

THE
GEOGRAPHICAL
JOURNAL

VOLUME LXXIX

JANUARY TO JUNE

1932

PUBLISHED UNDER THE AUTHORITY OF THE COUNCIL
EDITED BY THE SECRETARY

THE ROYAL GEOGRAPHICAL SOCIETY
KENSINGTON GORE LONDON S.W.7
EDWARD STANFORD LTD. 12 LONG ACRE W.C.2
AND 29 CHARING CROSS S.W.1

ROYAL GEOGRAPHICAL SOCIETY.

Patron.

HIS MAJESTY THE KING.

Vice-Patron.

H.R.H. THE PRINCE OF WALES, K.G., F.R.S.

Honorary President.

H.R.H. THE DUKE OF CONNAUGHT, K.G., G.C.B., G.C.S.I.

THE COUNCIL

(Elected 22 June 1931 for the Session of 1931-32.)

President : Admiral Sir William Goodenough, G.C.B., M.V.O.

Vice-Presidents.

Field-Marshal the Viscount Allenby, G.C.B., G.C.M.G.	Lieut.-Col. the Right Hon. Sir Matthew Nathan, G.C.M.G.
Colonel Sir Charles Close, K.B.E., C.M.G., C.B., SC.D., F.R.S.	Dr. A. Hamilton Rice.
Brigadier E. M. Jack, C.B., C.M.G., D.S.O.	Lieut.-Col. Sir Francis Younghusband, K.C.S.I., K.C.I.E.

Treasurer—The Lord Biddulph.

Trustees—Douglas W. Freshfield, D.C.L. ; The Most Hon. the Marquess of Zetland,
G.C.S.I., G.C.I.E.

Honorary Secretaries—Dr. T. G. Longstaff ; W. Lutley Sclater.

Foreign Secretary—The Right Hon. Sir Maurice E. de Bunsen, Bart.,
G.C.M.G., G.C.V.O., C.B., *decd.*

Members of Council.

L. C. Bernacchi, O.B.E.	Sir William Himbury.
Sir Harcourt Butler, G.C.S.I., G.C.I.E.	C. W. Hobley, C.M.G.
Air-Vice-Marshal C. S. Burnett, C.B., C.B.E., D.S.O.	The Rt. Hon. Lord Howard of Penrith, G.C.B., G.C.M.G., C.V.O.
Gen. Sir Alexander Cobbe, V.C., G.C.B. <i>decd.</i>	Lieut.-Col. C. K. Howard-Bury, D.S.O., M.P.
Maj.-Gen. Sir Percy Cox, G.C.M.G., G.C.I.E., K.C.S.I.	The Rt. Hon. Sir Halford Mackinder.
Colonel H. L. Crosthwait, C.I.E.	Dr. H. R. Mill.
Professor F. Debenham, O.B.E.	Mrs. Patrick Ness.
Professor C. B. Fawcett, D.S.C.	Professor E. G. R. Taylor.
Admiral Sir Cyril Fuller, K.C.B., C.M.G., D.S.O.	Bertram Thomas, O.B.E.
Maj.-Gen. Lord Edward Gleichen, K.C.V.O., C.B., C.M.G., D.S.O.	The Rev. Walter Weston. J. M. Wordie.

Dr. Henry Balfour, F.R.S. (appointed Nov. 2 in place of the late Sir Alex. Cobbe).

Secretary and Editor of Publications—Arthur R. Hinks, C.B.E., F.R.S.

Librarian.

Edward Heawood.

Map Curator.

Edward A. Reeves.

Bankers—Martin's Bank Ltd. (Cocks, Biddulph Branch),
16, Whitehall, S.W.1.

CONTENTS

NO. 1

JANUARY 1932

EXPLORATIONS IN GARHWAL AROUND KAMET. By F. S. SMYTHE	1
THE SMALL-SCALE MAPS OF THE ORDNANCE SURVEY. By BRIGADIER H. S. L. WINTERBOTHAM, C.M.G., D.S.O., Director-General O.S.	17
THE PURCELL SOURCE OF THE KOOTENAY RIVER. By J. MONROE THORINGTON and EATON CROMWELL	32
JOHN ADAMS AND HIS MAP OF ENGLAND By EDWARD HEAWOOD, Librarian R.G.S.	37
NOTES ON A TRAVERSE OF NORWEGIAN LAPLAND IN 1930. By CHARLES ELTON	44
REVIEWS : <i>EUROPE</i> : The Archaeology of Surrey. The Archaeology of Somerset. In the Highlands. How Europe Grew. Die Landschaft des Europäischen Nordens in ihren Übergängen von Deutschland bis Lappland. Risorse Idrauliche per Forza Motrice Utilizzate e Ancora Disponibili. Landeskunde von Deutschland. Greek Cities in Italy and Sicily. <i>ASIA</i> : In Bolshevik Siberia. The Imperial Gazetteer of India. The Climate of Japan. Bronnen Tot de Geschiedenis der Oostindische Compagnie in Perzië. <i>AFRICA</i> : Nigerian Sketches. Parergon : or Eddies in Equatoria. A Wayfarer in North Africa. The Stone Age Cultures of Kenya Colony. <i>NORTH AMERICA</i> : The Great Plains. The Rainbow Canyons. <i>AUSTRALASIA AND PACIFIC</i> : Australia and New Zealand, with Pacific Islands and Antarctica. Paradise Quest. <i>PHYSICAL AND BIOLOGICAL GEOGRAPHY</i> : Applied Geophysics. The Tidal Force. Principles of Structural Geology. The Study of Rocks. Vergleichende Landschaftskunde. Handbook of Ethnography. <i>ECONOMIC AND HISTORICAL GEOGRAPHY</i> : The English Adventurers. Allgemeine Verkehrsgeographie. The Corridors of Time. The Travels of Marco Polo. <i>GENERAL</i> : In the Track of the Crusaders. Memoirs of a Soldier of Fortune. The Wander Years	49
THE MONTHLY RECORD : The Proposed Northumberland National Park. Glaciation in the North Sea Region. Changes in the Po Delta. Aluminium Resources of Italy. The Mountains around Tatsienlu. Salt Lakes in East Africa. Adirondack Drainage System. Old Kentucky Documents. The Geography of Daniel Defoe	72
OBITUARY : Colonel Milo Talbot	78
CORRESPONDENCE : The New One-inch Ordnance Map. 'Social and Economic Geography'	79
MEETINGS : Session 1931-1932	80
MAPS :	
The approaches to Kamet	2
Glaciers of the Badrinath Range : sketch by Captain E. St. J. Birnie	7
Sketch-map of the Purcell Range and sources of the Kootenay River	34

THE BASIN OF THE RIVER PARANA. By W. S. BARCLAY	81
DISTRIBUTION OF THE URBAN POPULATION IN GREAT BRITAIN, 1931. By PROFESSOR C. B. FAWCETT, D.SC.	100
RAILWAY DEVELOPMENT IN TANGANYIKA TERRITORY. By BRIGADIER E. M. JACK	117
THE HEAD WATERS OF THE MNYERA RUAHA. By MICHAEL A. UNWIN HEATHCOTE	124
TWO EXPEDITIONS TO SPITSBERGEN, NORTHEAST LAND, AND THE NEIGHBOURING ISLANDS. By CHRISTOPHER T. DALGETY	131
REVIEWS. <i>EUROPE</i> : Dartmoor in all its Moods. Das Alpine Europa und Sein Rahmen. Süddeutschland. Wanderings in Greece. Arbeiten der Anstalt für Hessische Landesforschung an der Universität Giessen. La Porte de Bourgogne et d'Alsace. Die Geographischen Gebiete Finnlands. <i>ASIA</i> : The Romance of the Indian Frontiers. The Frontier Peoples of India. India and Jambu Island. <i>AFRICA</i> : The Bantu Tribes of South Africa. Monumenta Cartographica Africae et Aegypti. Youssouf Kamal. Rock-Paintings in South Africa. Bushman Art: Rock Paintings of South-West Africa. <i>NORTH AMERICA</i> : A Canadian Geologist. <i>CENTRAL AND SOUTH AMERICA</i> : Modern South America. <i>AUSTRALASIA AND PACIFIC</i> : South Australia. The Island Builders of the Pacific. <i>PHYSICAL AND BIOLOGICAL GEOGRAPHY</i> : Probleme der Wasserwellen. Handbuch der Klimatologie in fünf Bänden. Glacial Geology and Geographic Conditions of the Lower Mohawk Valley. Grundriss der Tropischen und Subtropischen Bodenkunde. <i>ECONOMIC AND HISTORICAL GEOGRAPHY</i> : Gallieni. Markets of London	135
THE MONTHLY RECORD: The Society: Changes in the Bye-Laws relating to Entrance Fees on Election. The Shackleton Memorial. Films of Geographical Interest. Christmas Lectures to Young People. Glacial Features of Wharfedale. Cloudbursts in Westmoreland. European Mountain Populations. An Atlantic-Mediterranean Ship Canal. Railways in Europe, 1830-1848	153
CORRESPONDENCE: Kamet	159
MEETINGS: Session 1931-1932	160
MAPS:	
Sketch-map of the Parana and Paraguay	82
Distribution of Conurbations, 1931	102
Changes in Urban Population, 1921-31	106
Changes in County Population, 1921-31	108
Proposed railways in Tanganyika Territory	118
Head Waters of the Mnyera Ruaha and neighbourhood, from Mr. Heathcote's Survey	following 160

SPEECHES AT THE UNVEILING OF THE SHACKLETON MEMORIAL	161
THE VOYAGE OF THE R.R.S. <i>DISCOVERY II</i> : SURVEYS AND SOUNDINGS. By DR. STANLEY KEMP, SC.D., F.R.S.	168
THE BASIN OF THE RIVER PARANA, <i>continued</i> . By W. S. BARCLAY	186
TIDAL OBSERVATION ON THE GREAT BARRIER REEF EXPEDITION. By MICHAEL SPENDER	201
OLD RIVER-BEDS IN THE FENLANDS. By MAJOR GORDON FOWLER	210
THE ORTHOGRAPHICAL RELIEF METHOD OF REPRESENTING HILL FEATURES ON A TOPOGRAPHICAL MAP. By PROFESSOR TANAKA KITIRŌ	213
A SUBMARINE TROUGH NEAR THE STRAIT OF GIBRALTAR. By PROFESSOR J. W. GREGORY	219
REVIEWS. <i>EUROPE</i> : Regional Planning Report on Oxfordshire. The Geography of London River. A Cotswold Book. Russian Waters. Beiträge zur Geologie der Westlichen Mediterrangebiete. Poluoostrov Kanin [The Kanin Peninsula]. Dänemark, Schweden, Norwegen. Wanderings. Summer Islands. And then to Transylvania. The Wandering Gentile's Log Book (1929-1931). <i>ASIA</i> : A Passport to China. Lou-Lan. Under Eastern Roofs. Plant Hunting in the Wilds. The Soul of Malaya. Les Noms des Lieux Habités par les Chinois en Mandchourie. In the Arabian Desert. The Stormswept Roof of Asia. Voiceless India. <i>AFRICA</i> : L'Algérie. Shooting with Rifle and Camera. The Lambas of Northern Rhodesia. Mémorial du Service Géographique de l'Armée. <i>NORTH AMERICA</i> : Canada's Western Arctic. <i>CENTRAL AND SOUTH AMERICA</i> : A Naturalist in Brazil. Länderkunde Südamerikas. <i>AUSTRALASIA AND PACIFIC</i> : Growing up in New Guinea. The Psychology of a Primitive People. <i>POLAR REGIONS</i> : Cold. <i>PHYSICAL AND BIOLOGICAL GEOGRAPHY</i> : The Surface-History of the Earth. Physics of the Earth—II. The Figure of the Earth. Emigration, Migration and Nomadism. <i>CARTOGRAPHY</i> : Land Forms and Life. Tacheometric Tables. <i>ECONOMIC AND HISTORICAL GEOGRAPHY</i> : Narratives from Purchas his Pilgrimes. Viaggio del Beato Odorico da Pordenone. Histoire Générale de la Navigation du XV ^e au XX ^e Siècle. History of Palestine. <i>GENERAL</i> : Sailing the World's Edge. By Cargo Boat and Mountain	221
THE MONTHLY RECORD: Banks and Channels of the Thames Estuary. The Source of the Garonne. Survey of Berlin. Population of France, 1801-1926. The Glaciers of Kilimanjaro. Retreat of the Muir Glacier, Alaska. The Bartlett Trough, West Indies. Limits of the Australian Desert. Old Pictures of Chinese Cities. Bibliographie Géographique 1930	246
OBITUARY: John Story Masterman	252
CORRESPONDENCE: Glaciation and Continental Drift	252
MEETINGS: Session 1931-1932	256
MAPS:	
The South Sandwich Islands	172
General Map of the Falkland Islands and Dependencies	178
Sketch-map of Guayra Falls	190
Submarine Trough near the Strait of Gibraltar	220
Surveys and Soundings of the R.R.S. <i>Discovery II</i> , 1929-30, <i>following</i>	256

A JOURNEY TO THE GLACIERS OF THE EASTERN KARAKORAM. By PROFESSOR GIOTTO DAINELLI	257
THE LAKES OF KENYA AND UGANDA. By DR. E. B. WORTHINGTON, M.A., PH.D.	275
THE LÖTSCHENTAL: A REGIONAL STUDY. By PROFESSOR J. F. UNSTEAD	298
THE LIVINGSTONE-STANLEY MEMORIALS IN AFRICA. By CAPTAIN C. H. B. GRANT	318
NEW TIDAL CHARTS FOR BRITISH WATERS. By DR. A. T. DOODSON and R. H. CORKAN, B.SC.	321
ZIMBABWE: Review by H. J. BRAUNHOLTZ	323
REVIEWS. <i>EUROPE</i> : St. Leonard's Church and the Ancient Town of Hythe. Southampton: A Civic Survey. Belgium and Luxemburg. A Journal of My Journey to Paris in the Year 1765. Thorpe's Yachtsman's Guide to the Dutch Waterways. <i>Länderkunde der Niederlande und Belgiens. Der Rhein.</i> <i>ASIA</i> : Survey of India: Geodetic Reports. A Refuge from Civilization, and Other Trifles. A Wanderer in Indo-China. Arabia Felix. Siamese State Ceremonies. <i>AFRICA</i> : The African Republic of Liberia. The African Handbook and Traveller's Guide. <i>NORTH AMERICA</i> : Freshwater. <i>CENTRAL AND SOUTH AMERICA</i> : Ancient Civilizations of the Andes. <i>AUSTRALASIA AND PACIFIC</i> : Great Dipper to Southern Cross. <i>POLAR REGIONS</i> : South Georgia: the British Empire's Subantarctic Outpost. <i>CARTOGRAPHY</i> : An Introduction to the Mathematics of Map Projections. <i>ECONOMIC AND HISTORICAL GEOGRAPHY</i> : Regional Survey and its Relation to Stocktaking of the Agricultural and Forest Resources of the British Empire. <i>GENERAL</i> : The Approach to Geography	326
THE MONTHLY RECORD. Visit of the King and Queen. Foreign Secretary. The Strait of Anian. The First Ascent of Mount Fairweather. The Volcanic Origin of the Bermudas. Fall of Sea-level in the Malay Archipelago. The Climate of Kerguelen Island. Names on the Antarctic Chart. Ice Formation on Unfrozen Surfaces. Early Advice to Travellers	342
OBITUARY: Sir Maurice de Bunsen	348
CORRESPONDENCE: A Submarine Trough off the Coast of Cyprus. Roddons	349
MEETINGS: Session 1931-1932	352
MAPS:	
Natural Divisions of the Lötschental	302
Tidal Chart for the English and Bristol Channels	320
Tidal Chart for the Irish Channel	322
Glaciers of the Eastern Karakoram	following 352
Lakes of Kenya and Uganda	following 352

THE BRITISH ARCTIC AIR ROUTE EXPEDITION. By H. G. WATKINS	353
A FOURTH JOURNEY IN THE TIEN SHAN. By LIEUT.-COL. REGINALD C. F. SCHOMBERG, D.S.O.	368
THE NEW PHOTOGRAPHIC SURVEY OF SWITZERLAND. By MICHAEL SPENDER	383
SOME FURTHER TRACES OF THE FRANKLIN RETREAT. By WILLIAM GIBSON	402
THE POLAR FRONT. By A. R. H.	409
ARABIA FELIX : Review by W. H. LEE WARNER	410
IRISH POLITICAL GEOGRAPHY : Review by E. L.	415
REVIEWS. <i>EUROPE</i> : The Place-Names of Galloway. Scottish Place-Names. Place-Names of Glengarry and Glenquoich and their Associations. <i>L'Agriculture en Roumanie</i> . An Agricultural Atlas of Scotland. Economic Geography of Europe. <i>La Franche Comté</i> . <i>Die Nachfolgestaaten : Österreich, Ungarn, Tschechoslowakei und ihre wirtschaftlichen Kräfte</i> . <i>Dalmatia : The New Riviera</i> . At the Western Gate of Italy. <i>ASIA</i> : An English Lady in Chinese Turkestan. Trails to Inmost Asia. A Geography of Ceylon. <i>AFRICA</i> : Mission de Prospection des Forces Hydrauliques de l'Afrique Équatoriale Française. Historic Farms of South Africa. The Birds of Tropical West Africa. <i>CENTRAL AND SOUTH AMERICA</i> : Archives of British Honduras. <i>AUSTRALASIA AND PACIFIC</i> : Memories of Pioneer Days in Queensland. <i>POLAR REGIONS</i> : The South Sandwich Islands. <i>PHYSICAL AND BIOLOGICAL GEOGRAPHY</i> : Bulletin of the National Research Council. <i>CARTOGRAPHY</i> : Internationales Archiv für Photogrammetrie (Archiv International de Photogrammétrie). <i>ECONOMIC AND HISTORICAL GEOGRAPHY</i> : Histoire de l'Extrême-Orient. Japan. A Primer of Economic Geography. The Kensington Stone. Rome and the Romans. <i>GENERAL</i> : Collected Essays of Naomasa Yamasaki. The Northern Lands. Water Diviners and their Methods. Geography and Stamps	419
THE MONTHLY RECORD. Medals and Awards, 1932. The Reports of Colonel Fawcett. Geography in the Universities. Glacier-Lakes in Cumberland. The Danish Eskers. A Century of Ice-Observation in Davis Strait. The Issiq Köl. Journey to the Hukong Valley, 1890. Floods in East Africa, 1930. Population of Canada, 1931. East Greenland. A New Settlement on the Parana. The Homem Charts of the Sixteenth Century	441
CORRESPONDENCE : Island Arcs and Mountain Building	447
MEETINGS : Session 1931-1932	448
MAPS :	
Proposed British Arctic Air Route	354
Sketch-map to illustrate Col. Schomberg's fourth journey in the Tien Shan	369
Col. Schomberg's route through the Central South Tien Shan	372
Sketch-map of the vicinity of Simpson Strait, from Admiralty Chart No. 5101	403
Southern Greenland, showing the seven journeys of the British Arctic Air Route Expedition	following 448
The Base Fjord, British Arctic Air Route Expedition, from a survey by A. Stephenson	following 448

THE CORAL COASTS OF INDIA. By LIEUT.-COL. R. B. SEYMOUR SEWELL, SC.D.	449
THE BRITISH ARCTIC AIR ROUTE EXPEDITION, <i>continued</i> . By H. G. WATKINS	466
BY AIR MAIL TO KENYA. By MICHAEL A. UNWIN HEATHCOTE	502
THE GAUSS ANTARCTIC REPORTS : Review by H. R. M.	506
REVIEWS. <i>EUROPE</i> : Tramping through Wales in search of the Red Dragon. The Adventure of the Faeroe Islands. Daniel Vetter a jeho "Islandia." Slovakia Then and Now. France : a regional and economic geography. <i>AFRICA</i> : Cape to Cowley <i>via</i> Cairo in a Light Car. Historical Outline and Analysis of the Work of the Survey Department of Kenya Colony, 1 April 1903 to 30 September 1929. The Nile Basin. A Game Warden among his Charges. <i>NORTH AMERICA</i> : Stream Sculpture on the Atlantic Slope. <i>AUSTRALASIA AND PACIFIC</i> : Hunting Insects in the South Seas. Down Under : an Australian Odyssey. The Lost Continent of Mu. The Children of Mu. Across New Guinea from the Fly to the Sepik. <i>POLAR REGIONS</i> : The <i>Marion</i> Expedition to Davis Strait and Baffin Bay, 1928. <i>PHYSICAL AND BIOLOGICAL GEOGRAPHY</i> : Ergebnisse der Kosmischen Physik. Manual of Meteorology. The Age of Pithecanthropus. <i>CARTOGRAPHY</i> : An Account of the Primary Triangulation of Malaya, together with the Secondary Chain through Kelantan and Secondary Points on Penang Island. <i>ECONOMIC AND HISTORICAL GEOGRAPHY</i> : The Court-Martial of the <i>Bounty</i> Mutineers. A History of Geographical Discovery and Exploration. London in Mittelalter. Les Caractères Originaux de l'Histoire Rurale Française. A Short History of British Expansion. History of Palestine and Syria, to the Macedonian Conquest. The Disaster of Darien. Europe and China. Histoire de la Nation Egyptienne. <i>GENERAL</i> : The Book of the Sailing-Ship	509
THE MONTHLY RECORD. Seventy-fifth Anniversary of the Geographical Society of Vienna. The Geographical Society of Belgrade. Portrait of Charles Enderby. Research in Eastern Siberian Waters. Last Spanish Expedition on North-West American Coast, 1793. Geodetic Survey of Canada. The "Gente Hermosa" Island of Quiros. The Four-metre Sounding Tube of the <i>Snellius</i> Expedition. Relative Terms for Geographical Position. The Jungfrauoch Scientific Station. Harmonic Tidal Constants for Durban	536
CORRESPONDENCE : Glaciation and Continental Drift	542
MEETINGS : Session 1931-1932	544
MAPS :	
Coral Reefs of India	450
Kangerdlugsuak	<i>following</i> 544
East Coast of Greenland, from Ikersuak to Umivik Bay	<i>following</i> 544

