and B stars). In 1949 Dr. Hins left and was succeeded in 1950 as Observatory Director by Dr. G. Bruno van Albada (1912–1972), who had obtained his PhD at the University of Amsterdam in 1945 with Professor Pannekoek. Like Elsa van Dien, being Jewish, he had survived the war in hiding.

Apart from his function as Observatory Director, van Albada also was asked to teach astronomy at the Technical University of Bandung (which at that time was part of the University of Indonesia). In 1950, van Albada and Elsa van Dien married, and in 1951 van Albada was appointed Professor of Astronomy at the University of Indonesia in Bandung. The day on which he presented his inaugural lecture (Figure 1) as the first Professor of Astronomy in Indonesia, 18 October 1951, was a very special

Figure 1 (left): Professor G.B. van Albada after the presentation of his inaugural lecture at the University of Indonesia in Bandung on 18 October 1951 (courtesy: Dr. E. van Albada-van Dien).

Figure 2 (right): Dr. Elsa van Albada-van Dien with her husband Professor van Albada and with their two eldest children photographed at Bosscha Observatory in the mid-1950s (courtesy: Dr. E. van Albada-van Dien).

day in the history of astronomy in Indonesia. On that day the Netherlands Indies Astronomical Society (NISV) transferred its ownership of the Bosscha Observatory to the University of Indonesia, and the Department of Astronomy at the University of Indonesia in Bandung (nowadays the Intitut Teknologi Bandung) was established, of which the Observatory became a part.

3 THE YEARS 1949–1960: THE FIRST INDONESIAN DOCTORATE IN ASTRONOMY AND THE RETURN OF THE VAN ALBADAS TO THE NETHERLANDS

From 1950 on, with great energy Professor van Albada and Dr. van Albada-van Dien (Figure 2) began educating the first generation of Indonesian astronomy students.

In the 1950s, President Sukarno of Indonesia organized important international conferences in Bandung of leaders of newly independent countries such as India, Ghana and Egypt. One standard item on the schedule of these conferences was a visit by the participants to Bosscha Observatory, where Dr. Elsa van Albada-van Dien and her assistants demonstrated the workings of the various telescopes. Among these distinguished visitors were, for example, President Nehru of India and his daughter Indira Gandhi, who later also was a President of India.

Figure 3: Professor Pik Sin Thé in the early 1960s, observing with the double 60-cm Zeiss refractor at Bosscha Observatory (courtesy: Bosscha Observatory).

The first of the Indonesian astronomy students to graduate, in 1958, was Pik Sin Thé (1927–2017, Figure 3). He was born in Yogjakarta to a family of Chinese spice traders that had lived in Indonesia for many generations and was fully integrated in Indonesian society. His education at the Dutch-model HBS high school in Yogjakarta was interrupted by WWII and the subsequent Indonesian Independence war. After completing high school, he started studies in electrotechnical engineering in Bandung, but thanks to van Albada's lectures in astronomy he became very interested in this science and decided to switch to astronomy.

After his graduation in 1958 he was awarded an American fellowship to carry out PhD research at Case Western Reserve University in Cleveland, Ohio, where van Albada had been a Postdoctoral Fellow after the war. At the University's Warner and Swasey Observatory was Thé's PhD supervisor Victor Blanco (1918–2011), who later would become the Director of the large American Cerro Tololo Observatory in Chile. The 4-meter telescope at this Observatory nowadays bears his name. One of Blanco's specialisms was working with Schmidt telescopes, and he educated Thé in this field.

In 1958, after Thé had arrived in Cleveland, Indonesian President Sukarno announced that all Netherlands citizens in Indonesia must leave the country, because of the conflict between the Netherlands and Indonesia about the ownership of Western New Guinea. Van Albada and his family thus were forced to leave Indonesia, and in 1959 van Albada was appointed Professor of Astronomy at the University of Amsterdam.

Because Bosscha Observatory now lacked a Director, Thé was asked by the University in Bandung to return and succeed van Albada as Director. In the meantime, a non-astronomy professor acted as interim Director. Thé, of course, had not yet completed his PhD research when he returned to Indonesia after just one year. But he had already learned a great deal and he had gathered so much observational material with the Cleveland telescopes that he was able to continue his PhD research after returning to Bandung in 1959. In June 1960 he returned to Cleveland for a few weeks in order to defend his PhD thesis and was awarded the PhD degree. He was the first Indonesian to earn a PhD in astronomy.

