

THE EQUATORIAL GLACIERS OF NEW GUINEA



*Results of the 1971-1973 Australian Universities'
Expeditions to Irian Jaya: survey, glaciology,
meteorology, biology and palaeoenvironments*

Edited by G. S. HOPE / J. A. PETERSON / I. ALLISON / U. RADOK

A. A. BALKEMA / ROTTERDAM



The Northwall of the Mt. Jaya massif from subalpine forest above Lake Discovery
Photograph: CGE (R. Muggleton)

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A. A. BALKEMA / ROTTERDAM / 1976

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P R E F A C E

This book deals with a remarkable region and a remarkable venture. Tropical glaciers are fascinating both as climatic witnesses and as illustrations of the extremes which the terrestrial environment can pack into a small space; but two expeditions bringing together scientists of many disciplines from six different universities (including an Indonesian one) into a spontaneous, informal, and effective collaboration seem equally exciting as an exercise in human common sense and goodwill.

The starting point was the interest in glaciers and ice sheets developed in the Meteorology Department of Melbourne University, from a beginning reaching back into the youthful alpine exploits of its founder, Fritz Loewe, and his explorations in Greenland and Antarctica. The study of the glaciers of Irian Jaya (West New Guinea) became part of the Department's program through the initiative of Randell Champion, a surveyor-glaciologist of the 1968 Australian National Antarctic Research Expedition. His drive and expert knowledge (derived from his upbringing in Papua New Guinea) enlisted the support of Freeport Indonesia Inc. during the early stages of their Ertzberg project. He drew together the members of the first Carstenz Glaciers Expedition (CGE) and led it to success; he also was responsible for the creation by Melbourne's TV Channel 0 of a film record of the second expedition. To Randell Champion belongs the main credit for making the expeditions a reality.

The credit for its wide range of research and results belongs to all the expedition members. Dr Jim Peterson (Monash University) was the geomorphologist of both expeditions and led the second expedition, which included his wife Judy Peterson as biologist. Dr Geoff Hope (Australian National University) was the biologist of the first expedition; the account of the fauna of the area was prepared by his wife, Dr Jeannette Hope (Australian National University) from expedition collections. Dr John Bennett (Flinders University) was the meteorologist and glaciologist of the first expedition. Ian Allison (Antarctic Division, Department of Science, and Melbourne University) took over these roles for the second expedition; he also played the crucial role in putting together the parts of this book. The all-important surveys of the area were produced, with

help from all expedition members, by Randell Champion and Dr John Allman (University of New South Wales) in the first expedition, and by Dr Ted Anderson (University of New South Wales) in the second. Richard Muggleton (Preston and Northcote Community Hospital) played the vital role of photographer for both expeditions; and Sam Mustamou (Cenderawasih University, Jayapura) acted as interpreter and helped with various field projects.

The organisation of the expeditions was centered in the Meteorology Department of Melbourne University; it drew extensively on the advice of its glaciologists Fritz Loewe and Bill Budd (Antarctic Division), and on the services of its Senior Technical Officer, John Turner, and its clerical staff — Vonne Murphy, Ruth Chalmers, Gundula Thwaites, Kim Bay. All expedition members were able also to draw on the resources of their own departments for equipment and services. This informal pooling of resources was a key factor in the success of the CGE.

Other vital contributions came from the Indonesian authorities in Jakarta and Canberra; special thanks are owed to Ir. Bambang Sulasmoro, of the Department of Mines. Members of the Cenderawasih University, Jayapura, greatly aided the second expedition; special thanks are owed to Professor S. Hadikoemoro and Dr M. Hassan. Members of the Mapala mountaineering club in the University of Indonesia, Jakarta, helped in the field; special thanks are owed to Hermann Lantang, Uncun Jayanegara, Iqbal Rahimsjah, and Rudy Badil.

For a further large group of contributions the members of the CGE are indebted to industry, Australian government agencies, and missionary organisations in Irian Jaya. The generosity of Freeport Indonesia Inc. was the decisive factor which made the first expedition possible; special thanks are owed to Mr Forbes Wilson. While heavily committed with managing the Ertzberg mining project he found the energy and time to nurture the scientific aims of the expedition with advice and substantial logistic aid. This help and that of the Freeport contractor, Bechtel Pacific, gave the first expedition a head start, which more than made up for its lack of experience and mitigated various setbacks; special thanks are owed to Freeport executives in Tembagapura, Alex Russell, John Currie, and Bob Stuart. The help of the Royal Australian Air Force in transporting equipment, stores, and personnel proved crucial for getting the second CGE to its starting point in Papua New Guinea; special thanks are owed to Mr G. Blakers and Wing Commander G. Marshall (Department of Defence). Colin Brooks, John Brooke and Bob Mitton, of Newmont Pty. Ltd., and the AMA Missionary Aviation group in Jayapura lent vital support to the second expedition's approach from the north; special thanks are owed to the Rev. and Mrs Larson and the Rev. and Mrs Ellenberger, of Ilaga, for their kindness and help. Agricultural Officer E. O. Bemey and K. P. S. Nicholas Tupu greatly aided negotiations with the Dani carriers at Ilaga.