The GEOGRAPHICAL JOURNAL

Vol LXXIX No 1



January 1932

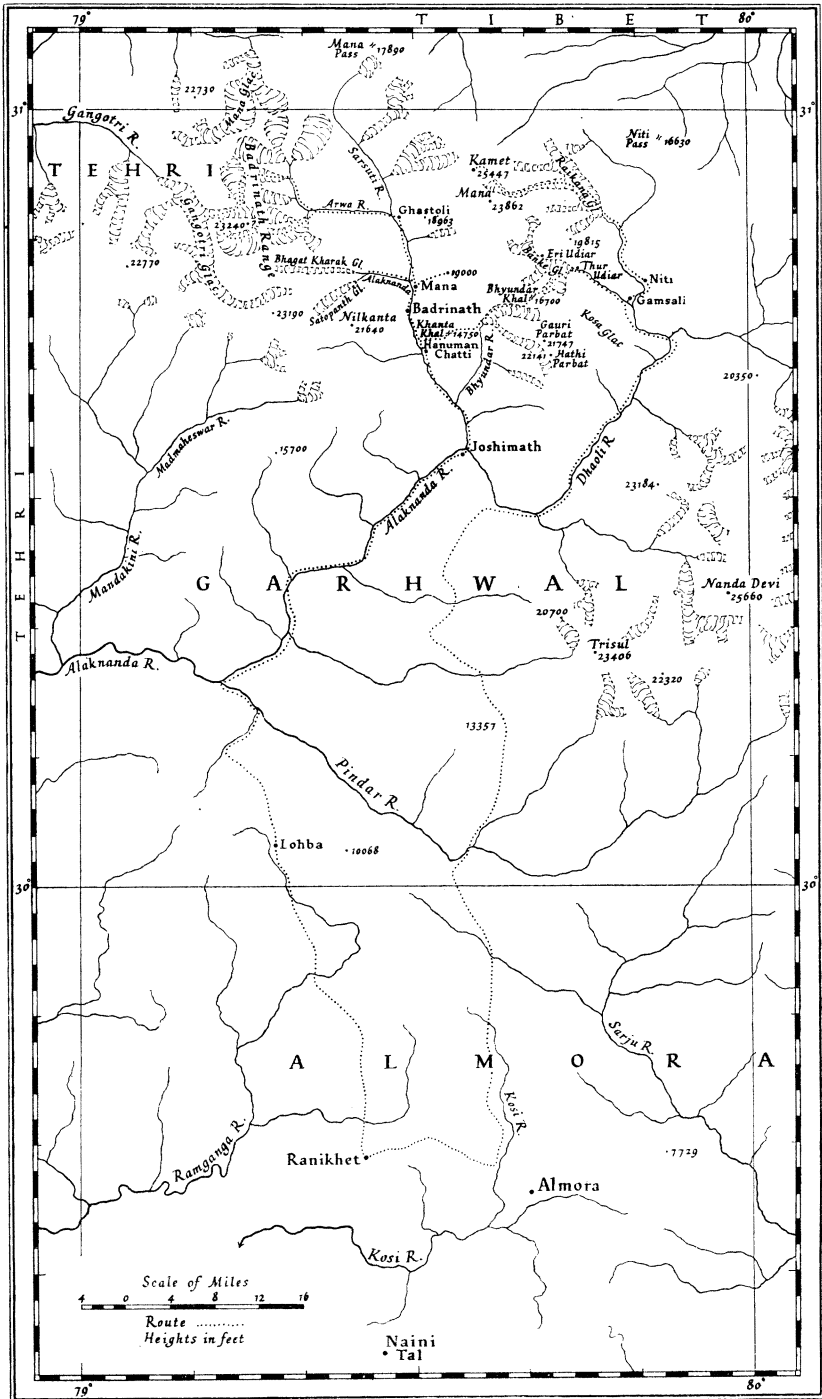
EXPLORATIONS IN GARHWAL AROUND KAMET: *A paper read at the Evening Meeting of the Society on 2 November 1931, by*

F. S. SMYTHE

THE personnel of the Kamet expedition consisted of Wing-Commander E. B. Beauman, R.A.F.; Captain E. St. J. Birnie, Adjutant to His Excellency the Governor of Bengal's Bodyguard, Transport Officer to the Expedition; Dr. C. R. Greene, Medical Officer; Mr. R. L. Holdsworth, Mr. E. E. Shipton, and myself. The expedition had two main objects: the ascent of Kamet, 25,447 feet, and explorations in the Badrinath Range, to the west of Kamet, which forms the watershed of the Alaknanda and Gangotri rivers, the two parent tributaries of the Ganges. As a description of the ascent of Kamet would have more mountaineering than topographical interest, I propose to deal here only with the second object of the expedition.

It is strange that Garhwal should be so seldom visited by explorers and mountaineers, for but ten days' marching suffices to take the traveller from the hill stations of Ranikhet or Almora to the fringe of little-explored ranges. Further, the explorer in Garhwal experiences a delightful climate; severe snowstorms are almost unknown during the summer months on the higher peaks, whilst the foothills relieve the monsoon clouds of much of their moisture, so that it is possible to climb in comfort during the height of the monsoon in northern Garhwal. The main Himalayan chain, which includes Nanda Devi and Trisul, should however be avoided during this season. The farther north the traveller proceeds the better is the weather. At Badrinath it is said only to rain for a week or ten days, whilst near the Tibetan frontier fine weather is the rule, and only the strongest bursts of the monsoon penetrate to the northern end of the Badrinath range and the Mana Pass. Another factor enters to diminish the strength of the monsoon in northern Garhwal, and that is the shearing effect of the dry Tibetan westerly winds.

Apart from the excellence of its climate Garhwal is unparalleled in my experience for its combination of fertile beauty and wild grandeur. As Dr. T. G. Longstaff wrote: "It is almost the only part of the Himalaya that can be compared with the Alps." It is indeed, like the Alps, built on a huge scale; it is inhabited by people professing a Hindu religion in its lower valleys and by nomadic Bhotias in its upper valleys whose religion alternates between



The approaches to Kamet

Hinduism and Buddhism according to which side of the Tibetan frontier they happen to find themselves. An additional charm is lent to Garhwal by the association of its peaks and glaciers with Hindu mysticism, mythology, and religion. Its two principal rivers, the Dhaoli which drains the glaciers to the east of Kamet and the Alaknanda which drains the glaciers to the west of Kamet and those on the eastern side of the Badrinath range, unite to form the Ganges. The Alaknanda is regarded by Hindus as actually forming the source of the Ganges, and, because of this, some 50,000 pilgrims flock annually to Badrinath to pay their respects to the snows whence issue the waters of that river which they believe to be associated with Siva and Vishnu. It was of these snows that the Hindu scribe wrote:

“He who thinks of Himachal [the Himalayan snows], though he should not behold him, is greater than he who performs all worship in Kashi [Benares]. And he who thinks on Himachal shall have pardon for all sins; and all things that die on Himachal, and all things that in dying think of his snows, are freed from sin. In a hundred ages of the Gods I could not tell thee of the glories of Himachal, where Siva lived and where the Ganges falls from the foot of Vishnu like the slender thread of a lotus flower.”

What mapping has been so far accomplished of the Badrinath Range, while giving a fair idea of general directions, is not in keeping with the other excellent work done by both Indian and European surveyors in Garhwal. The Gangotri glacier, about 25 miles long, appears never to have been visited since an enterprising officer of “The Company” trod its lower portion over a hundred years ago. It is however only fair to add that I have not at my disposal the records of the Indian Survey dealing with this district. In 1913 however Mr. C. F. Meade visited the Bhagat Kharak and Satopanth glaciers. Had he had more time at his disposal he might have forced a pass from the former glacier over the watershed of the Alaknanda and Gangotri rivers to the Gangotri glacier, thereby accomplishing the first crossing of this range. The Bhagat Kharak and Satopanth glaciers form the joint source of the Alaknanda river.

After descending from Kamet we arrived at a camping ground near the village of Gamsali in the Dhaoli Valley, where we rested two days to enable us to recoup our energies after a somewhat strenuous time at high altitudes, reorganize our portorage, and make arrangements for sending our Sirdar Lewa, who had been seriously frostbitten on Kamet, to the hospital at Joshimath. As regards portorage it is perhaps interesting to note that one of the objects of the expedition was to cut down the number of porters to the minimum in order that the expedition could live on the country. This was achieved by excluding rigorously unessentials as far as possible. Actually, we never employed more than seventy porters, and these included nine men carrying unessentials in the form of cinematographic and photographic apparatus.

En route to Gamsali considerable difficulty in crossing the Dhaoli river above Niti was experienced, and for the benefit of other Himalayan travellers it may be of interest to mention the method by which this formidable glacier torrent was crossed. In this particular instance it was possible for a man to cross higher up, but as this involved some rock climbing it was deemed advisable to get the loads across at a point lower down. In the case where it is not easily

possible to get a single man across a torrent a point must be found where the torrent curves sharply, so that the first man with a rope tied to him can be lowered down the torrent to the opposite bank. Having got a man across, a rope was fixed between large boulders. A strong V-shaped juniper root was next found. This was placed inverted over the rope and from it suspended loops of rope in which was placed the load or man. This contrivance was then pulled across the stream, the juniper offering but little frictional resistance. It was in fact a primitive form of the rope and breeches buoy by means of which shipwrecked mariners are rescued.

The vanguard of the monsoon arrived at Gamsali simultaneously with ourselves, but it was a mild, desultory affair, for the bulk of its moisture had been precipitated on the ranges of southern Garhwal and Kumaun. Indeed, the natives at Gamsali told us that they seldom experience more than a few days of bad weather, even during the height of the monsoon season.

Our next object was to force, if possible, a new pass over the range south of Kamet and between the Kamet massif and the peaks of Gauri and Hathi Parbat. Both the Meade and Longstaff expeditions had traversed the Bhyundar, 16,700 feet, and Khanta Khal, 14,750 feet, passes which had been traversed as long ago as 1862 by Colonel Edmund Smyth. The late Mr. Arnold Mumm, who was a member of Dr. Longstaff's expedition, had however noticed indications of a pass from the head of the Banke glacier system which, if practicable, would lead down to the Alaknanda valley above Mana. We decided therefore to follow this information up, and in addition see whether the Mana Peak was accessible from this side.

Leaving Gamsali on July 5 with only light luggage (the heavy luggage was sent round by the lower route *via* Joshimath to Mana) we ascended the Banke valley to the alp known as Thur Udiar, which is just below the snout of moraine-covered Banke glacier. The following day we pushed on to Dr. Longstaff's camping ground at Eri Udiar (Cold Cave). On July 7 Holdsworth and Shipton attempted to climb a fine rock and ice-peak 19,815 feet high, rising directly above Eri Udiar. They were unsuccessful, and had to retreat owing to lack of time 300 feet from the top. The following day Shipton and a Darjeeling porter, Nima, returned to the attack. This time Shipton was successful and was able to enjoy an excellent view of the upper part of the Banke glacier. The same day that this was accomplished Beauman and Greene explored the head of the Banke glacier. The topography of the Banke glacier, its tributary glaciers and neighbouring ridges, did not correspond to the map, so they made a rough sketch-map by means of photographs and prismatic compass bearings. Unfortunately there was no possibility of forcing a pass over the range, for the head of the Banke glacier is enclosed by a ridge, the face of which is excessively steep and plastered in hanging glaciers. The locality was also decidedly dangerous owing to the great ice and snow avalanches that the warm monsoon airs were peeling from every mountain-side. There did not appear either any possibility of climbing the Mana Peak from this direction; its southern ridge is very long and both difficult and dangerous to approach, whilst its south-eastern face is quite impracticable. Thus we were forced to cross the easy passes previously mentioned, and descend into the Alaknanda valley at Hanuman Chatti. Yet if no pioneering work was possible we were rewarded in other



Bhyundar valley



Looking down Glacier 6 from 19,500-foot peak, climbed 18 July 1931

ways. The Bhyundar valley, along the upper part of which we had to pass, is richer in flora than any Alpine valley I have ever seen. The hillsides were snowy with anemones, like the narcissus fields about the Lake of Geneva. There were countless potentillas, yellow nomicharis, kingcups with single and double flowers, the beautiful blue Himalayan poppy, geraniums of two kinds, forget-me-nots, pale blue borage, mauve polemonium, crimson orchids, rosy-coloured cyripedium, dwarf larkspur, and clumps of great purple asters. Holdsworth, our botanist, discovered no fewer than ten varieties of Alpine primula, among which were the tiny stemlets of *primula reptans* and *primula denticulata*, *primula involuceata*, and *primula androsace*. Peaks unnamed and unclimbed stand watch and ward over this Eden, greatest among them Gauri Parbat, the Brilliant mountain, to the north of which we noted a well-defined gap which, if practicable, would lead over the range to the Kosa glacier. Dr. Longstaff was told by the natives that there was no practicable route down the Bhyundar valley to its confluence with the Alaknanda valley above Joshimath, but now there is a good path, frequently used by shepherds and their flocks. For us however it was more convenient to traverse the Khanta Khal Pass, 14,750 feet. This route, since it was traversed by Dr. Longstaff, has now fallen into disuse, and we experienced some difficulty in descending into the Alaknanda valley owing to the dense vegetation through which we had to force our way.

At Hanuman Chatti we found ourselves on the pilgrim route to Badrinath, a route strongly impregnated with the odour of sanctity. At Badrinath we were received by the High Priest, the Rawal Sahib, and garlanded with flowers. Much interest was shown over our ascent of Kamet, and we were asked whether we had seen England from the top. This was not the first time we had been asked this question, and as an instance of how a tradition may originate it is perhaps interesting to mention that when Dr. Longstaff climbed Trisul in 1907 the Gurkha soldier, Karbir, who accompanied him and his guides to the summit, was asked, on their descent, by the villagers what view they had seen. Being of a somewhat inventive turn of mind the Gurkha replied with grave face that he had made out the city of Bareilly and, beyond that, Bombay and the Black Water (the ocean), and beyond that, Wilayat (England), and he knew it was England because he had been there. Thus it has come about that all the villagers in northern Garhwal now believe that one has only to climb a high mountain in order to see England from the top. Another curious tradition was that on the summit of Kamet is a palace of pure gold tenanted by a powerful god.

We arrived at Mana on July 12, being greeted by the whole village with the village band and the local idol. Mana is a Bhotia village, whereas the inhabitants of Badrinath, which is but 2 miles away, are Hindus. The Bhotias enjoy a smoke by the simple expedient of digging two small holes in the ground, boring a tunnel between them, filling one hole with tobacco, lighting it, and sucking energetically at the other hole. At Mana, also, we witnessed the blessing of the sheep before being sent up to the upper pastures, a ceremony accompanied by much drum beating. Two days were spent in resting and reorganizing our transport. The Gamsali and Niti men were dismissed and Mana Bhotias recruited in their stead. In our main object, which was the

crossing of the Badrinath range, there were two possibilities. We might ascend the Alaknanda valley and the Bhagat Kharak glacier and force a pass across the range from the head of the glacier; the second possibility was to ascend the Arwa valley, which is the next valley to the north of the Alaknanda valley and runs parallel to it. The sketchy manner in which this valley and its surrounding ridges is delineated on the map suggested that little or nothing was known about it. Its most important feature appeared to be a glacier about 12 miles long, which filled it to within 3 miles of its junction with the main Sarsuti valley, which leads up from Badrinath and Mana to the Mana Pass and Tibet. The only information we could obtain about the Arwa valley was that one Piggott or Biggott had visited it about thirty years previously. Also its lower portions are used for grazing the village flocks.

On July 15 we left Mana and marched up the Sarsuti valley, following the trade route to the Niti Pass as far as Ghastoli. Next day we entered the mouth of the Arwa valley and found ourselves on grassy slopes gay with yellow and red potentillas and other flowers. Two miles from its junction with the Sarsuti valley the Arwa valley is almost blocked by a great terminal moraine. This, at first sight, appears to be the terminal moraine of a main glacier filling the valley. Actually however it is the terminal moraine of a side glacier debouching from the south into the valley. Traversing beneath this moraine was a risky business, as boulders were constantly falling from the snout of the glacier, hundreds of feet above. Having passed it we were not surprised to find that the 12-mile-long glacier marked on the map was non-existent and that the valley continued for another 6 miles without a glacier. The fact that on the eastern side of the Sarsuti valley there is a measured point of 18,963 feet opposite the Arwa valley suggests that the native surveyors, instead of ascending the Arwa valley, merely observed it from this point, and looking up it not unnaturally mistook this terminal moraine for the terminal moraine of a glacier filling the upper portion of the valley. This side glacier appears to be advancing. An advance of only 200 yards would suffice to dam the Arwa river, and as the valley is almost flat for 3 miles above this terminal moraine a dam might result in the formation of a large lake. Should the dam afterwards burst, disaster would overtake villages in the Alaknanda valley. The progress of this side glacier should be carefully observed.

We camped at about 14,000 feet near the highest juniper bushes. Next day we continued on up the valley, noting as we did so three glaciers of considerable size debouching into the valley from the south. Camp was pitched near the point where the main Arwa valley forks into two glacier-filled valleys. The branch (2) running in a south-westerly direction contains much rock coloured by iron; the branch running in a north-westerly direction branches into three glaciers (4, 5, and 6) of considerable size which themselves branch off into other glaciers. In the map the frontier of British Garhwal and Tehri Garhwal is marked as running along the range north of the Arwa valley in an east-south-east west-north-west direction. In reality however there is no main ridge at all, but a confused jumble of ranges and glaciers. As our principal object was to cross the watershed and descend to the Gangotri glacier, it was our first duty to discover which of the many ridges before us formed the actual watershed. The Base Camp was pitched at about 16,000 feet. On the



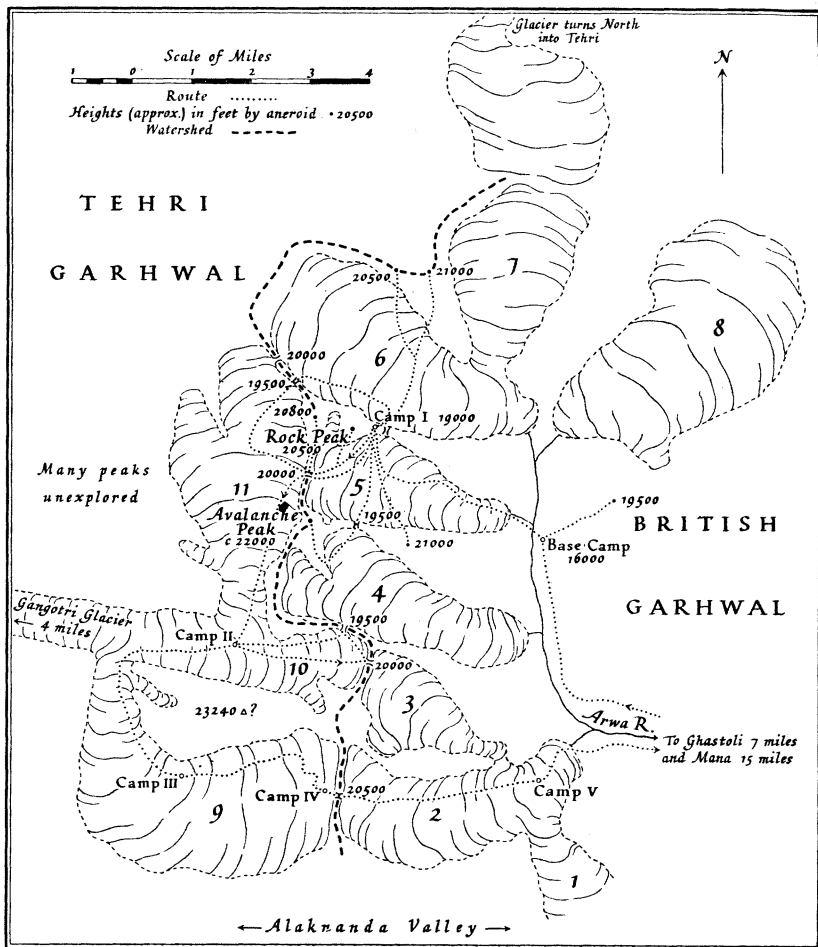
Looking west from 19,500-foot peak, climbed July 18; Avalanche Peak to left



Summit of 19,000-foot peak, Arwa valley, climbed July 19

next day, July 18, Greene, Shipton, and I climbed a peak of 19,500* feet to the north-east of the camp in order to obtain a better view of the complicated district and return if possible knowing the direction of the watershed.

We were well climatized and ascended at a rate of 1500 feet an hour. We reached the summit without difficulty. So delightfully warm was it that we spent many pleasant hours there. Although we were able to observe a con-



Glaciers of the Badrinath Range: sketch by Captain E. St. J. Birnie

siderable portion of the complicated glacier system at the head of the Arwa valley it was still not possible to determine which of the many ridges before us constituted the watershed. The most promising line of exploration lay up a glacier (5) running up in a westerly direction from our camp. Running up in a north-easterly direction and coming into the valley just above our camp was a

*Heights given were determined by aneroid and are open to considerable correction; if anything I believe they are under-estimated.

glacier (8) quite 5 miles long, whilst a direct continuation of the valley in which our camp was pitched opened out into a vast snowfield (6), the ridge at the head of which might well prove to be the watershed ridge. We were evidently on the border-line of the area influenced by the monsoon and the area swept by the dry westerly Tibetan winds, and it was interesting to watch the moisture-charged clouds blown up from the south pouring over the ridges and meeting annihilation from the dry westerly winds. So well defined is this line of wind shear that the snow-line on the southern side of the Arwa valley is considerably lower and the glaciers considerably larger than on the northern side, showing that the Arwa valley forms a natural funnel for the dry westerly winds. I have seldom spent a happier day on a mountain top, and so warm was it that it was actually possible to sit in one's shirt sleeves. Many magnificent mountains from 20,000 to 23,000 feet high rose to the south of us, some of which appear totally inaccessible.