4 THE LEMBANG SCHMIDT TELESCOPE

A very gifted former University of Groningen and Amsterdam astronomer, and former Bosscha Observatory staff member (1928–1930) was Dr. Egbert Kreiken (1896–1964; Figure 4). After a disagreement with Observatory Director Voûte he left the Observatory and from 1930 was a high school physics teacher in mid-Java, during which time he also continued his astronomical research. He was interned in a Japanese prisoner-of-war camp during the war, where he barely survived. After the war he was appointed Head of the Higher Education Department in the Ministry of Education in Jakarta, a function he kept after the Dutch transfer of sovereignty to Indonesia on 27 December 1949. In 1951, at the request of UNESCO, he accepted an educational position in Liberia and in 1954, at the request of the Turkish Government, he moved to Ankara, to establish a successful school of astronomy there.

In 1947 Kreiken had been able to secure UNESCO funding for a Schmidt telescope for Bosscha Observatory. Professor Gerard Kuiper (1905–1973), Director of Yerkes Observatory of the University of Chicago, met with Professor van Albada and offered to donate to Bosscha Observatory the optical components for a 70/51 cm f/3.5 Schmidt telescope that were stored in the workshop at Yerkes Observatory. The agreement between UNESCO and the Indonesian Government involved an estimate of only US$16,000 for the construction of a fully-functioning telescope, which turned out to be a considerable underestimate. Later estimates showed that the construction of the tube assembly, plateholder and mounting for the telescope would require more than $150,000 (Hidayat et al., 2017). Professor van Albada contacted Professor Oort (1900–1992) of Leiden Observatory, who was able to help to reduce these costs considerably. Also, he helped obtain additional funding from various sources (such as the Leids Kerkhoven-Bosscha Fonds), and UNESCO also increased its contribution. Much money was saved because the Carnegie Institution of Washington generously allowed the Dutch company Rademakers to use the design of the Palomar Schmidt telescope (the largest Schmidt telescope in the world) for construction of the tube, mounting and camera.

Figure 4: An undated photograph of Dr. Kreiken taken at Ankara University (http://rasathane.ankara.edu.tr).

Only a few months before the van Albadas left Indonesia in 1958, all parts of the telescope arrived in Jakarta harbor, and van Albada personally supervised their transport to Lembang. Immediately after that he had to leave Indonesia. The following year, Pik Sin Thé was able to secure UNESCO funding so that Professor Victor Blanco could come to Indonesia for several months in 1960 and assist him to install the Schmidt Telescope and prepare it for use. On 28 May 1960 at an official UNESCO dedication ceremony the telescope was inaugurated and saw first light (Figure 5).

In this way, Bosscha Observatory obtained what at that time was the largest Schmidt telescope in the Southern hemisphere (van Albada-van Dien, 1995) with a primary mirror 70 cm in diameter and a corrector plate 51 cm in diameter. At present (2025), this is the third-largest Schmidt in the Southern Hemisphere, after the UK Schmidt Telescope in Australia and

Figure 5: Professor Victor Blanco with the completed Lembang Schmidt telescope, at the UNESCO inauguration ceremony of the telescope on 28 May 1960 (courtesy: P.S. Thé Collection).

the ESO Schmidt telescope in Chile. At van Albada's initiative, the telescope was outfitted with an objective prism with an angle of 6˚. This made it perfectly suited for finding in a 5º × 5º field all stars with peculiar spectra, such as emission-line stars. The often-clouded Java sky is well suited for this type of spectroscopic work.

Figure 6: Professor Bambang Hidayat, Director of Bosscha Observatory from 1968 to 1999. This photograph was taken in 1979 at the IAU General Assembly in Montréal, Canada (Wikipedia).

In this way, Dr. Thé and his collaborators in the 1960s discovered many new Wolf-Rayet, T Tauri, Herbig Ae and Be stars, and Thé himself became an international expert in the study of the Herbig stars.

5 DEVELOPMENTS IN THE 1960s

After his return to Indonesia, Pik Sin Thé continued with full energy the education of the students that had started their studies under the van Albada couple. He obtained for many of them funding to go abroad after graduation to continue studies overseas in order to obtain PhDs. Several went to Paris, two to the Case Western Reserve University in Cleveland, where he himself had obtained his PhD, and several went to Tokyo University in Japan. In 1963, the first Indonesian to obtain a PhD after Thé, also in Cleveland, was Kusumanto Purbosiswoyo, who in 1964 founded the Indonesian Space Research Organization, LAPAN. Later he left for the Netherlands where he joined the Philips Electronics Company. Subsequently, in 1965 Bambang Hidayat obtained his PhD, also in Cleveland.

In the years between 1959 and 1968, Indonesia went through a very difficult political and economic period. In 1965 there was a coup led by General Suharto, when President Sukarno was removed from office and at least half a million communists were slaughtered in Java and Bali. Inflation was so bad that the salaries of the Bosscha staff members became almost worthless. Thanks to his personal connections, Thé was able to secure food for his staff and medicine for the sick. These were difficult times, but Thé and his staff were able to continue with their research and education of the students also continued.