The basic finance for the expeditions came from two grants (E 65/15162) made by the Australian Research Grants Committee to U. Radok,

R. Champion, and J. Peterson. Most of the remaining costs were covered by Meteorology Department research funds provided by the University of Melbourne. Some of the other universities paid the salaries of their expedition members and contributed to their air fares. Freeport Indonesia financed the photogrammetry needed to produce one of the maps. The publication of this book has been assisted by grants from the Committee on Research and Graduate Studies of Melbourne University, from the Publications Committee of Monash University, and from the Department of Biogeography and Geomorphology in the Research School of Pacific Studies of the Australian National University.

Numerous other helpers cannot be mentioned individually, but thanks must be recorded finally to Dr J. J. Dozy for encouragement of the CGE plans and for making available his photographs and reports from the 1936 Colijn Expedition; and to the Publisher for his patience during the slow growth of this book.

The extensive materials, observations, and photographic records collected by the CGE represent the joint property of all participating universities and are available for use by other investigators. A minor impediment to such use is created by the changes which have occurred over the last 30 years in the names of various geographical features of this area. Throughout this book the Indonesian names are given wherever possible, and often are followed in parentheses by alternative names, mostly Dutch, which were in use at one time or another. For general reference purposes a list of names follows this preface.

Christmas 1975

Uwe Radok
Coordinator, CGE

NAMES OF FEATURES AND ABBREVIATIONS USED IN
THIS BOOK

This list gives the alternative or obsolete names for those used.

Mountains

- Mt. Jaya — Mt. Jayakusumu, Mt. Carstenz, Carstenz Toppen, Pk. Sukarno
Ngga Pulu — Ngga Poloe, Pk. Jaya,* Pk. Sukarno
Unnamed peak 500 m west of Ngga Pulu — Sunday Peak, Pk. Jaya,* Pk. Sumantri
Carstenz Pyramid — Carstenz Pyramida (Indonesian spelling; the highest point retains this name)
Midden Ridge — Celah-tengah
Northwall — Noordwand, North Wall
Sudirman Ra. — Nassau Ra., Western Snow Mts.
Merauke Ra. — Snow Mts., Central Ranges; mis-spelt in some atlases as "Maoke Ra"
Mt. Mandala — Mt. Juliana
Mt. Trikora — Mt. Wilhelmina
Mt. Idenburg — Ngga Pilimsit, Gn. Enngea
Pk., Puncak = Peak or Mountain; Gn., Gunung = Mt., Mountain

Fluvial

- L. Larson — D. Lyrasetio
L. Discovery — D. Athaboe
L. Dugundugu — D. Wiseku
L. Biru — Blauwemeer
L. Hijau — Groenmeer
D., Danau = L., Lake; Dataran = level area, Plain; Lembah = Valley;
CGE = Carstenz Glaciers Expedition

A list of current and former names used for the language groups living around Mt. Jaya is given in Chapter 11.

* The name Mt. Jaya in this book is not used for any distinct peak but exclusively for the entire masf.

MT. JAYA: THE AREA AND ITS EXPLORATION

1.1 DESCRIPTION OF THE MT. JAYA AREA

The Merauke Range forms the western half of the great cordillera which runs for 2,000 km along the centre of the island of New Guinea. Except where it is cut by the gorge of the Baliem River, this complex of ranges provides a barrier between the north and south with crests in the divide continuously above 3,000 m, and rising above 4,500 m at several points. Three peaks, Mt. Mandala (Juliana), Mt. Idenburg and Mt. Jaya (Carstenz) are capped by snowfields, and the legacy of far greater ice cover in the past is shown by steep-walled valleys, cirques, splintered crags and long moraine ridges.

The cordillera is asymmetrical, rising abruptly 3,000-4,000 m to the crest of the main divide from the broad lowland swamp plain on the south, and then falling more gradually via series of lower ranges to the great inland basin of the Mamberamo and its tributaries on the north. The southern face is formed by a maze of steep ridges which are cut by deep gorges created by powerful torrents. The dense forest that clings to the slopes is slashed by countless landslide scars and cliffs formed by steeply dipping sedimentary rocks.

The range crest is marked by towering grey cliffs and rolling plateaux of sandstone and limestone. Dun-coloured grasslands dotted with low shrubs form a monotonous cover, broken by patches of low mossy forest or groves of tree ferns. Blind valleys, sink holes and isolated towers of limestone are common. Tall mountain forest covers vast areas on the northern slopes which consist of east-west trending minor ranges and valleys with occasional gaps through which rivers break out to the north.

The warm, humid air that rises from the swampy lowlands brings cloud and daily rain to the mountains. The early mornings may be crisp and clear, but by mid-morning the first wisps of cloud float up and coalesce until a dense cold mist or drizzling low cloud is present. The high areas are uninhabited and in fact not commonly visited by the local people. The population lives mainly in isolated intermontane valleys on