The same day that we ascended the 19,500-foot peak, Beauman, Birnie, and Holdsworth ascended the glacier (5) running up in a westerly direction to a height of about 19,000 feet, where they discovered an excellent camping site on a rock ridge separating this glacier from the great snowfield (6) we had observed. On the following day, July 19, we ascended to this site, climbing on the way a minor peak of about 19,000 feet from which we enjoyed a beautiful view and were able to observe distinct indications of a pass at the head of the glacier (5) on which our new camp (I) was pitched. On July 20, Birnie, Holdsworth, Shipton, and myself walked up the glacier and climbed a short, steep, but easy slope to the pass. Arriving on the ridge we found to our satisfaction that we were indeed on the watershed. Before us and separated from us by a steep slope only 300 feet high was a large glacier (11), running downwards in a south-westerly direction and then curving round out of sight in a westerly direction to join the main Gangotri ice-stream. It was decided that Birnie and a porter should descend to this glacier and endeavour to force their way back over the watershed by a pass which had been previously noted by Holdsworth, a pass which, if practicable, would lead them back into the great snowfield (6) north-west of our camp. Shipton and I meanwhile climbed a peak of 20,800 feet on the watershed ridge to the north-west of our pass. Unfortunately however we were able to obtain but a poor view owing to mist and snow squalls, but we were able to observe the finest peak we saw in the Badrinath range with the exception of Nilkanta—an extraordinary fang-like peak of snow and ice which rises from the ridge forming the westerly retaining wall of the glacier (11) leading downwards to the Gangotri ice-stream. We returned to camp in a heavy snowstorm, feeling somewhat anxious about Birnie, but he, with excellent mountaineering judgment, traversed his proposed pass, descended into the snowfield (6) north-west of the camp, and from it climbed up to the ridge on which was pitched the 19,000-foot camp.

Opposite to our camp and on the far side of the glacier (5) rose the finest peak in the vicinity, about 22,000 feet high.* This Shipton and I attempted to climb on July 21, but were forced to retreat by a snowstorm. The following day we returned to the attack; this time we were successful after a steep climb up snow slopes and an ice ridge. Birnie and a porter followed us the same day.

*Subsequently named Avalanche Peak.

Unfortunately, owing to mists we saw little or nothing from the top, but we obtained glimpses of what appeared to be another feasible pass across the range immediately to the south of us, which links up the glacier (10) leading down into the Gangotri glacier and glacier 4. Immediately to the south-west of this pass rose what we took to be the only triangulated peak of any magnitude in the northern end of the Badrinath range, 23,240 feet high. It is however not quite certain whether there are not higher peaks. The beautifully formed snow and ice peak we had previously noted must be at least 23,000 feet high. The descent was marred by the only mountaineering accident of the expedition. When glissading the last snow slope to the glacier I was overwhelmed by an avalanche dislodged by a companion above me and carried down over the bergschrund, with the result that I fractured a rib and was severely bruised about the body.

The following day, July 24, a snowstorm prevented any work from being done. It was now decided that in order to carry out the maximum amount of exploration and mountaineering in the limited time at our disposal we should split up into three parties. Holdsworth and Shipton were to remain at the 19,000-foot camp and continue with the exploration of the glaciers in the immediate vicinity. Beaman and Greene were to descend to Mana and ascend the Alaknanda valley and note any possibility of passes existing from the head of the Bhagat Kharak glacier to the head of the Gangotri glacier or from the head of the Satopanth glacier to the Madmaheswar valley which drains into the Mandakini river. Birnie and I were to cross the watershed by the pass originally discovered, descend to the Gangotri glacier and endeavour to force a pass back over the watershed into the Alaknanda glacier system, preferably linking up to Beaman and Greene. This scheme depended for its success largely upon good visibility, and doubtful weather would entail retreat for a party lightly provisioned and far from its base. Unfortunately however I was forced to return before the pass had been gained, as my bruised thorax, by preventing full expansion of the lungs, did not allow of sufficient oxygen being imbibed. I was carried down in a fainting condition, but soon revived on gaining a lower altitude and was able to accompany Beaman and Greene down to Mana. Despite the snowstorm, Birnie with eight porters crossed the pass, descended some 3 or 4 miles down the glacier (11) on the eastern side and made his camp (II) not far from the junction of this glacier with the main Gangotri ice-stream.

Doubtful weather rendered the original scheme inoperative, and Birnie decided to keep near enough to the 19,000-foot camp to retreat to it should really bad weather supervene. Next day he ascended a glacier (10) leading up to an apparent pass to the north-east of the 23,240-foot peak and reconnoitred the pass, reaching the base of a very steep slope. The pass was forced up snow slopes. Descent on the far side was found to be possible but difficult, and as the pass led back into the Arwa valley and not to the Alaknanda, as he hoped, he returned. From the pass a view of several miles was obtained down the main Gangotri ice-stream. Birnie then ascended another glacier (9) leading back towards the watershed and partially reconnoitred an obvious pass at its head. Camp III was made at about 17,500 feet.

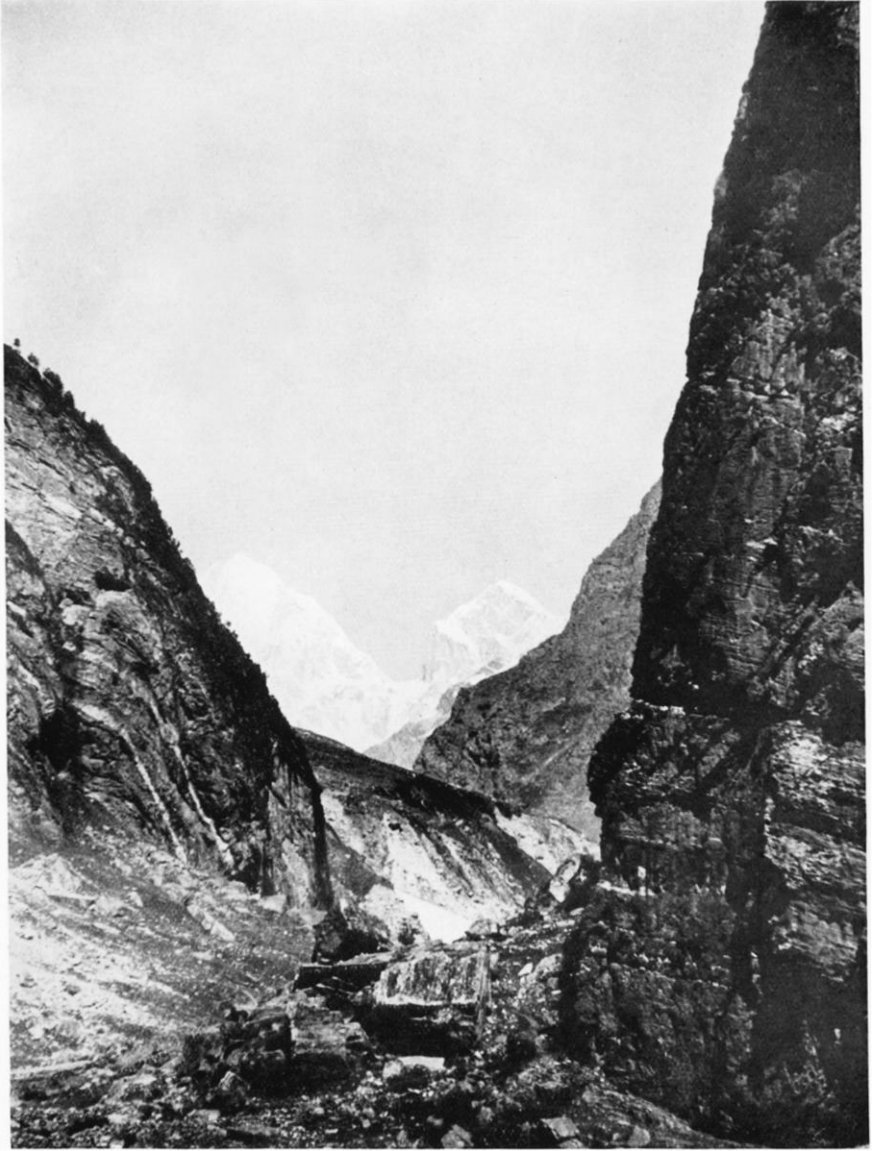
On the following day reconnoitring was continued with Gian Singh, a local

porter. After some step cutting this second pass was reached. Descent on the far side was found to be steep but practicable. Unfortunately however the pass did not lead to the Bhagat Kharak glacier as hoped, but back to a subsidiary glacier flowing into the Arwa valley. The route over this pass is liable to be overwhelmed by ice avalanches, but a safe camping site (Camp IV) was found. On the next day Birnie with the whole of his porters returned to the pass. The porters were lowered one by one through a cornice and 2000 feet of very steep snow slopes was descended by the party. After a careful descent however the easier glacier (2) was reached. Luckily there was no ice to give trouble. This pass would be possible for laden men only under good conditions, as ascent or descent on the Badrinath side of the watershed would involve too great a strain. Camp V was made at 16,700 feet. The local men showed up exceptionally well and several of them became skilled in handling the ropes and ice-axe. After a long, tedious march Birnie found himself once more in the Arwa valley on July 29, and descended to Mana. Holdsworth and Shipton on July 25 descended to the glacier (6) north of the 19,000-foot camp, and crossed it to a fine peak at the junction of two glacier bays. This they climbed by the south-east ridge, finding the rock very loose. Mist unfortunately spoiled the view from the summit. The peak is about 21,000 feet. They were however able to observe that a glacier about 12 miles long, marked on the map as flowing from east to west, north of the Arwa valley and approximately parallel to it, and draining into the Gangotri glacier, just about its termination, does not exist, its place being taken by another great glacier running not east and west but north and south, which appeared to drain into Tibet. This was an interesting discovery, and, if their brief observation were correct, the ridge separating the Mana glacier from the glacier flowing into the Gangotri glacier does not exist either. It is interesting to note that the frontier of British Garhwal and Tehri Garhwal is marked as running along the crest of the ridge, north of the Arwa valley and parallel to it, but it must bend considerably in a north-westerly direction if it is to follow the main watershed ridge.

On July 26 in good weather the party assailed a peak south-east of the 19,000-foot camp, about 20,400 feet high. An excellent view was enjoyed from the summit, particularly of the great 23,240-foot peak to the south, which from this side appears entirely impracticable. On July 27 another peak of about 21,500 feet was climbed south-east of the camp. On the following day the party descended to Mana, reaching the village on July 29. On July 30 Shipton and four porters ascended the eastern side of the Alaknanda valley, and next day climbed a peak of about 19,000 feet, whence they obtained a good view of the unexplored glaciers south-west of the Mana peak. He returned to Mana the same day. On July 28 Greene and I ascended the Alaknanda valley, intending to explore to the Satopanth glacier, and see if there was any possible pass at its head. Our project was cut short by an accident whereby one of our porters nearly lost his life in a glacier torrent—an accident which entailed the loss of our food. We were however able to visit the combined snout of the Satopanth and Bhaghat Kharak glaciers whence issues the Alaknanda river, considered by Hindus to be the source of the Ganges. It is perhaps a district worthy of the reverence which inspires thousands of Hindus who yearly make



Pass over Badriwath Range; Avalanche Peak to left



Looking up Alaknanda valley to head of Satopanth and Bhagat Kharak glaciers

a pilgrimage to Badrinath. Finest of all the peaks that guard these sacred snows is Nilkanta, a sheer pile of snow and ice, rivalling Siniolchum in its grandeur and beauty. On July 31 the expedition assembled at Badrinath and returned *via* the pilgrim route and Lohba to Ranikhet, which we reached on August 13.

It is not easy to understand why the Badrinath district is so little visited by explorers and mountaineers. Its climate is ideally suited for prolonged work and it is always possible to escape the monsoon to a large extent by keeping well to the north near the Tibetan frontier. In spite of a considerable amount of ground covered in the short time at our disposal we did little more than touch on the vast and complicated glacier system at the northern end of the Badrinath range. The Gangotri glacier, which is probably the greatest glacier in the Central Himalaya, still remains almost completely unexplored, while the peaks around it, and those of the watershed and in the immediate vicinity of Badrinath, are many of them climbable by mountaineers. Undoubtedly, when this district comes to be opened up, it will be recognized as one of the most beautiful and interesting in the Himalaya. Its flower-covered pastures and its magnificent peaks and glaciers demand a return visit.

DISCUSSION

Before the paper the PRESIDENT (Admiral Sir WILLIAM GOODENOUGH) said: The pleasure that we all experienced twelve months ago in meeting for the first time in our own hall is more than doubled when to-night we come home to it. And in that intimacy there are one or two things which Fellows of the Society will wish to know of and which I will ask our guests to bear with for a moment at the opening of the Session. There are eighty-eight proposals for new Fellowship. That is a very good number. But what is not mentioned on the proposal paper is the number that we have lost both by death and by resignation. We have to mourn the loss of such men as Sir Alexander Cobbe, who had just been appointed to the Council; of Major Chipp, who at Kew managed to combine his work there with geographical work; and of the President of the Manchester Geographical Society, Lord Stanley. There have been a large number of resignations, and I ventured to write a letter to each of the Fellows concerned suggesting that they might care to reconsider their decision or postpone it for a few years at any rate. The new buildings—the Map Room, the Library, and this Hall—have to be kept up, and they afford very great amenities to all Fellows. I think many would agree that the range of the Library is in itself comparatively cheap at the subscription of £3 a year, and in the Map Room and other parts of the House there is an immense amount of interest and pleasure to be obtained. And, most important of all, we want a very large amount of support if we wish to keep our place pre-eminent among the other nations and Geographical Societies of the world. There is one addition which we are about to make. We arranged this afternoon to buy a new projector for cinema work. No Geographical Society would be worthy of its name unless it could show films of geographical work. We propose to exhibit such geographical films on some of the spare Mondays; attendance, at any rate for the present, will be confined to Fellows. I hope that will be an additional incentive to people to come and join us.

If Mr. Smythe were not, considering his age, a fairly old Fellow of this Society I should apologize to him for having kept him so long on the platform without drawing the bolt; but as he is a Fellow I need make no apology to him at all. Mr.

Smythe is a mountaineer of many years' experience in Switzerland, and now he is an experienced mountaineer on the Himalaya. He was a member of Professor Dyrenfurth's expedition to Kangchenjunga, and he has made a most successful attack on Kamet, followed by some very admirable work round those portions of the Himalaya known as the Sacred Sources of the Ganges. He may perhaps speak to us rather from the point of view of geographical or, to be more accurate, topographical work than of mountaineering, but I am glad to hear from him that you will not be disappointed if you care for great peaks, for he has a few slides to show of Mount Kamet itself. These he will show you in the lecture which I now ask him to deliver.

Mr. Smythe then delivered the lecture printed above, and a discussion followed.

Mr. HOLDSWORTH: Perhaps Mr. Smythe has left unsaid one or two things I might say. We had a number of attempts on Kamet by previous expeditions to go by, and I think one of the reasons why the international expedition to Kangchenjunga failed was that the leader of that expedition entirely neglected the experience that had been gained by other Kangchenjunga and Mount Everest expeditions. I think that the success of our expedition in climbing Kamet was largely due to the very careful study that Frank Smythe and Bentley Beaman had given to the actual problem of Kamet and the reasons why the other expeditions had failed.

Meade was the first to discover the col which goes by his name between Kamet and the Eastern Abigamin. He went up there with Frank Lochmatter, but he went as quickly as he possibly could, the theory in those days being that the longer one stayed on a mountain above 20,000 feet the worse one felt, and that one's best chance was to do it quickly. The result was that at 23,500 feet he and this extraordinarily strong and capable Swiss guide were practically knocked out and could not move a step farther up the heavy and exhausting snow at that great height. The next expedition, the Kellas and Morshead expedition, decided to attempt acclimatization and did what we did. They went up in stages, remaining two or three days at various useful heights, and when they got to Meade's Col they were comparatively fit; but their trouble was that their transport had broken down badly owing to the lack of proper organization and lack of knowledge about the fuel difficulty. Our expedition had to thank Frank Smythe for getting over both those difficulties. We profited by the lesson learned from Meade, and we went up in slow time, spending, I think, four days at Camp II (18,400 feet) and about five days at Camp III (20,500 feet). We realized the difficulty of fuel some time before and had thought about it in considerable detail. Captain Birnie was an admirable transport officer and was able to get the last ounce out of the porters, both those who came from Darjeeling and those who came from the Central Himalaya. He had a sort of instinct for knowing when they had a legitimate "grouse" and when they were trying something on. On the whole, they are extraordinarily good people and did very well; but he was amazingly good in his grasp of the detail and the efficient way he dealt with the fuel problem. We could afford to equip with proper Alpine equipment only a certain number, I think six, of the local porters, our own ten Sherpas from Darjeeling, and two Gurkha N.C.O.s we took with us. We therefore could not make any unequipped people sleep on snow, so those who were unequipped used to sleep at Camp I, 16,500 feet, or at the Base Camp at 15,500 feet, and make themselves useful while we were climbing the mountain and working the way out by bringing up fuel and food. Juniper, which is the main source of fuel, comes to an end about where the glacier ends. It grows quite plentifully on the terminal moraine. We got juniper scrub carried by means of relays up to 20,500

feet to Camp III, so we did not have to use our spirit fuel except for Camp IV and Camp V. Another reason for not using it earlier was that we found paraffin alone would not burn in a Primus stove. That was what Morshead and Kellas discovered. A mixture of paraffin and petrol would do for a Primus. We had that, and we had Meta, and the result was that when we came down from the day's working out of the route or climbing Kamet, we could get a cup of hot tea as soon as we asked for it.

Compared with the second part of the expedition, Kamet, I felt, was more like trench warfare: a very well organized battle on preconceived lines. The whole way was known. We had to avoid mistakes that had been made by our predecessors and to keep ourselves fit. Otherwise, as far as I was concerned, it was merely a question of going where I was told. The second part of the expedition I think I really enjoyed more because it was in completely unknown country. One ought, I think, to be sympathetic to the Survey of India. Their map, of course, was inaccurate, but, considering the difficulties they had to contend with, and considering the enormous complexity of the Himalaya, to produce a map of such accuracy as they have done is really a prodigious achievement. At the same time, the map being inaccurate one had all the joy of the unknown. One never knew what one was going to see over the next ridge. I remember after we had gone 2 or 3 miles up the Arwa valley we saw it blocked by the great snout of a glacier. I was carrying my skis in the hope of putting them on when I got on to the top of the snout of the glacier, but to my great disappointment I found the glacier petered out and turned out to be one coming in from the side. About 3 miles farther on we found the valley was blocked by another glacier snout, and again I took my skis off my shoulder and said, "The hard work of walking over boulders is over: I shall now walk nicely up gentle snow-slopes." But not a bit of it, for that was also a side glacier.

What interested me most was the view I had from the last peak you saw on the screen. As Mr. Smythe said, he and Birnie were to go over the Gangotri, but Smythe, unfortunately, had to return owing to his crushed rib hurting him so much. So Shipton and I were left, and altogether we had eight days at 19,000 feet. As we had been eight weeks climbing and acclimatizing it was not at all distressing. We had fairly good appetites and slept pretty well. We climbed three mountains there in our last three days. We thought, as Birnie was going towards the south, our duty was to try to discover something on the north. A 21,000-foot peak presented itself towards the north-west of the lower glacier. We crossed the glacier and climbed up a ridge, but unfortunately, although the morning had dawned fair, it was typical monsoon weather, and woolly clouds came up and, most irritatingly, they just came round our heads as we got to the top. Instead of seeing a wonderful view to the north we could only secure the somewhat disquieting information that we were standing on a rather dangerous cornice. But we did get just a glimpse, and we saw that the glaciers at our feet and slightly to the west, instead of continuing to go west into the Gangotri, seemed to turn north. The next day was beautifully fine, and we thought we would try a peak south of our camp, so we climbed a 20,400-foot peak—quite a nice little climb with one or two enjoyable bits of rock-climbing in it, but from there the complexity of the ridges was so terrific that, although it was a beautifully clear day, we simply could not make any contribution to the topographical puzzle.

On the third and last day we sent our goods and chattels down to the Base Camp at 16,000 and dropped to the lower glacier again, crossed it and climbed a 21,500-foot peak. That was a very enjoyable climb with 200 or 300 feet of quite exciting snow on top of ice near the summit. We had the desired view north, and from there we saw Kamet due east and, north-east, we saw the Mana Pass.

I was talking just now to Dr. Longstaff and was relieved to hear confirmed the impression I got. It was very difficult to find where the actual pass was. There seemed to be a glacier flowing both ways, both into Tibet and down into India, which, according to Dr. Longstaff, is exactly what the state of things is on the Mana Pass. But most sensational of all, west of the Mana Pass and over a subsidiary ridge going north and south, there was a very impressive glacier rising in our peak and flowing north into the brown plains of Tibet, which of course is entirely different from what the map says. The map says that there was a big glacier flowing east and west, where the map marks the frontiers of the little local state of Tehri Garhwal. If what we have described is true, the Rajah of Tehri Garhwal will find himself either credited or debited with several thousand more square miles of ice and snow.

The PRESIDENT: You have heard the name of Dr. Longstaff more than once this evening, and not only this evening. I invite him to come on the platform.

Dr. T. G. LONGSTAFF: It is twenty-six years since I was first in the country of which we have heard this evening. To see these photographs and hear Mr. Smythe's lecture has been an immense pleasure to me. He has told us very little of the chief feat which his party performed, the ascent of Kamet, 25,000 feet: 1000 feet higher than Smythe's own record on the Jonsong Peak. Kamet is now the highest mountain that has been climbed to the top, though actually greater altitudes have been reached on Mount Everest. Not only that, but his party displayed the most extraordinary energy in climbing. They seemed to make nothing of climbing a 20,000-footer on any spare Saturday afternoon: they bagged about ten! I want to assure Mr. Smythe and all the members of the party that every mountaineer has the highest respect for their achievement and for the way in which they overcame difficulties without any loss of life: which means that the skill displayed was adequate. One of the fascinations of mountaineering is that if the skill displayed is not adequate you do not come back.

Now what I am going to say now is not a reflection on anything that the speakers have said, but I want to point out that the conditions now are different from what they used to be. The criticism of the Survey of India map is due to a misunderstanding: that survey was made in the seventies. It cannot be compared to the work done by the Indian Survey at the present time. I very carefully read up before I went to that part of the world the literature of the country from 1800 onwards, and I looked up the old Survey Reports. I found that the surveyors were definitely ordered not to waste time on uninhabited districts. They were to map the inhabited valleys and the villages. The old triangulation is reliable, but this map is not a topographical survey at all. It was a question of expense. They were definitely told that in uninhabited hill country they were to spend as little time as possible, and they were simply to sketch in what they could quickly see, without visiting the glacier regions. So those maps are really not comparable in any way with modern work; and they never claimed to be topographical surveys in the modern sense of the word.