In 1968 Professor van Albada offered Thé a tenured Associate Professorship at the University of Amsterdam. Because Bambang Hidayat (Figure 6) in the meantime had obtained his PhD and would be able to succeed him, Thé felt that he could safely accept the Amsterdam position. Thus, in 1968 he joined the University of Amsterdam and Hidayat became Director of the Observatory and Head of Astronomy at the Institut Teknologi Bandung.

6 RELATIONS BETWEEN THE BOSSCHA OBSERVATORY AND THE UNIVERSITY OF AMSTERDAM

We saw in the preceding paper by van der Hucht (2025) that in 1926 Professor Anton Pannekoek from the University of Amsterdam worked for half a year at Bosscha Observatory to carry out his measurements of the brightness distribution of the Southern Milky Way. Sub-

sequently, between 1950 and 1958, his pupils, Bruno van Albada and Elsa van Albada-van Dien, educated the first generation of Indonesian astronomers. After van Albada's appointment in 1959 in Amsterdam, his pupil Pik Sin Thé became first Associate Professor (1968) and later full Professor (1980) at the University of Amsterdam.

After their appointments in Amsterdam the van Albadas and Thé kept close contact with their former pupils in Indonesia. Several Indonesian students came to Amsterdam and obtained PhD degrees. The first one was the brilliant Winardi Sutantyo (1944–2006) who was awarded his PhD in 1975 under my guidance. The last one was Jasinta Dewi, who obtained her PhD in 2003. Sadly, Professor van Albada died in 1972 and the then Associate Professor Thé for two years temporarily was Director of the Amsterdam Astronomical Institute until I, as Professor van Albada's successor, arrived in 1974. In 1980 Thé was appointed a full Professor. In 1993, when Professor Thé retired, a large international conference was organized in Amsterdam on the "Nature and Evolutionary Status of Herbig Ae/Be stars" (Thé et al., 1994). In recognition of his important contributions to education and research, Queen Beatrix of the Netherlands at that occasion awarded Professor Thé the rank of Officer in the Order of Orange-Nassau.

7 BOSSCHA OBSERVATORY SINCE 1968: GROWTH TO INTERNATIONAL PROMINENCE

Pik Sin Thé's successor as Director of Bosscha Observatory was Professor Bambang Hidayat (born in 1934), who fulfilled this function for 31 years, from 1968 until 1999. Under his leadership the fields of research at the Observatory were broadened to include almost all branches of modern astronomy and astrophysics. Apart from the original research in astrometry (stellar parallaxes, orbits of visual and astrometric binaries) and spectroscopy of emission-line stars, the research at the Observatory now includes studies of galaxies, cosmology, solar physics and studies of planets and exoplanets. The scientific staff of the Observatory also are very active in outreach to schools and the general public. Indonesian astronomy grew to international prominence, also thanks to the organization by Hidayat of the first International School for Young Astronomers in Indonesia, and important international conferences such as the Asian Pacific Regional Meeting of the IAU in Bandung in 1981 and the 143rd IAU Symposium *on Wolf-Rayet Stars* in Bali in 1990. Professor Hidayat also fulfilled the position of Vice-President of the International Astronomical Union. His successors as Director of the Observatory continued with full energy the scientific leadership that he initiated.

The Director at the time of the 100th Anniversary of the Observatory, Professor Premana Premadi (PhD University of Texas in Austin; Figure 7), organized the festive celebration of this event in January 2023. On this occasion the Indonesian Postal Service brought out three special stamps showing: the portrait of K.A.R. Bosscha, a picture of the Bosscha Observatory Schmidt Telescope and a picture illustrating astronomical outreach to children, respectively (Figure 8).

Figure 7: A 2003 photograph of three Indonesian astronomers who were all destined to become Bosscha Observatory Directors; from left to right: Dr. Taufiq Hidayat (2006–2009), Dr. Premana Premadi (2018–2023) and Dr. Mahasena Putra (2012–2018) (photograph: E. van den Heuvel).

Professor Premadi and her predecessors and successor as Directors are working in collaboration with the Indonesian Space Research Organization (LAPAN) to install a 3.8-meter reflecting telescope on a mountain top in Western Timor, where the dry climate offers the best circumstances in Indonesia for astronomical observations. In this way, also after 100 years, the Bosscha Observatory will remain the center of astronomical activities in Indonesia.

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Figure 8: Indonesian stamps, brought out on 1 January 2023, celebrating the 100th Anniversary of the Bosscha Observatory in Lembang, Indonesia. Left: K.A.R. Bosscha in front of the frame of the dome of the double Zeiss refractor during its time of construction. Middle: the Lembang Schmidt telescope. Right: symbolizing the outreach activities of the Observatory (courtesy: Professor Premana Premadi).

kindly providing important information on the celebration of the 100th Anniversary of Bosscha Observatory and on the plans for its future.

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