Then there is one other thing I wish to say: that our predecessors in those countries, like Sir Richard and Henry Strachey in the fifties and sixties, Edmund Smythe, Drummond, and Webber of the Forest Department, and so on, even to later expeditions than that, found that the local men had the greatest terror of going into those snow regions inhabited by gods and demons. You have to go very slow with those people. If the earlier explorers had tried to force them to go with them up on to the glaciers there would have been difficulties for subsequent travellers. Bruce, Slingsby, Meade, Kellas, and others did not, as a matter of fact, force the local people; they were particularly careful when taking natives

into any place of real difficulty or danger. That policy is now bearing fruit and that policy has rendered it easier for explorers who have come afterwards to get the local men to accompany them. Fear and distrust have gradually worn off: conditions are certainly a little different now as compared with twenty-five years ago.

You heard Mr. Holdsworth express his preference for the joys of exploration, as compared with actual mountaineering. Anybody who has been to that country understands very well something of that. But the audience perhaps do not, because on no occasion has Mr. Smythe made the faintest allusion to the perfectly ghastly and horrible discomfort of mere existence, much less climbing, above 23,000 feet. Those of us who have been there will also emphasize the great achievement of Captain Birnie, who not only organized victory by accomplishing the supply problem without a hitch and without friction with the inhabitants, but himself achieved the ascent of Kamet.

The PRESIDENT: We have with us to-night the Vice-President of the Alpine Club—it is quite possible that people may know his name even better in other connections—and I will ask him to say a word or two: Mr. Amery.

The Rt. Hon. L. S. AMERY, M.P.: I am not sure in what capacity you have asked me to speak, Sir. If it is as a Member of Parliament, then I think my place would be more fittingly occupied by one of those whose majorities have reached Himalayan figures. My majority of not quite 15,000 belongs more properly to an Alpine classification. But perhaps it is—though you may not be aware of the fact, Mr. President—that I am, I think, the earliest explorer still in the ranks of the living of the particular region we have been hearing about to-night. I went all the way up the Alaknanda to its source in the year 1875. I admit when I say “went” I do not mean on my feet. I was eighteen months old and was carried, and on one occasion, owing to a stumble on the part of one of the bearers, I was jerked out of the litter and saved from ending my life in the Alaknanda by being caught by my petticoat and thrown back again. But the object of our expedition—I will not say my object—was, in fact, to do some of that survey work which Mr. Smythe and Mr. Holdsworth have criticized and which I am glad to say Dr. Longstaff has since so brilliantly vindicated. Therefore, no filial piety on my part is required to justify such sketchy work as my father’s party did up there in the early seventies.

Like every one else I have been immensely interested in the account of an expedition which did two things. First it set out in the most businesslike fashion to climb the highest mountain yet climbed to its summit. It was all clearly thought out and all done absolutely to time-table and without a single hitch. And then, having done the work, the boys indulged in a little play and scrambled up and down a dozen or so little 20,000-foot peaks and, incidentally, disentangled a certain amount of very complicated country for the benefit of topography at large, leaving the suggestion to others that there is still plenty to disentangle and plenty of fun in the way of jolly little afternoon walks. The scale of these things is always changing. We have only to read the awful doubts that beset the early parties that attempted Mont Blanc: whether it was possible for human beings to exist at heights over 12,000 feet, and all the complicated precautions taken. We think of the immense difficulties that faced the early Himalayan explorers. But now we have these lads waltzing on foot and on ski, and I suppose later on some form of light motor craft, up everything below 22,000 feet. After that even they would allow that serious climbing begins. Up to that they pick anemones and other beautiful flowers. They stroll up the summits with skis under their arms, slide down in graceful loops and curves and, modestly, say hardly anything about it when they come back. Anyhow they have shown that the world

is still full of lots of quite pleasant peaks and bypaths and opportunities for adventure.

The PRESIDENT: May I start by answering the last speaker? Mr. Amery asked in what capacity I asked him to come on the platform. I asked him as one who is a very great friend of the Society whom we are always glad to see here.

It is my most agreeable duty to thank the lecturer on your behalf and on behalf of the Society. That I do with great sincerity. Not only, Mr. Smythe, have you afforded us a most agreeable and interesting evening, but you have shown that there are problems which either yourself or other people will be able to solve in the future. Of the many true things that you have said I think the truest was when you said, "I am sorry I cannot show anything of this properly without a map." This afternoon the Council set up a small Committee with the particular object of improving the mapping of mountains, glaciers, and the like, and those who are interested in such things will have an opportunity of seeing the maps which we shortly hope to produce.

Dr. Longstaff and Mr. Amery have saved me from making any defence of the Survey of India; not that I hold any commission for them any more than for anybody else. But the map which Mr. Smythe spoke of is dated 1880, and you have heard of various reasons why, perhaps, it is not very great in detail. It is agreeable to find that despite his criticisms Mr. Smythe has left the maps which he has made in the hands of the Survey of India to complete. I think he is very wise to have done so.

What we thank Mr. Smythe for, as well as for the very interesting topographical work which he has shown us, is the astonishing beauty of some of his pictures. Anything more lovely than that picture taken by moonlight I do not think we have ever seen in this hall, and I know there is one present who may be considered to be a critic of beauty, the President of the Royal Academy. He told me just before we came here that that was what he was looking forward to, something beautiful. I am sure he is not disappointed. Will you therefore, Mr. Smythe, accept our most grateful thanks for the admirable lecture that you have given us and also accept our congratulations on having accomplished a great feat largely thanks to excellent forethought and organization?

The GEOGRAPHICAL JOURNAL

Vol LXXIX No 4



April 1932

A JOURNEY TO THE GLACIERS OF THE EASTERN
KARAKORAM: *A paper read at the Evening Meeting of the Society
on 11 January 1932, by*

PROFESSOR GIOTTO DAINELLI, Accademico d'Italia

IT may perhaps seem superfluous that I should say why I undertook this journey into Eastern Karakoram. But for its story's sake I may mention that I had the great fortune of being a member, as Geographer and Naturalist, of the memorable expedition organized by Dr. Filippo De Filippi and led by himself in 1913-14. During that time I asked and obtained from the leader the widest freedom of action and movement. And thus for a whole year and a half, nearly always alone with my very light personal caravan, I was in continual movement, because I knew it was necessary, for my own experience of the region and for the contribution I could bring to its knowledge, that I should see as many valleys and glaciers, as many plateaux and villages or shepherds' camping grounds as I possibly could. And thus at the end of the expedition I could say to myself I knew all Baltistan and all Ladakh and the first Tibetan plateaux as far as Pankong lake and the Aksai Chin.

One blank, however, had remained: the Nubra valley from its mouth in the Shyok valley to its origin in the Siachen glacier. The Nubra valley in its lower half is frequented by caravans which cross the Karakoram Pass during the summer, and it has been followed by various travellers; however not much was known about it, and I had special ideas regarding its population, from an anthropological point of view. The upper half of the valley had been climbed by very few travellers indeed. Of the old ones, Moorecraft in 1821, Vigne in 1835, Thomson and Henry Strachey in 1848, and some years later by Drew. Then we come to quite modern times, with Longstaff in 1909 and the Vissers in 1929; but its geological conditions were practically unknown.

At the head of the Nubra valley is the Siachen glacier, which is said to be the largest glacier on Earth outside Polar regions. Longstaff had discovered and been on it in 1909, the Workmans followed in 1911 and 1912, and also the Vissers climbed it in 1929, but only for a few miles from the front upwards. Of the geological conditions of its immense basin nothing was known. And this represented the chief blank in my personal knowledge and in connection with the attempt that I have been preparing for years, of reconstructing the

geological history of the entire region, which is the last part, and perhaps not the least important, of the scientific results of the De Filippi Expedition.

This blank represented a wish on which for years I dwelt with always greater affection. To this you can add the longing I felt for the free caravan life, and that peculiar longing for a region which is grand in its landscape and highly interesting in its inhabitants. All these reasons of attraction grow all the greater when you think of the life a man of study leads in his own town, tied down to his writing table and by his numerous duties.

At the end of 1929 I could resist no longer, and decided for the Nubra valley and the Siachen glacier. And I worked out my own programme. As my programme was merely the manifestation of my personal wish to fill up a scientific blank—a blank not only mine—and to live again the healthy strong and free life of travel in regions neither well known nor of easy access, I wished my expedition to represent only a personal initiative of my own: I did not ask nor seek the help of any society nor of any committee. But this fact, though it brings as a consequence no light financial weight for a poor professor, as in no country in the world are professors wont to swim in gold, also brings the immense advantage of the most complete freedom and independence. Thus it was not necessary for me even to announce my programme. I chose my companions and set to work at my preparations.

My companions were to be very few. Miss Elly Kalau, my faithful collaborator for some years, a strong alpinist and skier, and prepared for the journey, if only by tradition in her family which has produced naturalists and travellers. Doctor Ardito Desio, my former pupil, possessed of a wide scientific preparation and quite good experience as a traveller; unfortunately he was hindered at the last moment to join me on account of his University duties. Third in my programme was Hashmatullah Khan, an Indian whom I had known as Wazir in Ladakh, and who had helped me a lot in my researches, rendering them easy in every way with the authority due to his official position. I meant to do without interpreters or caravan leaders, feeling capable of managing the men by myself, even in case of eventual difficulties.

The greatest difficulty I experienced perhaps during the period following my decision, namely in obtaining the necessary permits. From Rome to London, from London to Delhi, from Delhi to Srinagar, and then all the way back: that way is a long one indeed. And only in February did I finally receive the news that I was lacking no further official sanction. I like to name this date, especially when speaking to Englishmen, who are men of action, and who can therefore measure the rapidity with which my journey was organized. In one month, exactly, everything was ready, and on April 9 I left my own town, Florence, foretasting the delight and the enjoyment that were in store for me. However the rapidity was not to last only during the time of preparation: it had to be kept up also during the first part of our journey, that is during our movements of approach towards our still far-off goal—the Siachen.

The summer campaign, in fact, is perforce very short, and sharply limited within the year, when the essential part of the programme is to evolve on high glaciers; and in this particular case the upper Nubra valley was so renowned for its not easy accessibility, owing to the summer floods of the river, that any delay would have meant a serious menace to my entire programme.

At Bombay two days' halt to verify the food supplies, ordered from Italy at the Army and Navy Stores; then straight to Kashmir with the whole luggage of my expedition; five days at Srinagar to arrange all the loads and organize the crossing of the Zogi La, which did not present itself favourably, on account of much snow and numerous avalanches. And in fact it proved not an easy matter, but on May 9, just one month after leaving Florence, I was in the small bungalow of Machhoi, beyond the pass across the Himalayas, with all my 180 loads.

For some days still, on account of avalanches and landslips, the way was not always easy; then up the Indus valley our marches became faster until we reached Leh. On the way however I deviated towards Temesgam, to engage forty permanent porters in that village and in the neighbouring one of Teah, as I had never forgotten the solid qualities of the men who had followed me during the summer campaign in 1914, in the fatiguing and uncomfortable marches to the glaciers of the upper Shyok valley and on the first Tibetan plateaux, giving proof of a strength of resistance and faithfulness beyond comparison.

At Leh five days' halt, but not of rest indeed. The passes of the mountain range towards the Shyok valley were all under snow, and the most direct one, the Khardung La, was unpassable. From the first day I started sending ahead the main bulk of loads by small separate caravans, across both the Digar La and the Chang La. In the bazaar I bought part of the food supplies for the porters, that is butter, tea, salt, also tobacco, enough to last four months; and I sent at once into the Nubra valley a trustworthy man to buy and collect on his way as much flour as he could possibly obtain, according to the custom of the country, of barley and wheat.

On the fifth day I also started together with my caravan, crossing the Digar La in a somewhat tiring eleven hours' march, and reached Panamik in the Nubra valley after some days, having picked up on the way all the flour that my man had been able to gather all along the valley. As I at once pushed on beyond Panamik, the Nubra river did not present any difficulties, and I reached the front of the Siachen glacier, with my 180 loads which I had taken with me from Italy and then from Bombay, plus 7 tons of food for the porters and, if you are interested in the lesser details, with a small flock of sheep, 120 living chickens, and a provision of 120 dozen eggs. I remember how in Florence, just a few days before my departure, Dr. Longstaff recommended to me above all "food, food." You must admit that I had done everything to put into practice his excellent advice. And on June 9, exactly two months after my departure from Florence, I personally led a caravan to form a first depot some miles up on the glacier. You will acknowledge that a greater rapidity could hardly have been possible.

Now began our march up the glacier, and began for me the greater difficulties, namely those imposed by logical necessities. In a completely uninhabited region it is absolutely ridiculous to think of augmenting the number of men so as to diminish the difficulties of transport, because men have the unpleasant habit of eating, and therefore require provisions for their necessary feeding. Just think that a porter normally carries, in uninhabited regions, a useful weight of about 48 lb., and eats daily something more than 2 lb. He

carries thus about twenty-four days' food for himself, whilst my programme had planned a stay of nearly four months in uninhabited regions. Hence the necessity of recurring to expedients which constitute surely the most difficult thing in a journey like mine. The secret is to reduce the number of the men as much as possible, and to encourage them to the limit of their capacities and of their strength. My men made double stages every day, during three and a half months; but only thus, with that constant effort required of them, have I been able to overcome the really very great difficulties I met with. A caravan of seventy porters accompanied me to the centre of the Siachen, during our first fifteen days on the glacier; fourteen were then sent back to their villages so as to lessen the number of mouths to be fed.

The advance had not been a difficult one. I can certainly deny without hesitation the fame of inaccessibility of the Siachen's front, which, besides, had already been climbed by Longstaff and by the Vissers, though only for some miles. The extreme snout, as in nearly all large Karakoram glaciers, is broken up into a gigantic intricacy of ice hillocks, more or less covered by moraine, and furrowed by deep little valleys and often cut up by perpendicular walls. But with some patience and numerous windings the way is to be found. Farther up the glacier's surface changes its aspect, longitudinal zones or bands appear, some of them consisting of pure ice, others instead of moraine. The pure ice usually rises above the general surface to form tall banks or high series of picturesque pinnacles, and also the moraines form complicated broken and irregular ridges. Inconvenient, sometimes difficult, is the crossing of the glacier, consisting as it does in overcoming these obstacles. But to climb up it is easier, because you can always find a longitudinal zone between some embankment of ice and some moraine ridge, where marching is relatively easy and fast.

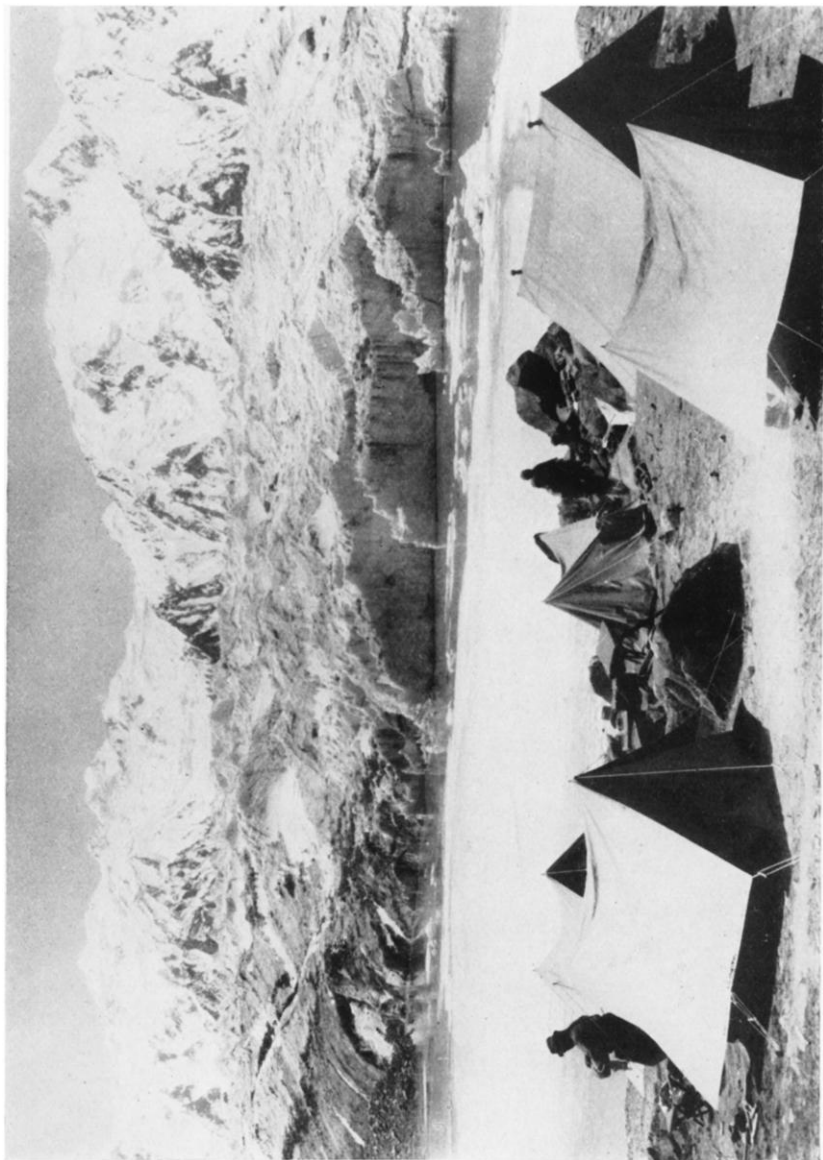
More difficult perhaps is the establishing of the camps, because you must avoid depressions which are always so inviting but dangerous in case, for instance, of a sudden emptying of one of those numberless lakes which dot the surface of the glacier; neither is it easy to find sufficient space to put up the tents, and it is mostly necessary to level moraine and ice, trying to avoid the too dangerous vicinity of crevasses. But all my camps on the glacier have left in me the remembrance of something supremely and inexpressibly picturesque.

Farther up the Siachen's surface tends to become more uniform, banks of ice and moraine ridges smooth themselves down; our vision of the neighbouring slopes and of the mountains in the distance grows always wider and grander and marching becomes easier and faster. When I arrived not far from the junction with the Teram Shehr, the principal affluent descending from the east, I deviated and abandoned the main tongue of the glacier, and reaching its rocky border I established a camp at about the same place where the Workmans had stopped already eighteen years before. This became my base camp for more than one month and a half.

My base camp halfway up the Siachen was simply wonderful. Imagine its position at about 20 miles' distance up from the front of the glacier, which extended itself for another 20 miles to its head; on one side, towards the east, the Teram Shehr came flowing in, measuring by itself alone about 18 miles,



Third camp on the Siachen Glacier; mountains of the right flank in background



Base camp beside a lateral lake on the left side of the Siachen and near the confluence of the Teram Shehr Glaciers

and from the opposite side came the Lolofond glacier, less long, but having other glaciers beyond its head before reaching the depths of some ice-free valley, just as beyond the Teram Shehr stretches the immense tongue of the Rimo. It is difficult to imagine an ice world of such immensity. Nevertheless there in the middle of it my base camp was like an oasis, well sheltered from the wind, well exposed to the sun rays, on the margin of a small lake shut in between ice and rocks, and surrounded by a vegetation and a flora which in all the Karakoram Range, even outside the glacier region, is really unusual. Rarely have I seen in our Alps high pasture grounds with such an intense abundance of flowers, of every kind, of every colour, and of every perfume. There was also a rich and varied fauna in which the hibex reigned supreme, that came down to graze every morning in groups of dozens and dozens and gazed stupefied at this strange invasion of men and tents and at the movement and activity that seemed to agitate this corner of their ice world. As a culmination to our good fortune we also found a great quantity of burtse, that little plant the small boughs of which make good fuel. It thus became unnecessary to refurnish our camp with juniper wood, which is relatively abundant near the front of the glacier.

Everything was of interest around my base camp, also the lake. After my arrival its level began to rise, at first rapidly, then more slowly; but after having risen over 70 feet it ended by endangering my camp, and I was obliged to set my tents higher up on the slope with all the boxes and bags that had accumulated around them. Then however the lake began to decrease, at first slowly, then with always greater rapidity, and on the last day of my stay in the oasis it emptied itself almost suddenly, whilst the Siachen's ice masses, robbed of their support, split up into large crashing blocks. My porters said that as the barasahib—the great lord, by which name they meant me—was leaving, so also the spirit of the lake was going.

The base camp naturally was not an oasis of rest. It was the centre of excursions upward along the Siachen and along its main affluents. These excursions were also difficult to organize: there were still loads to be fetched from the front of the glacier; fourteen men, as I have said, had been sent back; permanently five or six were on the sick list; and moreover I had not come to the Siachen from Florence to idle about amongst the flowers near the lake of my base camp. The solution I found to the difficulties was to organize a system of flying caravans, generally led by Miss Kalau, which were to make depots of food and fuel in places easy to locate. These caravans accomplished as many as three stages and more a day, and made it possible for the following caravans to move with very few men and more slowly according to working exigencies. I am glad to think that not one man during the whole time that my expedition lasted was kept in want nor short of food or fuel.

In the meanwhile the Siachen revealed itself always more to my curiosity as a naturalist and to our admiration as alpinist travellers. Above the base camp, where the glacier presents its greatest width, of over $3\frac{1}{2}$ miles, it grows steadily more uniform, the moraine ridges do not only become depressed, but they also separate from one another, and individualize always better; and each one can be traced to its origin, in one or the other of the mountain spurs at the foot of those ranges. Still farther up they disappear completely beneath the even

mantle of the eternal snow, which levels everything and also hides insidious deep crevasses.

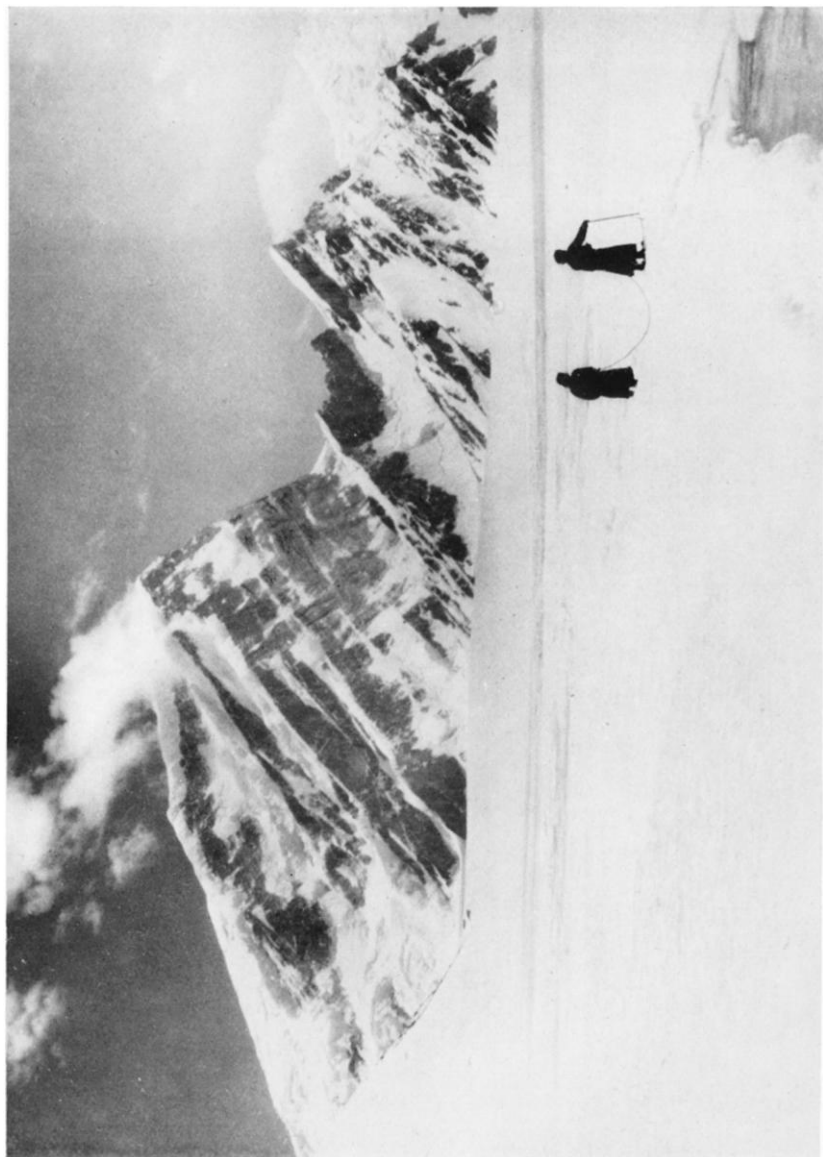
One must not believe however that the glacier's uniformity is as great as it appears when seen, from above and at some distance, from the rocks overhanging my base camp. Though high ice-banks and elevated moraine crests are not found here any more, yet there are tracts all broken up into pinnacles and pyramids and spires, where the hollows are invaded by numberless lakes, which are sometimes rather difficult to cross; also real watercourses on the ice, rivers, and torrents can be met here, with deeply excavated beds, running often between almost perpendicular banks, where patience is needed to find some way across, often only on a feeble snow bridge, which in its turn requires prudence and the use of the rope. But these are not real difficulties for those who are experienced alpinists, and for men like the Ladakhs who follow faithfully where their master has passed before them.

But the spectacle of that immense glacier world and of those fantastic mountain circles was supremely wonderful. The mountains above all perhaps, for although disposed in series constituting ranges and watershed ridges they seem to show, each one of them, an individuality of its own, as if some artificer had modelled them thus, with mighty blows, out of the compact mass of rock. And each one seemed to have its special physiognomy, be it the long crest of the Teram Kangri, or the pyramidal and most daring peak of the Rose, or the Twins joined in their massive power, or the Ghent, with its snowy summit divided like a saddle bow, or the Hawk, its upper part resembling the beak of a bird of prey, or the Hardinge and the Queen Mary, in the King George Group, with their daring pointed peaks, or the Hidden Peak, a gigantic block and the extreme bastion between Siachen and Baltoro glaciers. Of these names I think that only Teram Kangri is officially admitted.

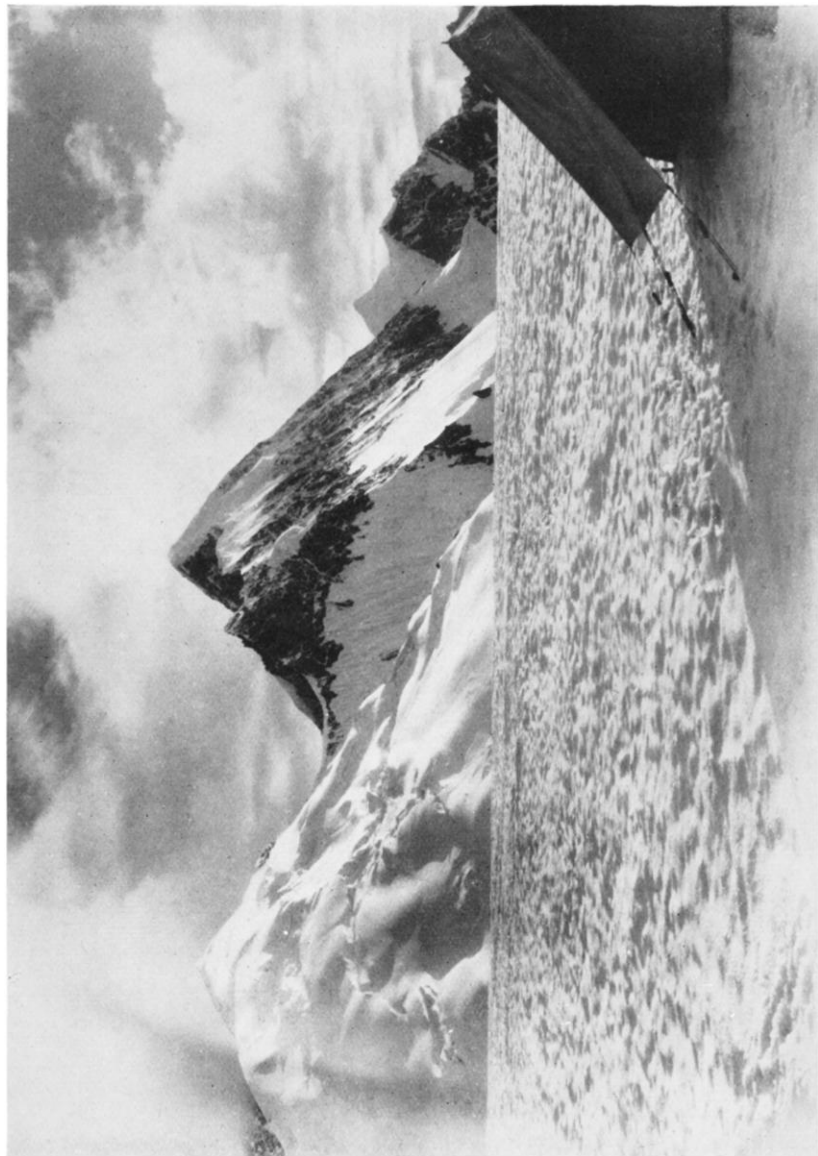
Two months had thus passed on the glacier. I had to think of our departure. In fact I had been thinking about it for some time already, with all the more preoccupation as the news in the meanwhile had not been of the kind to leave the leader of an expedition quite indifferent. A weekly service of couriers had been established to descend into the Nubra valley with my post and bring up that which might have come for me from below and from Europe. For two weeks everything went well. But already the first couriers I had sent from the base camp had found the Nubra so swollen and impetuous, on account of the beginning summer floods, that they were unable to ford it. I thus remained completely blocked on the glacier, completely shut off from the outer world. The consequences, as you can imagine, were not of the most agreeable: impossibility to receive those last food supplies for which I had arranged, and impossibility to send back some twenty porters, as I had planned, so as to facilitate my exit from the Siachen, which was still full of uncertainties.

My plans in fact had foreseen to leave the Siachen with not more than forty men; I found myself with seventeen more with a long journey in front of me, with food supplies that were forcibly becoming scarce, and with a new way ahead, already attempted without success by the Workmans, who had failed because of the difficulties they encountered, failed though they were not followed by a loaded caravan, but alone with two famous Alpine guides.

You must remember that Dr. Longstaff in 1909, and the Workmans in 1911



Peaks 35 and 36 from the east



Mount Lakshmi on the left of the Teram Shehr Glacier, flowing from the left

and 1912, had entered the Siachen and had also left it by the Bilafond La, a pass to the west leading into the Saltoro valley in Baltistan. My plan had been, instead, to leave towards the east, by that unknown pass, which presumably led to the Rimo glacier, explored by the De Filippi Expedition. The Bilafond La was the known way, which would have brought me in a few stages into inhabited regions; by the unknown pass I would have to descend the whole Rimo and part of the upper Yarkand valley, reaching the Karakoram caravan route, and then follow it for twelve good stages, before reaching the first villages.

This way, I repeat, had been attempted up to the col by a caravan consisting only of alpinists and two Alpine guides. And the attempt had failed. Some one may think perhaps that I was rather too daring in wanting to follow it with all the loaded caravan and in the particular conditions in which the Nubra had unfortunately placed me.

I decided to anticipate the departure by five days, as this would procure me a corresponding economy of food supplies. I told my men that during the crossing of the glaciers I would continue to distribute complete rations, reserving to myself the right to shorten them once outside the glaciers, if it should prove necessary. They agreed to whatever restrictions I might decide upon, for they knew it was a question of *force majeure* independent of my will and my preparations.

And thus in the first days of August I began to send food and fuel up the Teram Shehr glacier, which was now to be my way of exit. Just think that of burse alone there was more than a ton. On the 7th I folded up the tents of my base camp, where an inscription on a moraine block marks the dates of my stay there, and I began to ascend the Teram Shehr, which for two good stages is nearly as easy as a highway. And thus far the Workmans had pushed forward with their two guides, and thence had tried to reach the col.

Let us see what they have written of their attempt.

“Seen from the Rose [or Siachen] this glacier [the Teram Shehr] appears to rise gradually for miles, but in reality its higher part was composed of three slopes broken by short snow-terraces, and its whole upper area was cleft by crevasses of a size and depth not met with on the Rose or its other large affluents. A wide plateau was finally reached lying at over 18,000 feet. This white sea is cut up by shrunds and chasms running in all directions. Leading the caravan cautiously in and out of this maze, we advanced slowly, until Savoye said the responsibility for him was too great, as the caravan might at any moment become engulfed in this vortex of seemingly bottomless chasms. We had wished to reach the end of the plateau, now quite visible, and see if any possible passage existed leading towards Nubra and the Remo glaciers, but this was no smooth lustrous expanse, such as are some elevated plateaux in Himalaya, but a mountain devil’s snow-continent set with death traps to entice unwary men into their pitiless jaws.”

There was reason to be at least somewhat preoccupied. I won’t hide that in fact I did feel a bit so, especially on account of my caravan’s weight, that is for the great number of loads which obliged me in the beginning to repeat three times every stage, then twice only, as soon as the consumption of food had rendered it possible.

But the leader’s troubles were not yet over. No sooner had we reached the Teram Shehr than it began to snow. And then persistent adversity of

the weather set in, with nearly continual snow, thick fog, and violent wind-storms. As soon as the fog lifted even slightly I had to fix well in my mind the topography of the glacier, so that our going should consequently be as little dangerous as possible. Many times was I forced to stop on the way because the storm prevented my proceeding any farther. But, since fortune helps the audacious, as our Latin forefathers said, I succeeded in avoiding the worst crevasse fields, and with continual prudence and giving personal aid to each porter whenever it seemed necessary, for the glacier was treacherous, I overcame the worst difficulties, in spite of the weather's obstinate adversity. And when on the eighth day of this period of trial the fog finally cleared, the clouds vanished, and the sun reappeared in a radiantly serene sky, my tents were set up against the rocks in the now immediate neighbourhood of the pass.

From here, in a few hours' time, the col was easily reached, the large tongue of the Central Rimo descended from it, which I recognized in every detail of its own and of its surrounding mountains. A long descent on skis brought me halfway down its length, against the left rocky border, in a miserable camping ground, where I was forced to remain for two days, so as to collect all the loads that had been left behind.

The descent along the Rimo was almost playwork, almost like taking a walk. Not so our exit from it. I meant to leave it by that northern tongue which during the De Filippi Expedition both Major Wood and I, each one separately and at only two days' distance, had discovered to be the source of the Yarkand river. But the front of that glacier was so much swollen, and ended in an ice-wall of such height, that it was impossible to find a way out on the evening of our arrival. I was forced to pitch our tents there, on the extreme edge of the glacier front, and it seemed as if the Yarkand river were mocking me all the time, running so quietly just below me. We even got into our sleeping-sacks without a warm supper that night, because our fuel supply had just then come to an end, so precise had been my calculations for the necessary economy of loads.

One whole day was needed to get out of the Rimo. You will understand my emotion when, setting up my tents under the shelter of some rocks, I discovered a heap of dried-up burtse, abandoned by myself sixteen years before when I had been camping in that same place.

Thus the expedition could be considered as come to an end. Not yet however my various preoccupations. I immediately reduced the food rations of my men and speedily started on the return march. But luckily, near the Karakoram Pass, I met a relief caravan, on which I had not really counted much, as from the Siachen I had been unable to send any precise orders. But the general arrangements I had made in the Nubra valley had been so marvellously carried out that I was now again swimming in plenty, just at the moment when restrictions had been imposed by circumstances.

By the Karakoram caravan route I returned into the Nubra valley, by the Khardung La to Leh; by the high passes of the Rupshu into India at Sultanpur. Thus the journey was ended.

I regret that the limit of time has hindered my saying more about the majestic grandeur of the Siachen and its mountains, and my showing you a

larger number of those photographs which Miss Kalau's intelligent activity has contrived to bring back. It is certainly not sufficient to be accustomed to the beauty of the high mountains in the Alps to form an adequate idea of what are the mountains and glaciers of the Karakoram. The scale is so different, so uncommonly grand, that those phenomena and those shapes which are quite familiar to us in the Alps seem almost new. The surface rivulets, which can be crossed by one step or by one jump on our glaciers, there, in the Karakoram, are or can become great rivers, broad and deep and impetuous; the small pools of our Alpine glaciers become large lakes on the Karakoram glaciers, and can be found innumerable among the moraine hills or in the lowlying portions of the crystal ice. The small irregularities of the surface, which in the Alps seem and are small details, almost miniature shapes, there become gigantic banks, forests of pyramids, labyrinths of spires, amidst which, if the sky is uniformly covered, it is necessary to use the compass, so as not to lose our direction. The glaciers are so large that it is difficult to embrace them at one glance, while they flow along, though scarcely winding, in their gigantic troughs; and the mountains are so high and full of majesty that any one of them having there the importance merely of a small detail of a secondary range has in itself the majesty and grandeur of a Mont Blanc seen from Courmayeur.

All this is more than sufficient to fire the imagination and to satisfy the passion of one who feels deeply all the fascination of the high mountains and knows, from a now long experience, that nothing like the high mountains can give full satisfaction to every sense of beauty and a serene and absolute calm of the mind to him who has known how to conquer them.

But allow me to say when the traveller is also a geographer, also a naturalist, his satisfaction must be, and is, far greater, even if the world, more or less, would go on just the same even without knowing what rocks constitute the Siachen basin or what flowers adorn that rocky corner, that seems a small paradise made purposely to receive the traveller who should venture into that glacier world.

I can say that I have experienced all these special satisfactions. And I allow myself to set them before you briefly in this place and to an audience amongst which are men who have accomplished memorable journeys in the Karakoram Range. It is enough to mention Lord Conway, Sir Francis Younghusband, and Dr. Longstaff, to whom we owe the first and real discovery of the Siachen.

There was the small topographical problem concerning the col between Siachen and Rimo. The Workman Expedition in 1912, as I have already said, had attempted but had failed to reach it. From the travellers' accounts it seemed that they believed they had seen it. But it was simply an illusion, since from the place they had reached the col is not visible.

The De Filippi Expedition, in 1914, did not even try to reach it from the Rimo glacier: they stopped at a distance of several miles from it, but, as it is a typical tableland col, they were able to sight it though only indistinctly, as was then my impression, and as I have ascertained later.

Further, the map of the De Filippi Expedition sets down, though incompletely, that which ought to be the southern side of the Karakoram watershed range in correspondence with the Central Rimo's summit. Major Mason, from the Shaksgam valley, surveyed the northern side. But between one and

the other there remained a blank space, which the recent edition of the Map of India has logically filled up, imagining a long and narrow glacier as an affluent of Northern Rimo. This representation did not convince me, so far as I remembered the Rimo.

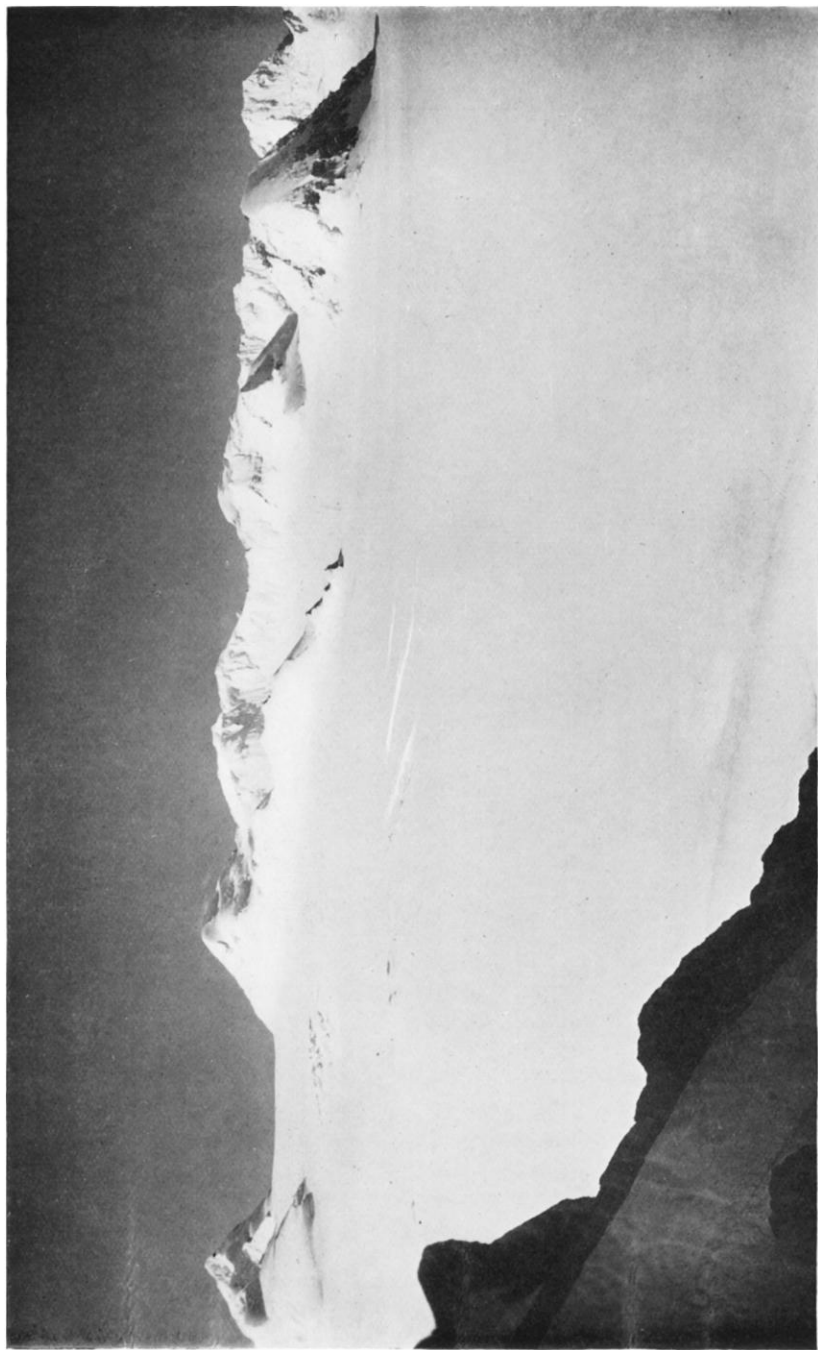
These were all good reasons, though simply topographical ones, that added themselves to the others to induce me to include in my programme the crossing of that col, and to make me persist in that programme in spite of every difficulty and of the contrary weather. Results proved that I did well in persisting.

The col, which is about 20,000 feet in height, is situated about $3\frac{1}{2}$ miles more to the east than the place shown on the recent maps. It is not closed in, as the maps show it, between two opposite mountain spurs, but is wide and placed on a kind of plateau, where from both opposite directions, from the north and from the south, two large glacier branches of alimentation come flowing in. Besides, of these two branches, the southern one, which, according to De Filippi's map would aliment the Rimo, in reality is alimentering the Siachen, and its head is not shut in, as the map has it, by a mountain ridge, but ends in an ample level saddle, by which it must be possible to reach the more southern glacier explored by the Vissers in 1929.

That long and narrow glacier placed in the maps immediately south of the principal watershed ridge as an affluent of Northern Rimo does not exist; into the northern Rimo runs, correspondingly, an insignificant small valley and not a tongue of ice 8 miles long. And the Central Rimo actually reaches with its head the principal watershed ridge of the Karakoram. Thus the large collecting basin of Central Rimo is determined, a collecting basin however not simple and uniform as it would appear from the maps if that inexistent ridge were taken away, which limits that imaginary glacier to the south, but a basin, rather than divided up by real mountain ridges of some length, interrupted by isolated hillocks, especially in its more southern portion.

This upper basin opens out widely from the north on to the col which I crossed; it opens on to the col like a gigantic fan of ice, alimentering simultaneously both the Siachen and the Central Rimo.

One more remark. The recent maps give, immediately east of the col, a narrow and rather long glacier, shut in by two mountain ridges, which is supposed to feed the Rimo. As the col is really situated much more eastward, that small narrow glacier would feed the Siachen. But in reality it does not exist. To understand how it comes to figure on the Indian map we must think how this map has necessarily been constructed for that region, that is by joining both Workman's and De Filippi's maps, according to the geographic co-ordinates. But one of these two maps must contain some error in the geographic co-ordinates, because those two mountain ridges, which there appear different and separate, leaving a gap which the Indian map has been obliged to fill up by placing between them a small narrow and long glacier, correspond in reality to the same and only ridge seen from the two opposite directions. That there must be some error in the geographic co-ordinates, in one or the other of the two maps, can also be proved by the fact that a peak, figuring on both maps with an identical quota, does not coincide as to its position, but appears in two distinctly different places, and therefore is doubled, in the same way as the ridge was doubled, which in reality is only one.



Zone of the Colle Italia from the north; the pass is just to the right of the crevasses in the middle of the photograph



Zone of the Colle Italia from the east; in the middle the huts of Professor Dainelli's first camp on the Central Rimo and his caravan tracks down the glacier are visible

These are the essential modifications to be introduced in the recent maps of the region: not very great ones, naturally, as they certainly do not revolutionize the Karakoram topography, but yet they may have a certain importance, seeing that to reach the col between Siachen and Rimo is not as simple as taking a walk between one meal and another.

Let me record a few more among the results of my expedition. When I was in that region the time before, I intensified my excursions so as to obtain also elements for the sketching of a geological map, that should be at least an improved and more up-to-date edition of Lydekker's old map of about fifty years ago. There had remained for me the blank of the Siachen's basin; and now, at least partly, this blank is filled up since I know which part in the geological constitution belongs to intrusions of granite, which to antique crystalline rocks, which to the Permian period of normal facies, and also which to the Trias period of Dolomitic facies.

The time before, from a very vast region, but of which no fossils were known except through vague, uncertain, and even erroneous indications, I was fortunate enough to bring back large collections almost of every geological epoch, from the Silurian to the Eocene. But also this time, even though less abundantly, I brought back fossils both from levels from which I had already collected, and from levels that I consider new, belonging to the Permian, to the Trias, and to the Jura periods.

As to the morphological problems connected with the phenomena of the Quaternary period, I could not hope to bring back anything very new. I have already published a study of a monographic and extensive character on the Quaternary period in the whole of that region, and, by analogy and by induction, I have already said what must have been the conditions of the Nubra valley and of that short tract of the Shyok valley which I yet did not know. I have the satisfaction to state that what I have now observed confirms, I can even say completely, all I had previously inferred.

At the base camp, in the centre of the Siachen, at 15,000 feet above sea-level, during a month and a half, registering instruments recorded the temperature, the dampness, and pressure. They will bring a contribution to the knowledge of the daily course of these meteorological elements.

Thanks to Miss Kalau, a diligent gatherer, I have brought back several hundred specimens of high mountain plants. As before, I again did not consider it necessary, with the many occupations I had, to think of the flora in the lower valleys, where so much has already been collected and where I, simply passing through, could have gathered but little. But again, I did not want to neglect the flora of the real high mountain areas, where very few travellers have collected and where it is possible to be thorough, or nearly so. My botanical colleague to whom I entrusted the Alpine flora brought by my expedition assures me it is the richest that has yet come from the Karakoram region; especially interesting is that of my base camp's glacial oasis.

The time before it had been my task to draw the plans of the different houses, so that I believe this essential element of the material human life is now well known in reference to the region from Baltistan to the first Tibetan tablelands. I was still ignorant as to the Nubra valley; but from the Nubra valley I have now brought with me plans of houses sufficient to show the

similarity of the general structure and the local variations due to the influence of the milieu.

The time before I brought back the anthropometrical measurements of 450 individuals, taken in a way that for each people one had a series sufficiently long to allow the anthropologist to make his deductions, as in fact he has done. This time I have measured another 150 individuals, divided in three series, namely three groups of different peoples.

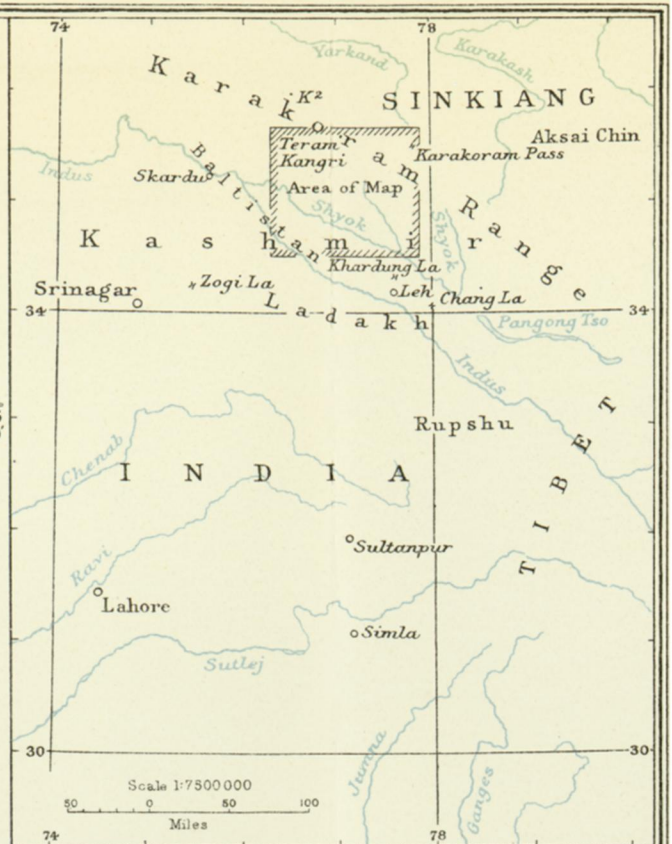
And finally I may mention a small discovery, which can interest those who know the Karakoram. In one of my studies I have endeavoured, some time ago, to reconstruct all the routes followed in former times by the Baltistan natives across the large mountain range. Also the Workmans had affirmed that the Siachen itself was normally visited by the natives, but evidently what they had heard was a purely fantastic legend, namely that a real town had existed on the rocks halfway up the glacier. From sure accounts I collected in the Saltoro valley and from evident traces of a shelter arranged by human hands, right at the northern front of the Rimo, I had concluded that the Baltis used, as a way towards Yarkand, also that one which, starting from the Saltoro valley, climbed the Bilafond La, crossed the Siachen, ascended the Teram Shehr, surmounted the pass between Siachen and Rimo, and finally, descending this last one, ended in the Yarkand valley. Well, ladies and gentlemen, when, having established my camp under that pass, the fog cleared and I was able to make a proper inspection of all the neighbourhood, I discovered above the rocks near my tents two cairns of perfect shape, as if they had only just been erected. Thus my hypothesis that this way had been used by the natives in former times was completely proved.

Some one might philosophize on the illusion we live in, we who believe we are exploring and discovering that which other men, instead, have known before us, perhaps for centuries. But we explore and discover for the sake of general knowledge and of science, and we cannot feel diminished if only in this sense be understood the discovery of the Yarkand source from the Rimo, made sixteen years ago, or the so-called first crossing of the col between Rimo and Siachen. For geography and for science, as well as for alpinism, it has certainly been the first crossing and therefore, in remembrance of the contribution which my fellow citizens have brought to the knowledge of the Karakoram, I have allowed myself to give the name *Colle Italia* to this pass, crossed for the first time by a caravan led by a European.

DISCUSSION

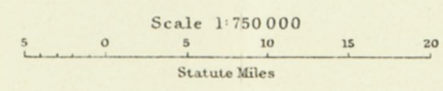
Before the paper the PRESIDENT (Admiral Sir WILLIAM GOODENOUGH) said: No session passes without at least one evening being devoted to a consideration of some part of the Himalaya, and we may say that the Karakoram is part of the Himalaya. I speak with certainty on that, for having no experience of those parts myself I consulted what I considered to be expert opinion. Of that great range of mountains which would seem to be the backbone which supports half Asia, buttressed and branched and ribbed and jointed for hundreds of miles, the more we hear the more we want to hear. To-night we are to hear of a portion of the Eastern Karakoram from one who combines in a very remarkable degree the geographer, the traveller, and the mountaineer. Professor Dainelli is a member





Glaciers of the EASTERN KARAKORAM

To illustrate the Journey in 1930
of
Prof. Giotto Dainelli



From sheets of the Survey of India on the scale of 1 inch to 4 miles, with corrections by Prof. Dainelli. Contour interval 2000 feet

of the Academy of Italy, and that in itself is a great distinction. He was educated at the University of Florence. In 1914 he was given the Chair of Geography at the University of Pisa. From Pisa he went to Naples, and has now returned to the University of his native town, Florence. His journeys in Eritrea with Marinelli resulted in more than one volume on the geography and geology of those regions, and these have become standard text-books: In 1913-14 he was in Asia with our very old friend Dr. Filippo De Filippi, and has written several of the volumes on the geography and the kindred sciences of those regions resulting from that expedition. In 1930 he undertook the expedition of which he will give us an account to-night.

Professor Dainelli then read the paper printed above, and a discussion followed.

The PRESIDENT: We find ourselves to-night very fortunate. Not only have we had a most charming and interesting lecture, but there are three men whom I am going to ask to speak, all Gold Medallists of this Society. The first has been absent from our platform far too long. Now that he has been, shall I say, moved from one legislative assembly to another I hope that he will find time to come and speak to us a great deal more. I will take this opportunity of offering him, on behalf of the Royal Geographical Society, our very sincere congratulations on the honour which has been bestowed upon him by His Majesty.

Lord CONWAY: Our lecturer has said that when he went amongst the mountains of the Eastern Karakoram, of which he has spoken to us to-night, he had the illusion of being fifty years younger than he really was. I can assure you that there is a much greater defect than that that makes me feel exactly fifty years older. I am sure we have all been delighted by the lecture to which we have listened. To me, and perhaps to most of us, the greatest charm was not its importance as a piece of geographical exploration, but as a revelation of beauty. I do not think it often happens, beautiful as are the visions that are thrown upon this screen from time to time, that we have shown to us in one evening a series of not merely beautiful slides, but slides taken of beautiful scenery from the best point of view, one after another. We were so enraptured that sometimes perhaps we failed to realize all the difficulties of the journey.

My own travels in the Karakoram happened so long ago, are so far away, that though they are not forgotten by me they might have ceased to be really vivid memories. But, as a matter of fact, it is a quality of the Karakoram Mountains to a very peculiar degree, when I think of them as compared with other mountains of the world, to fix themselves in detail with extraordinary firmness in the mind, so that they become possessions for the whole of the rest of one's days. The part of that great mountain region that I visited is to the west of the part we have seen to-night, and it consequently happens that the exploration of those mountains that I have been able to read about and to follow in the pictures has just missed the junction between where I went and where the travellers who visit the Siachen and that district generally go. I noted that the long glacier about which we heard to-night stretches up somewhat west of north and appears to draw its original ice-flow from the back of that great mountain, Gasherbrum. I only saw the western side of Gasherbrum and its neighbouring peak, which appears to be part of the same mountain mass, called the Hidden Peak. Gasherbrum is one of the finest mountains in Asia, but I always wondered what it would be like on the other side and whether there was a way over the saddles that seemed to beckon one to try to cross it. I believe that there is a possible way across from the Baltoro glacier eastwards over what I called the Probable Saddle, and, if there is, then it would be one of the very finest passes in the world for any explorer to discover.

Personally, I do not believe peak climbing is worth very much in the Himalaya.

It is a great feat to have accomplished, but for enjoyment and pleasure give me the Himalayan passes, those great passes with their wonderful views, with their great upper snowfields, so large, so wide, so white, and so placid, and beyond them, rising towards the horizon, white peaks of no great relative elevation in themselves but almost like Arctic peaks. There, on the upper levels, you find such beauty and such loveliness in light, shade, form, and colour that you win a greater reward, I feel sure, in investigating and following passes than any peak in the Himalayas can give you. The great peaks, we hope, will be explored. Kangchenjunga is hopeless, but there is Nanga Parbat and there are other great mountains which it would be a memorable feat to accomplish and I think may be accomplished; but if I were to have my life to live over again it is not peaks but passes which I should choose.

Well, we have listened to our lecturer with great interest and delight, and we thank him most cordially for having come amongst us. We can assure him that he will have left behind him in the minds of those who have listened to him this evening memories of a most delightful kind which will last as long as we can think.

The PRESIDENT: If, when you go out, you will look on the board at the other end of the corridor you will see a map of the region of which we have heard to-night. That map, which I believe I am right in calling a sketch-map, was made in the year 1889 by Sir Francis Younghusband.

SIR FRANCIS YOUNGHUSBAND: I have listened with extraordinary interest to the lecture by Professor Dainelli because, quite unconsciously, he discovered the pass that I had been looking for forty-two years ago—that pass which he has very appropriately called the Colle Italia. In the year 1889 I was sent by the Government of India to examine all the passes that might lie across that range between the Karakoram Pass and the Pamirs. In the year 1888 a Russian traveller, Captain Grombchevsky, had crossed the watershed into the little state of Hunza. Now news had come to the Government of India that he was about to start from St. Petersburg to come again into that region. So at the beginning of July 1889 I was commissioned by the Government of India to proceed as rapidly as I could to the Karakoram Pass, thence to the Shaksgam river, which I had discovered in 1887, and then find my way into Hunza. The main idea was to discover the passes into Hunza. But we also had heard of a mysterious pass which some called the Saltoro pass, which led into Baltistan, and it was that pass that, if I had time, I was asked to try to find. It might be such a pass that small parties of Russians could use to penetrate into Indian territory.

I went down the Yarkand river, and over into the Shaksgam valley. All this country was very badly and erroneously marked on the maps in those old days. The Siachen glacier was not known until Dr. Longstaff discovered it many years afterwards, and I tried a pass which I thought was the Saltoro pass and found it quite impassable for anything in the way of a military party, however small. And there the matter rested for many years, until one day in London I heard of a British officer who had been shooting in Chinese Turkistan. His leave was very nearly up, and instead of coming back from Turkistan by the well-known route of the Karakoram pass his shikari said that he knew a short way into Baltistan and would take him by it. The shikari took him by the short route, and I happened to meet the officer one day in Piccadilly and asked him by what pass he had returned to India. He had not the least idea. All he knew was that it was not the Karakoram pass and that it was not the Muztagh pass which I had crossed in 1887. It was somewhere in between, and it had brought him into Baltistan, but where it was he had not the faintest idea. There the matter rested. I am sorry to say I have forgotten the officer's name, though I believe it was Knox Niven.

Now we know that there is a pass, the Colle Italia, which does lead from Turkistan into Baltistan, though whether that is the one that the British officer crossed I do not know. At any rate, to-night we have had the mystery of forty years ago cleared up. Also we have seen most beautiful photographs of that pass and the wonderful region in which it lies. And I can join with Lord Conway in thanking Professor Dainelli for having brought back to us some of the beauty of that marvellous region.

One word in conclusion. The Italians seem to have annexed that part of the Himalaya for their explorations, and as an ex-Resident in Kashmir I should like to testify not only to the value of the work that they do there, but to the good name which they have established in those regions. Anybody who has been in the position of Resident in Kashmir knows that travellers can be divided into two classes: good travellers and bad travellers. The bad travellers are those who get themselves horribly disliked by the people of the country and give the officials an infinity of trouble. The other class, the good travellers, are those who get on with the people of the country, who bring back valuable scientific results, and so make it worth while for the officials and the people of the country to have helped them. I need hardly say that the Italians belong to the latter class. I had the pleasure of being Resident in Kashmir when the first Italian expedition, led by the Duke of the Abruzzi, came out. He established a tradition there of the way to treat the people, and that tradition was carried on by Dr. De Filippi, the Duke of Spoleto, and Professor Dainelli. I wish to thank you very much, Professor Dainelli, and congratulate you on the work you have so successfully accomplished.

The PRESIDENT: Dr. Longstaff's name in connection with these regions is one to conjure with. Dr. Longstaff.

Dr. T. G. LONGSTAFF: I had the pleasure of reading Professor Dainelli's paper before I came here, and there is very much more that he might have told us, and that we should have been glad to hear. It is too late to deal with most of the more technical and geographical points, but there are one or two which really must be emphasized.

The first point is that the one-hundredth part has not been told. It is a very remarkable achievement indeed to have spent two months on the greatest glaciers of the Karakoram, completely cut off for the whole time from all extraneous sources of supply. This demands extremely good preparation beforehand, and fine organization is evidenced by the achievement of landing the party, with all its supplies, on the Siachen glacier only two months after leaving Florence, quite apart from having maintained that caravan on the glacier for two months. One of the points that Professor Dainelli has not made is that the Nubra river rises in flood behind you. You get up there in June, if you are lucky, and then the Nubra river rises and you cannot get down. Therefore all supplies must be on the glacier for the whole season's work. Another difficulty was that Professor Dainelli had every intention of sending back twenty coolies, and keeping even fewer men than he did in fact keep. I am pleased that my friend remembered that, when he last saw me in Florence, before he started, he showed me the most beautiful sets of instruments in wonderful cases, and asked me what I thought of them. I advised him to leave them behind and take more food. If he had not done so I am sure he could not have succeeded. But the odd thing is that he seems to have done both, because if you read the paper you will find he took the instruments as well as the extra food.

The whole expedition exemplifies the advantage which a small party has over a large one in country where the difficulties of food supply are very great. I hope the President will not pull me up, but I must confess that I often feel rather

superciliously inclined when I hear about European transport officers and English-speaking interpreters. There are exceptional cases, of course, but there is to me a personally conducted tourist element about that. Unless you can penetrate somewhat into the lives of the native peoples it seems to me you lose half the delights of travel. Professor Dainelli's previous anthropological work had given him the entrée to an unusual extent. His expedition was a piece of real travel. Professor Dainelli had already wintered in Ladakh and Baltistan, as a member of De Filippi's expedition. He was his own transport officer and his own interpreter. He knows and likes the local people; and if they did not like him he could not have got such excellent service out of them. And what a compliment to Miss Kalau's character and capacity! To be the sole conductor of those subsidiary caravans over such glaciers and over ground which they did not know proves that she must have gained the confidence of those Ladakhs to a very remarkable extent. Those people will only follow some one in whom they have complete confidence.

I have been on part of the ground and it has been an extreme pleasure to see it again in those very wonderful photographs. It is, as Lord Conway has said, really as big an achievement to open one of these big Himalayan passes as to climb a big peak. The opening of this 20,000-foot pass between the Siachen and the Rimo glaciers is a fine alpine achievement. The Workmans, approaching from the Siachen side in 1912, declared that it was impossible. They denied the possibility of this route having been previously crossed by natives, as I had suggested in 1909, following of course the tradition recorded by Vigne in 1835, for the pass was not *known* to anybody. Dainelli has not only proved its practicability for capable mountaineers, but he found those tell-tale cairns which show that the pass had at some time or other been used by natives, probably in the time of Ahmed Shah or earlier. Nevertheless, for all practical purposes it is a new pass. I therefore consider the crossing of the Colle Italia to be just as great an achievement as the ascent of a great peak. I would draw attention to the fact that this is the first time that the main range of the Karakoram has been crossed between Younghusband's Muztagh Pass and the Karakoram itself—or, if you prefer it, the Saser—in either case a distance of 100 miles. It is really a remarkable achievement of Himalayan exploration, and I ask Professor Dainelli to accept our most hearty congratulations on the safe accomplishment of a difficult feat and on the solution of a puzzle which has intrigued us for so long. You continue, Professor Dainelli, the tradition of successful exploration and friendliness with the local people which the great expeditions of the Duke of the Abruzzi, of De Filippi, and of the Duke of Spoleto have accustomed us to expect from your compatriots.

The PRESIDENT: Professor Dainelli, you have heard three men pre-eminent in this country, mountaineers and geographers, speak with unqualified praise of the work which was done by the expedition of which you were the leader. It would perhaps be hardly becoming for one bred and almost born on the low level of the seas to attempt to paint those vivid colours as they have painted them, but I do, on behalf of the Society, wish to give you an expression of our admiration and thanks for what you have done.

I should like to take the opportunity of saying with what great admiration we all regard the fine Atlas of the Touring Club of Italy. If you will look at an enlarged map in the corner of Nos. 93 and 94 you will see a map of these parts. I was looking at it with the Professor yesterday afternoon and said, "That's an admirable map," and he replied, "Thank you very much. I made it." And that shows that what he brings back enables him to turn out excellent results; that his observations are recorded with great accuracy.

Dr. Longstaff, in that way in which he approaches the precipice of indiscretion and then stops, asked whether I was going to pull him up. I did not, but I have a small bone to pick with him, for he took from me the first mention of one who was the collaborator and the companion of the professor in his great expedition. That is some one whom I invite, if she will be so kind, to come and stand by me on the platform, Miss Kalau. When the flying caravans were organized and went out in various directions, Miss Kalau led one of them, and I am sure the ladies present will all applaud the fact that her caravan went much faster than anybody else's. The lovely photographs were all taken by her; and when all the collections of flowers are got out and tabulated the results will be mainly due to her care and energy in making the collections.

Professor Dainelli, I have one more duty to perform, and that is an extraordinarily pleasant one. It was unanimously resolved in Council this afternoon to invite you to become what we, perhaps in our conceit, may think is somewhat of a distinction, and what we know will be an honour to us, that is, an Honorary Member of our Society. I have the very greatest pleasure in offering you the thanks of this audience and of the Society, and of presenting you with this record of the fact of your Honorary Membership.

Professor DAINELLI: It is my duty to speak for various reasons, but all of these meet in the wish to express my gratitude. First of all to the President of the Royal Geographical Society, for the flattering words with which he has presented me to the audience. Secondly, to Lord Conway of Allington, to Sir Francis Younghusband, and to Dr. Longstaff, for the approbation they have given publicly to the expedition I have led in the Eastern Karakoram. It is an approbation of which I am particularly proud, as they have great experience of those mountain regions where my activity as a traveller has lain. It is therefore superfluous to remind the members of the Royal Geographical Society of the great explorations and topographical achievements of Lord Conway on the large Biafo and Baltoro glaciers. I am particularly grateful to him for saying that to-night's lecture has revived in him the remembrance of his explorations of forty years ago and has given him the impression of returning to that time; but this is probably not my own merit, but that of the pictures of those marvellous mountains which I was able to show you. It is also superfluous to remind any one of the successful explorations of Sir Francis Younghusband, who, about twenty-five years ago, after crossing a large part of Asia, near the end of his journey, encountered that yet unsurmounted obstacle, the Karakoram Range, and found in himself the courage to still more arduous exploration; he climbed the Shaksgam valley and the Urdok glacier until he came in view of the unknown Indira Col, then crossed the range by the unknown Muztagh Col, the first European to do so, and moreover without high-mountain equipment. I am glad if he thinks I have followed, though very modestly, in the tracks of his exploration. And to Dr. Longstaff I owe more particular thanks still: he is the real discoverer of the Siachen, and, by means of his great topographical sense, he was able to draw the sketch for a map of that immense glacier which, considering the brief time he spent there, seems a marvel of accuracy. He can realize above all others the difficulties of an exploration journey in that immense glacier world; and for this reason he has wanted to place in relief some of those he considers the merits of my expedition in meeting and overcoming these obstacles: a stay of two and a half months on the glaciers, the complete isolation towards the outer world in which I found myself, the persistence in my programme, namely to leave by a new way, which I had reasons to consider difficult. Of his approbation I must feel very proud indeed; but I must add that—if also in other circumstances I have always followed the rule to bring with me really everything that I considered

possibly necessary—in the case of my recent expedition I have followed this rule also on account of the recommendations of Dr. Longstaff, when, before my departure, he encouraged me to bring abundant quantities of food for the caravan.

But if all these were not reasons more than sufficient for my gratitude, another has now been added by the President in letting me know that the Council of the Royal Geographical Society, in to-day's meeting, has decided to make me an Honorary Member. And this I feel, and must say, is a greatly coveted prize for the activity which for more than thirty years I have dedicated to Geography, according to my feeble means, but, I can affirm, with great and never diminished ardour.

And, as many words cannot, I believe, express better this feeling of gratitude, I now have ended. But allow me to make still a kind of confession, which I might call a psychological one. When I left Florence to come to London, I felt some emotion: an emotion made of some anxiety and uncertainty, as must be felt by any one who, as a foreigner, is coming to speak in this Royal Geographical Society, which has so long and so glorious a tradition. And now that I must leave London to return to Florence, I also feel a deep emotion; but it is no longer one of anxiety and uncertainty, but consists only of that sorrow which is felt when parting from old friends. And also for this I want to thank the President and all his colleagues of the Royal Geographical Society, whose welcome and courtesies have taken from me the feeling of being a foreigner and have given me instead that of being a friend amongst old friends.

A FOURTH JOURNEY IN THE TIEN SHAN: *A paper read at the Evening Meeting of the Society on 22 February 1932, by*

LIEUT.-COL. REGINALD C. F. SCHOMBERG, D.S.O.

WE left Qara Shahr on 31 May 1931, and were glad to get away from the dirty fly-blown town, which is the rendezvous for the Torgut and Khoshut Kalmuks who regard it as little less wonderful than Paradise. After spending two nights at the headquarters of the Torgut chief at Khotun Simbel ("the Moslem encampment") we left the main Khaidik valley and followed the Kapchigai valley as far as the Kotil pass. Crossing this, our route led through the Yulduz, which we left by the Narat pass, and reached Aral Tepe in the upper Kunges on June 15. The weather throughout the Yulduz had been execrable, with unceasing rain, wind, and mist, and it pursued us into the Kunges across the watershed, for on June 16 a storm swept down, flooding the fine felt tents of the Qazaq headmen, and damaging the contents. The rain went through the thick coverings of the *auls* as though they were muslin. My object was to re-visit the upper Kash, and particularly the valleys north of the Satleh pass, and the Manass mountains, an area which the shortness of supplies and the lateness of the season had obliged us to leave in 1928. Accordingly we crossed the watershed between the Kunges and Kash valleys on June 19 by the Kaktassin or Qaraghai Su pass (9560 feet), one of the many passes that connect the two valleys, and at this time of the year convenient enough, though rather steep. Later in the season the Kangrai Su pass, due east of the Kaktassin, is one more convenient and frequented, besides being a good deal nearer. We reached the Umuraba Sai on June 21, a most gorgeous day, which we foolishly imagined was an augury of good weather. The upper Kash was wholly deserted as it was too early for the nomads and their flocks to move to the higher pastures; and we had, mercifully, the place to ourselves.

Although the next day was threatening, I moved a march up the valley, leaving the main camp to follow; but the weather broke and torrents of rain fell relentlessly for five days. I discovered, too, what I had not bargained for, that the river was unfordable, and that consequently we should not be able to reach our objective for at least four weeks, if not longer. In these circumstances it was no use havoring and wasting time. The only course was to abandon our plans and all further attempts on the headwaters of the Kash, and explore some more favourable area. It was a great disappointment and a grievous waste of time to turn back, but it all proves how difficult travel is in the Tien Shan. It was true that in a month's time the rivers would subside and be generally fordable; but at the same time the grass in the upper valleys would be growing scanty, the danger of an early snowfall blocking the passes was not remote, and the general disadvantages of a waning season would be considerable.

The flocks in the remoter uplands only stay a week or ten days, as the herds fear being snowed up on the higher pastures. Short though the stay of these animals is, they finish up the grass to the detriment of the traveller. This was our lot in September 1928, where we found extensive pastures absolutely barren, and with no means of feeding our animals.

We descended the Kash valley, wading through the luxuriant pastures, shoulder-high in the lush greenery, and our ponies revelled in it. We met, on our way down, parties of Qazaqs moving up. Their plan was to go up the valley and eat their way down, thus spending the autumn days in a lower altitude. We reached Kuldja (Ili) on July 6, and let the animals have a week's rest. The flies were intolerable, and although our house was in the new quarter, away from the bazaar, it was well-nigh impossible to eat or to read. The town was full of a mongrel crowd, including many refugees from



Sketch-map to illustrate Col. Schomberg's fourth journey in the Tien Shan

the rule of the Bolshevists. Good black beer at fourpence a dozen bottles helped to enliven our stay, as well as the great hospitality of the Rev. Theodore Hufnagel, the Catholic missionary. His six-year-old white wine was a revelation, and so was the four-year-old red; both illustrating the great possibilities for viticulture in the Ili valley.

We left on July 13, crossed the Ili river immediately below the confluence of the Kash and Kunges rivers, and where that river properly begins. The ferry boat was large and commodious, and rushed across the stream, being the fastest form of transport in that region. The route now led through the

curious nondescript range that lies between the Ili and Tekes river. These hills are little known and are not inviting. The forest is poor, and the trees are being rapidly and ruthlessly destroyed as the wood is needed in Ili. As the perpetual snow is scanty, and as the forest fails to retain the melting snow of spring, there is a great shortage of water, but there are nevertheless considerable grazing grounds; and, especially on the northern side, villages of some size. The moisture on the south of the range is less, and the absence of trees and brushwood, partly natural, partly due to cutting, is very marked. All the same this range of mountains deserves study.

We reached the Tekes valley by the low grassy Saraghujin pass, and came to Kuba, on the Tekes river, where a Chinese amban had been recently installed, and where our pet sheep, Li Darin, joined us.

The appointment of this magistrate was most unwelcome to the nomads, who preferred the easy sway of the remote military governor to the constant presence in their midst of a Chinese officer. The amban lived in a merchant's house in the bazaar, and he was not having an easy time of it. He had been boycotted and driven out of the large Kalmuk lamaseraï farther to the west, and after a sojourn at Kuldja he had been told to try his luck at Kuba. When we were there the betting was against the amban. The truth was that all the nomads, Qirghiz, Qazaq, and Kalmuk, were determined to get rid of him. They knew they were exchanging a King Log for a King Stork, and hated the idea. Naturally the military mandarin had no love for his civilian supplanter with the inevitable loss of prestige and perquisites. Administratively speaking, a civil administration would perhaps be an improvement, though the control of the nomads was in no case an easy matter, complicated also by the proximity of the frontier.

There is something very dreary in the Ili and Tekes valleys, with their mongrel population, their gangs of nomads, and the untidy, higgledy-piggledy villages and cultivation. The wide grassy plains are treeless, the crops, badly weeded, are inextricably mixed up with the tall grass, and the inhabitants—all immigrants—never regard themselves as permanent occupants of the land, but show, in their houses and their husbandry, their intention of some day moving elsewhere. Yet the land is kind, agricultural conditions good, and no reason exists for this reluctance to settle down permanently.

We were glad, then, to enter the mountains. We crossed the Tekes by a bridge, the private speculation of an energetic Kashgarlik, and entered the Kök Terek Sai ("green poplar valley"), one of the few places in Chinese territory, north of the Tien Shan, where Qirghiz are found. These belong to several branches, but the largest sept, of about three hundred families, is that of the Ming Murat, who came about a century ago from Qara Qol, now in Russian Turkistan. We reached Chongkurtur (9415 feet), an encampment on an old grassy moraine, on July 20, and as the track to the head of the valley was very awkward, we had to cross into the adjoining Cholaq Terek Sai by an easy pass from which a track led down a precipitous greasy slope to the bed of the valley. It was a wonderful sight to see the pack animals go tumbling head over heels down the hillside. The boxes flew off, and most of them burst asunder on meeting a rock, and their contents strewed the slopes. Clothes, maps, dry plates, medicines, Chinese paper money soon littered the ground,

and took long to collect as much got hidden in the creeping juniper. No animals were killed, and most of the scattered articles were found, but the delay was great, and heavy hail and rain hampered the search. The irreparable loss of fifty eggs nearly broke the cook's heart; and I shared his sorrow.

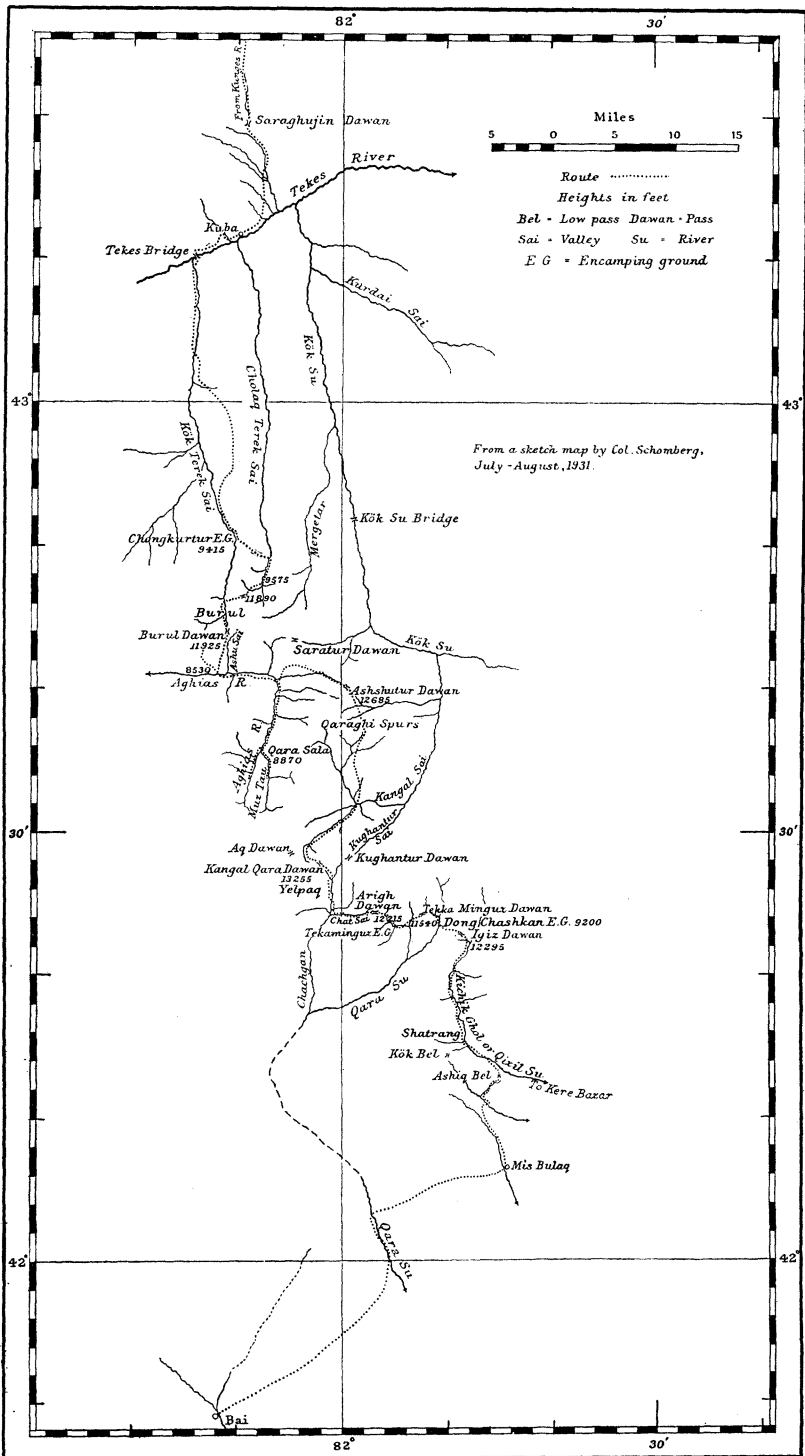
On July 23 the head of the Cholaq Terek Sai (9575 feet) was reached. This valley belongs to the Alban Qazaqs, and they say that the valley's name is derived from the destruction of the poplar trees for forage in the winter. "Chöl" is the Turki for desert, and this valley, once full of poplars, has now become denuded of them. The destruction of the conifers in the neighbouring Kök Terek Sai was truly melancholy. The whole valley carried dense forests of the dead trees which had perished, so the Qirghiz asserted, by forest fire. They said in particular that refugees had squatted in the forests during the time of the Russian revolution, had lit fires, and these had destroyed the trees. The objection to this theory (on which they were most positive) lies in many acres of forest being destroyed in an inaccessible place which even a refugee acrobat could not reach. Even helped by a strong wind, it is doubtful if fire could cause such widespread damage, and it is probable that some insect pest was concerned in the harm in certain cases.

In this valley, the Kök Terek, I saw the small black fly which deposits an oblong white secretion on the underside of the leaves of the spruce tree, and which was found at work. Captain George Sherriff, H.B.M.'s Consul-General at Kashgar, had heard of this and had drawn my attention to it. The Qirghiz shake off the deposit into a large pan, and melt it down over the fire. The result is known as *bäl* and used as sugar, but the nomads say that the secretion is not regular in appearance, that a warm summer is necessary, and that often four or five years pass without any being yielded.

After a very wet stay in the Cholaq Terek, a brief break in the weather enabled us to re-cross by an easy pass (11,890 feet) into the head of the Kök Terek. The descent on that side was very steep, and the mist was thick, but we groped and squelched our way down to the tents of the Qirghiz, and endured two more days' rain as best we could. We were now at Burul, a word expressing the green shoots of grass or shrubs that burst out in the spring, and the headquarters of the Ming Murat Qirghiz and their chief. We said good-bye to our Qazaqs who had served us well but whom we neither liked nor trusted, for no one can feel confidence in any one who is a liar, a thief, and an underbred scrounger, and all Qazaqs, except the Kirei, are essentially that, brought up to steal, lie, and cadge from childhood. We met an old Qazaq here who had accompanied Merzbacher, and who yearned to chaperone us, but we realized that he was one too many for us, and escaped his clutches. He talked too much Russian to please us.

The Qirghiz admitted there was a route to the Aghias, but said that the track at the head of their valley was quite impossible. All nomads endeavour to prevent a traveller from following a new or different route, and probably their chief reason for so doing is laziness; they are afraid (and often correctly) that they may be forced to come too. There was only one course to take, to reconnoitre the Burul Pass: so, taking Daulat Shah and a Qirghiz, I set forth.

The appearance of the pass was disagreeable, for it looked like a steep wall of snow. The nearer we approached the steeper the ascent looked, but it also



Col. Schomberg's route through the Central South Tien Shan

looked shorter. After crossing a moraine, covered with dwarf yellow poppies, we started on the pass, and found it to be what the Qirghiz had described, a glacier covered with snow and with numerous crevasses. The total ascent up the pass proper was only 1000 yards, but it was very steep, and we sweated profusely. The crest of the pass was very narrow, and the descent on the southern side was free from snow, and easy over shale.

From the summit the view was superb, with all the unknown, unmapped giants of the heart of the Tien Shan rising before one. There were years of exploration, I realized, for future travellers amongst these gleaming peaks and hanging glaciers and black unentered valleys. These secret snows were enthralling. The height of the pass was 11,925 feet. We came to the conclusion that it could be crossed by our pack transport—coolies are unknown in Central Asia—and started on July 28, a fine morning. If it had rained or snowed the crossing would have been impossible. The kindly headman provided us with an excellent Qirghiz guide (a rarity), some spare horses, and two other men. Everything went well, if slowly, until we got within 200 yards of the top. We had to clear away the snow to enable the horses to get a foothold; and in doing so, to our disgust, exposed a number of crevasses, just large enough for a horse to get jammed in; and the first thing we saw was two of our best horses, King Mulberry and Kök Sultan (Greengage), wedged in a crevasse. It took three and a half hours to accomplish the last 200 yards to the top of the pass, and most exhausting work it was, carrying kit, hauling horses, digging out the donkeys—a heart-breaking, boring business. In the midst of all this labour, bad language, and perspiration, the Qirghiz guide produced a large skin of koumiss, which greatly comforted us, and we finally reached a grassy plot on the southern side of the pass. The Turki pony-men who spend their lives amid the miseries of the Ladakh-Karakoram road were quite demoralized and wished to halt, in a place without fuel or shelter, and where a sudden storm would have troubled us sorely.

We went on to the Aghias river. The distance seemed unending. Down and down we went, with the muddy waters of the river in sight, and after endless trouble over an abominable track we reached the right bank of the river, height 8530 feet, and got the tents up just as the rain came down. Opposite on the left bank the forests of spruce swept down to the glacial river, whose white waters give it the name of Aghias, and on the right side willow and other shrubs grew. The blue gentians were very abundant, from the diminutive little star gentian to the large bell-shaped ones, known to the Qirghiz and Qazaqs as the Kök Baichichike, whilst the large, short-stemmed white gentian was also abundant.

The pasture in the Upper Aghias was very fine, but it is preserved for the winter months when the Qazaqs, both Kizei and Alban who have definite grazing grounds, bring their flocks for three months' sojourn. The river is then fordable and the journey easy, whereas when we were in the Aghias it was impossible to descend the broad valley which unfolded itself in a vista of swelling forest-clad ridges and grassy slopes. We were comforted in finding abundant mushrooms, wild spinach, and rhubarb, for which we had previously searched in vain.

Beautiful as the head of the Kök Terek Sai had been, with its side valleys

crowned with snow peaks and hanging glaciers, the Aghias was even more so. Every small side-water had a glacier at its head, while the slopes of the left main valleys were clad with thick brushwood, willow, and spruce. The right of the valley was very steep and very barren, and a climb to the top, over the wiry grass, was no easy matter. We moved up the valley, and fortunately were able to ford the river early in the morning, and to camp just beneath where the Saratur ("grassy place") stream flows from the pass of that name, and below the water from the neighbouring Ashshutur pass.

The main Aghias valley now turned south, and at a place called Qara Sala, descriptive of the black projecting rocks at the head of the valley (height here 8870 feet), the two main sources of the Aghias river unite, after flowing from two adjacent glaciers. The eastern affluent seemed to me to carry more water than the western, though local opinion was against me; but at 11 a.m. the water was well up to the saddle, and it was only by clutching the pommel of the native saddle, and half kneeling on the seat, that it was possible to ford the stream. On such occasions the unshod weedy Qirghiz horses are better mounts than their Kashgarian brethren, as the latter always dislike being kept with their heads against the current, though that is the only way to cross these rivers.

There were other differences between these two tributaries. The left or western stream flows from its glaciers down a narrow gorge, which in several places is bridged by fallen rocks; and in places the breadth is only 4 feet, with the imprisoned river roaring below. Above the mountains rise cliff-like, and it is a weary climb to reach the source of the river. In this western arm of the Aghias there are two glaciers only, one from an ice-fall that descends steeply from a short arm running south-west; the second and the main source is a glacier which flows from the east, and then, embracing a subsidiary one, turns north. The whole upper valley is filled with this combined glacier which seems, like its colleague in the eastern branch, to be advancing very slowly again after receding. The eastern arm of the Aghias is broad, and the progress of its glaciers will be unimpeded. In the western arm however the glacier and moraine have reached the gorge, and in a few years, given the continued advance of the glacier, the state of affairs will be most interesting. This glacier gave the impression of having slipped from the right to the left of the valley, and was filling up completely the left side—the right was already choked with debris.

I walked a great deal over the combined glacier and its awkward moraine, and whilst crouching in the rain during the continual storms I had ample leisure to watch it. The noise of the stones and rubble shooting down the ice-slopes was constant. My Hunza men declared it was a good glacier, and compared it favourably with their Batura, which is much larger. In Merzbacher's map both glaciers, the eastern and western affluents, appear too long and are not quite rightly co-ordinated. The eastern glaciers are less easy to "work" owing to the river, and bad weather and shortness of time did not allow of proper examination of this affluent. Both these valleys are named Muz Tau, or ice mountain valley—a ridiculous but characteristic piece of nomenclature in a land where every valley might be so described.

Curiously enough we had several visitors, unwanted ones. When they



Looking east from near the top of the Ashshutur Pass



Looking west from the Igiz Pass



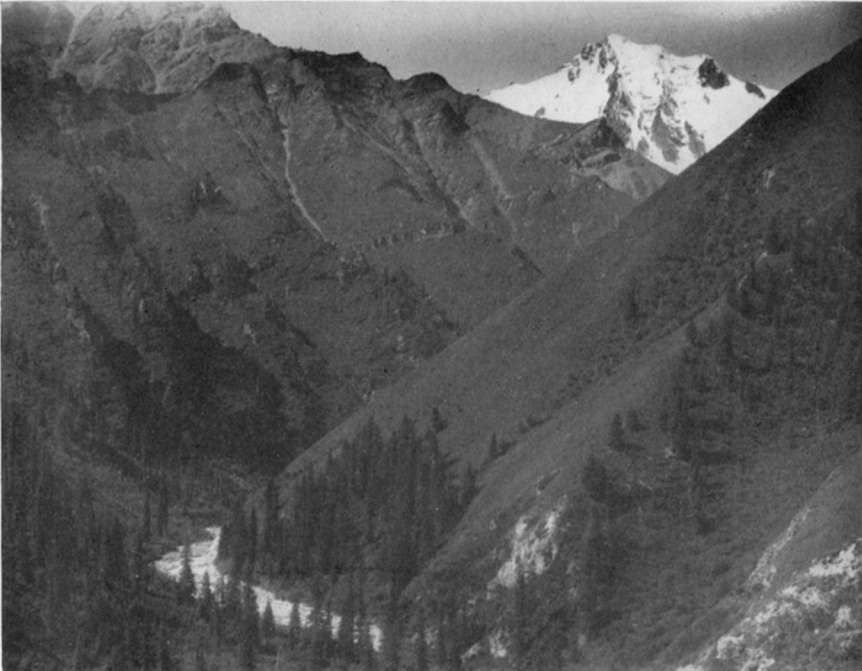
Looking east from near the top of the Ashshutur Pass



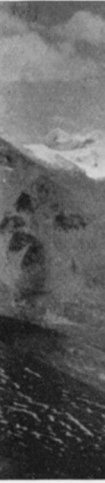
Looking west from the Igiz Pass



Horses in crevasses ascending north side of the Burul Pass



The Kangal Sai

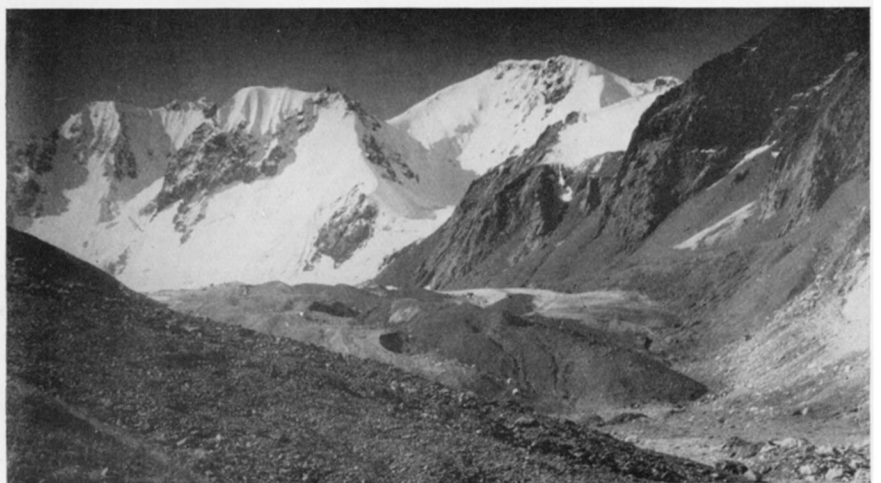




Looking south from the Burul Pass



Peak to the left of pass at head of the Kangal Sai



Head of the Kangal Sai

found that a foreigner had crossed the Burul pass they came over too: now an easy route for unladen animals on a track improved by us. It was just like the nomads to wait for a stranger to show them the way over their own mountains.

Rain, which was due to an almost perpetual cloud-cap that collected at the head of the western tributary, shortness of food, and the fear of an early snowfall rather hustled us out of the Aghias, where I should have willingly stayed for another month, but our Qirghiz guide warned us that we might never get across the main watershed if we dallied too long. Retracing our steps from Qara Sala, we camped below the Ashshutur pass—this melodious name only means the crossing place—above the Saratur slopes. It may be mentioned that there is only one Saratur pass known to the Qirghiz, that shown on the accompanying map; and to reach the Mergetar valley, which flows into the Kök Su, it is necessary to return to the Kök Terek Sai and cross straight into the Mergetar, to which there is no direct route from the Aghias.

The Ashshutur Dawan (12,685 feet) was crossed on August 8, and it proved a very easy pass, and quite free from snow. The view to the south was good, but on ascending a promising ridge half a mile due west, and about 500 feet above the pass, we beheld a superb prospect. Below, at the head of a valley, was a large glacier with several small lakes from which a stream flowed through an insignificant nala into the Aghias above the Saratur stream. No one would have suspected this glacier. There is usually some catch about an easy pass in Turkistan, and so it was with the Ashshutur, as we found that two spurs known as the Qaraghi had to be crossed. The first was steep enough, and descended along a sort of grass-cliff into a good pasture. We managed this spur successfully, but were much perturbed to see a narrow perpendicular chimney confronting us, which was facetiously called the "road." In this we came to grief, many times, but finally reached the top, and looked down, dismayed and disgusted, on a series of precipitous slopes. The Ashshutur pass is on the Aghias-Kök Su watershed, and we now looked down on the Kangal valley, a tributary of the Kök Su. We wound along these cliff-like slopes, down into a ravine from which we climbed tediously, and finally descended steeply into the narrow wooded Kangal Sai (8035 feet), with great cliffs and snow-peaks above, and below spruce forests clinging precariously to the sheer sides.

It hailed furiously as we arrived in camp, and then it rained in sheets all night long, and in the morning I found Li Darin, the sheep, lying comfortably by my bed. A Tien Shan sheep is a good judge of weather. Here the horse-flies (Kokyin in Turki or Khamang in Chinese) were very trying; and so too was a fly like a bee, but not so respectable in its calling. Both were blood-suckers, and attacked man and beast alike. Even in the glaciers we were not free from them. They filled our tents, attacked the horses, and were a great pest. Common enough on the plains, it was difficult to understand how they managed to live in such high altitudes, where animal life was scarce.

The Kangal Sai formed a typical Tien Shan valley with a narrow bed and a rough stony track which brought us through fine scenery to the foot of the Kangal Sai Pass, which we had been told would be the *pièce de résistance* of the journey. Here all but one Qirghiz left us. The Qirghiz were pleasant fellows, and far nicer than the Qazaqs, but all these nomads are alike. Any job of work,

no matter how easy and well paid, is irksome, for a nomad's labours are limited to a few hours spent in rounding up horses. The men with us were well paid and well fed, and only one long day's march from their *auls*, but they could not endure the exertion of riding with us, and towing a pony, and preferred twiddling their thumbs in their tents.

We left our camp at the head of the Kangan Sai (height 9730 feet) on August 11 and started to cross the Kangan Qara Dawan, so called to distinguish it from many other Qara Dawans in the vicinity. As we left camp at 7.15 a.m. we congratulated ourselves on the beautiful weather. The valley turned east, and just at the turning a large disreputable glacier thrust down its snout. Climbing over the moraine, and then over the upper part of the glacier, we came to the mouth of a nala adjacent to the head of the valley which was a mass of snow and ice. Due west, and immediately opposite, was the Aq Dawan, or White Pass, so called from being always snow covered, and affording another example of the poverty of the local nomenclature. A difficult and rarely used track leads over this pass to the Qarabagh District, north-west of Bai. By a coincidence, just as we passed the mouth of this pass at 9 a.m. three Qirghiz women and two men came over it. They were probably as much astonished to see us as we were to see them.

We were now on the right of the main valley, at the mouth of the side nala, which was a mass of shifting shale. Our troubles began. There was no track, the gradient was steep, and the hillside was always slipping, and it was only by making five men walk in front, and lay out a sort of rough path, that we were able to move. This road-making had all to be done by hand, and it was chilly work, as the fair morning had changed to a mist-ridden sky with a little snow. I estimated the distance from the foot of the pass to be $1\frac{1}{2}$ miles, and it took three and three-quarter hours to reach the top, height 13,255 feet, which is considerable for the Tien Shan. It was a slow, tedious climb, and I asked my men what they thought of the pass, as the opinion of experts from Hunza and Kashmir was more valuable than my own. They seemed surprised at the question, and said it was a really bad pass. Personally, I do not call the Kangan Qara Dawan very difficult, except after rain or melting snow, when the shale would be very precarious, and the many small landslips would be fatal to pack animals.

From the top we looked down on an affluent of the Qara Su and entered a very different country. A series of abrupt serrated ranges, powdered with snow but otherwise naked and repellent, lay before us, contrasting greatly with the narrow grassy slopes and tree-covered mountains behind us. Shooting over a few yards of snow-wall, we tumbled down a nala, a mass of shale and stone, passing a stream cascading through a narrow gorge; then we went over a very rough moraine from a glacier in the north-west, and finally reached a grassy patch (height 11,305 feet) with another nala coming down from the pass at the head of the Kughantur (dry or barren place) Sai, a branch of the Kangan Sai, but a little-used route as the glacier on the north has too many crevasses to be pleasant.

We were now at the head of an open, rather shallow valley called Yelpaq, with fair grass but no wood. There were some flocks of sheep with Turki shepherds, who gave us the latest news, a month old, from their metropolis,

the grubby town of Bai. But we were disappointed, as we found no supplies at all, although we had been told we should have some, and we badly needed flour. It is a feature of Turkistan that accurate information on the simplest point, well within the modest intellectual capacity of the average native, is quite unobtainable. The lack of fuel seriously inconvenienced us. A few "camel's tails" were to be had, but they were scarce, and horse dung hardly suited.

After Yelmaq the main stream, which is now called the Chachgan, flows through precipitous cliffs and hillsides of a great height, and the track turns east to avoid the defile which is passable in winter for unladen animals, with some difficulty, and after steps have been cut in the ice. It is only urgent need of supplies that makes this track used. Crossing a high spur we entered the Chat Sai (Chat in Qirghiz-Turki means the union of two rivers), and most unexpectedly came to a broad open grassy valley, about a mile in width, really an old moraine. It was curious to see deposits of stones brought down by torrents in spate, covering the grass. As often happens, this old moraine was very swampy. The ascent by the Aral or Arigh Pass (the word only means division), height 12,215 feet, was easy. This pass is the watershed between the two main branches of the Qara Su.

The view was impressive and sombre rather than beautiful and stimulating, for wherever one looked there was the same panorama of abrupt, jagged, well-nigh perpendicular mountain ranges, barren, harsh, and inhospitable, with patches of snow and small glaciers clinging uncertainly to the rock. Farther to the west rose a great massif of blackish stone, holding more snow. We did not like the scenery at all, as we wanted wood, and as the pony-men scanned this naked prospect cries of *wa dada-im, wa ana-im* ("alack, my father, alack, my mother") arose as their faces fell; for beyond a few sticks in a bag we had nothing wherewith to boil the pot, and to a Turki food comes first, before family, or money, even before life.

As a matter of fact we were not so badly off, but being without any guide we groped along without knowing it. Descending steeply we found, poked away on a little flat patch of grass at the junction of two torrents, a Qirghiz *aul*, and there we managed to get some wood and dung, and even (at a great cost) a little flour for the ravenous Turkis. The name of this haven of refuge was Tekka Minguz, or the Ibex Horns. After a very wet night and morning, for the rain pursued us relentlessly, we crossed the pass of the same name (11,540 feet), and from it had a view to the south-west over glaciers and snow-peaks, whilst due north we saw the sable peaks at the head of the main Qara Su, to which we descended to a grassy valley. Here, by the river-side, we found a deserted hovel, in which was a fiddle and a great prize, four pieces of wood. We took three pieces of wood and camped at Dong Chashkan ("Below the hill"), height 9200 feet, just below the Igiz or High Pass. We should have fared badly without the three pieces of wood, as we had taken all that the Qirghiz at Tekka Minguz could spare. The local supplies of cow dung were useless, as the heavy rain had spoiled them.

The scenery at this camp was really impressive as giant cliffs soared above us, forcing the Qara Su into a defile, and obliging us to climb out of the valley by a high pass. We were now sick to death of passes, as we had been

crossing one a day for some time, and the prospect of having only one more cheered us immensely, well though we could have dispensed with it.

On August 15 we started to climb the Igiz Dawan, or High Pass, a stupid name in a region of similar passes. It proved to be only moderately difficult, the height was 12,295 feet, and the view west over the snow-covered rocky peaks of the Qara Su was fine but limited. To the north was the head of the Qizil Su, with its black peaks and corries, with a glacier gleaming against a background of black rock, whilst south and east was the cultivation of Kere Bazar and the arid, dismal foothills of the Tien Shan. The sight of the far-away fields and tall poplars gladdened our Turkis, who had begun to wonder if the mountains would ever end.

We descended the Qizil Su steadily, and camped 4 miles down the river with a thick forest of spruce and willow covering the steep bank opposite, and with excellent black currants close at hand. The sun came out for the first time for four days, and brightened the beautiful glen. To celebrate the end of the mountain journey, the men made a *mazar* or shrine, piling up the stones, placing old sheep and ibex horns on them, and putting up sticks with bits of cloth as *ex voto* offerings. The materials for founding a centre of devotion are easily come by in Turkistan, and it was our pious hope that this shrine might become a place of pilgrimage in a district notoriously lacking in hagiographical interest. The men were all devout Moslems and much pleased with their shrine.

We continued to go down the forest-clad widening valley, and very charming was the scenery. At Shatrang there were wide pastures, rather eaten down at this time of the year; and a little lower we left the valley, which ended in the cultivation of Kere Bazar, and climbing the steep green side to the Ashiq Bel we descended into a maze of waterless valleys to the north of Mis Bulaq. There were a few spruce trees in the upper part of these valleys, but the general aspect of the country was very desolate and dry, for the aridities of Southern Turkistan affected the vegetation. Finally, after crossing another *bel*, or low pass, we entered the wide valley to the north of Mis Bulaq, and late in the evening of August 16 we reached the Sheikh's house, and the old gentleman tottered out to meet us. We camped near the delicious water of the spring (I could not discover why it was called Copper Spring) under conditions very different from those of the past month, which seemed dull and commonplace after the romantic scenery of the Tien Shan. Even at Mis Bulaq we could not escape the rain, but it was not so plentiful. The journey was certainly arduous and not really suitable for laden ponies, but the route was a new one, and enabled us to see unexpectedly large glaciers and forests on the southern or dry side of the Tien Shan.

DISCUSSION

Before the paper the PRESIDENT (Admiral Sir WILLIAM GOODENOUGH) said: I do not know why it is that some parts of the world are spoken of as very interesting countries. It is not their shape, for the Rub al' Khali is as interesting as the ice-caps of Greenland; not their people, for the hardly inhabited forests of Brazil are as interesting as a Chinese city. Whatever it is, we are to hear to-night of what

is in all respects, and from all aspects, a very interesting country: the Tien Shan, the Heavenly Mountain, which lies between Soviet Russia and China; and we are to hear of it from one of whom I may say that it is his pleasure-ground. When a man can give a lecture which he calls "A Fourth Journey," not only must he have a great knowledge of the place, but it must have been a great pleasure to him to go back to it. Colonel Schomberg was at Oxford and then in the Seaforth Highlanders. He served with distinction and then took the opportunity of carrying out various investigations in Asia on which he lectured to us at an afternoon meeting of the Society in 1930, on "The Climatic Conditions of the Tarim Basin," and at an evening meeting, on "Three Journeys in the Tien Shan." To-night he will give us, in a lecture which I now ask him to commence, his account of "A Fourth Journey in the Tien Shan."

Colonel Schomberg then read the paper printed above, and a discussion followed.

The PRESIDENT: We had hoped that Colonel Howard Bury would have been present this evening, but he has been obliged to go to the country. He writes to say he is sorry he cannot be here, for he has travelled much on the edges of the country that Colonel Schomberg has described. If he had been here he would like to have emphasized the extraordinary richness of the northern slopes of the Tien Shan in birds, animals, and plants, compared with the extreme poverty of the southern slopes. You heard our lecturer say there were with us to-night no less than three Consuls-General of Kashgar able to speak. I left the choice to them, and Mr. Skrine is the one who has been elected to address us.

Mr. C. P. SKRINE: Of the three Consuls-General who are present I am certainly the least qualified to speak. In the first place, I was in the part of the world about which we have heard longer ago than any of them, it being some seven years since I left Chinese Turkistan. In the second place, I have never been in the country to the north of the main axis of the Tien Shan, with which Colonel Schomberg's most delightful, amusing, and beautifully illustrated lecture was chiefly concerned. There are however one or two points I should like to make in connection with what he has told us.

The chief, in fact the only regularly used pass over the Central Tien Shan is the Muzart, which goes over from Aqsu to the Tekes Valley and Kuldja or Ili. Colonel Schomberg, I gather, travelled southwards from Kuldja through the Tekes and Yulduz valleys, and over another and even more difficult pass to the east of the Muzart, a pass which had never before been crossed by a European. This fact alone lends exceptional interest to his experiences. He came out on the south side of the mountains at a small town called Bai. My wife and I visited this place in 1923, when we marched eastwards along the southern slopes of the Central Tien Shan from Uch Turfan, visiting the Yangi Art and one or two other alpine valleys on the way. At Bai we turned south-westwards and returned to Kashgar *via* Aqsu and the Tarim River valley. The lecturer spoke, as does Colonel Howard Bury in his letter read by the President, of the fact that the southern slopes of the Tien Shan are generally regarded as extremely arid, with little vegetation and particularly few big trees. We saw only a few scattered conifers in Colonel Schomberg's pictures of the southern side of the watershed. I, on the other hand, was struck by the flourishing forests of conifers, which I took to be pines and *pinus schrenkiana*, which I could see with the glasses away up in the alpine belt of the great massifs. This was to the west of the Muzart Pass, *i.e.* well to the west of the bit of country which the lecturer passed through coming down to Bai. I could only see the rim of the forest, as it were, along the tops of the ridges, for in those parts no conifers will grow on the southern side of the slopes where snow does not lie; but they stretched for 50 miles or more east and west,

and there was no doubt (and my local inquiries bore this out) that the forests in this part of the Tien Shan are of considerable extent. I refer to the southern versant of the great central massif of the Tien Shan, of which Khan Tengri, the highest peak of the whole chain, is the culminating point. Merzbacher, in his book, 'Central Tien Shan,' mentions this region, which he says is very arid, but he admits that he did not have time to go there.

I would like to bring this particular section of the country to the notice of future explorers—Colonel Schomberg himself, if he goes again, or any other traveller—as being one which would well repay close study. Apart from its forests and the probably plentiful flora and fauna therein, there is any amount of oil in that part of the world. I heard of several surface oil deposits, and the people use oil a great deal. I believe the oil deposits there are an extension of those in Russian territory in Semirechia, to the west. There are also surface deposits of coal. From a purely topographical point of view, again, the fact that the country is only partially explored—certain huge glaciers of which I saw the snouts far away in the north are, I believe, entirely unexplored—makes it of particular interest.

The plains at the southern foot of the Tien Shan are extraordinarily fertile. A local proverb says that you can get anything there except milk from a chicken. I saw one smallholder with his melon crop laid out on the ground in rows; there were, he said, between 15,000 and 16,000 of them. He was not at all proud of the crop, for which he expected to get about $\frac{3}{4}d.$ per melon in the local market. In conclusion, I would like to say that I think the lecture one of the most interesting and amusing I have listened to for a very long time.

The PRESIDENT: I do not know whether Sir Francis Younghusband has been over the actual ground about which we have heard; I know he has been very close to it. You know, as I do, that when we are discussing matters of this kind, his word is one which we would always wish to hear.

Sir FRANCIS YOUNGHUSBAND: I should like to join with the Consul-General in congratulating the lecturer upon the interesting lecture which he has given us and on the very amusing way in which he has made us acquainted with the country.

The Tien Shan I visited first about forty-five years ago, when crossing the Gobi Desert; and then I well understood why it was called the Tien Shan, the Heavenly Mountain, because from the Gobi Desert you first see the Tien Shan as a line of white in the sky. You do not see the base of the mountains at all, but just the broad line of white on the horizon. I travelled for several days towards that line before I realized, as the base came into sight, that I was looking at mountains. That was a good deal farther east than the lecturer has described. Proceeding westward I saw these mountains towering above on my right-hand side, with the rivers coming down from them on to the plains and forming a succession of oases through which I travelled. But farther westward I did go up into the mountains which Mr. Skrine was telling us of, and travelled amongst the Qirghiz. My experience entirely corroborated what Colonel Schomberg has said as to their genial qualities and their liking to take ordinary travellers into their tents and make them thoroughly at home and one with the family. Also it seemed to me that the ladies amongst the Qirghiz, as amongst the others, did most of the work and management, so that they were a very hefty, capable lot. All the people in those parts look extremely healthy and strong, although they live on uncommonly little. Perhaps you may have seen in to-day's *Times* a letter with reference to the healthiness of the inhabitants of the little island of Tristan da Cunha in the Southern Atlantic. Apparently, they feed there on very little, and only eat one article of food at a meal, either milk or grain of some kind, or

potatoes. Perhaps it is also because their meals are so simple that the people in the Tien Shan are so healthy. At any rate, they are a strong, robust people.

I congratulate Colonel Schomberg upon his interesting lecture and thank him for his enterprise in going again and again into that interesting region.

THE PRESIDENT: One or two points have been raised which I think Colonel Schomberg might like to reply to.

COLONEL SCHOMBERG: Perhaps I may add three or four brief remarks in reply to the interesting speeches you have heard from Sir Francis Younghusband and Mr. Skrine. Mr. Skrine, among other things, spoke of the fruit, and my mouth just waters for the fruit we had at Uch Turfan. The nectarines are especially good, and I have been twice there to eat them. The second time there were none—it was absolutely heart-breaking.

What Mr. Skrine said about oil is perfectly true, but you know when travelling in Chinese country it is advisable not to go and see an oil well or mines, or even to inquire about such things. Some Germans went three or four years ago to look at some copper mines, but a good deal of the trouble they subsequently suffered was due to that perfectly natural scientific curiosity.

I rather hesitate to differ from Mr. Skrine because he is far more learned than I; but he talked of conifers in the plural. I am prepared to bet him a small sum, say, one penny, that in the Tien Shan there is only one sort of conifer, and that is the ordinary Karaghai or Tien Shan spruce. It is true that in other parts, far away to the north, you get the larch—but I am not going into botanical niceties now.

There is one other thing about travelling in that country. I am sorry to say that the tourist season is for the time being closed in Central Asia. Sir Aurel Stein and the Haardt Expedition have had much to put up with. I feel it is only right that the Society should know the way in which a distinguished man like Sir Aurel Stein was treated. This is no place for politics, but I contend that one of the most distinguished archaeologists now living should have been treated with common decency.

THE PRESIDENT: That is exactly what I was going to say. It is disappointing to find that these places are at present closed to us. Many a true remark has been made by Colonel Schomberg, and the truest of all was that we do not discuss anything in the nature of politics in this Society. We can only hope that in the future there will come a time when we can go and find that there is still much unknown country which the adventurous explorer who is prepared to risk a good deal can open up.

There are many points to which I could refer. The questions asked have been more or less answered. If Colonel Schomberg had made any complaint we should not have thought it very genuine, for it is quite evident that he took a most intense delight, as great delight as we have taken in listening to him, in crossing that pass and going through that country. His lecture has shown how very observant he was in every particular. He has shown us the different types of natives and told us of very interesting names and their interpretations. That is one of the most delightful things, to hear these great rolling eastern names. I know no Arabic or Eastern language, and I always long to know what these fine-sounding names mean, and this Colonel Schomberg has told us in more than one instance.

A very enthusiastic fisherman sitting near me murmured into my ear a question as to whether there were fish in the rivers. I am glad to tell him that there are many, and when he returns from that important duty he is doing in keeping us alive in this country, I have no doubt he will go across and have a good day's fishing.

I was going to refer to Tristan da Cunha, but that Sir Francis Younghusband

has done, especially with regard to the islanders' good teeth. I have never been there myself, but I know a good deal of it, and I only wish I could say the same kind of thing as to their intellect; it is not of such a high quality as their teeth evidently are. However that is somewhat of a digression from the subject of the lecture. Both Sir Francis Younghusband and Mr. Skrine have spoken from actual knowledge of the great charm of the country about which we have heard. What I do is, on your behalf, to thank Colonel Schomberg for one of the most delightful evenings I have spent in this hall. We make no comparisons, but he can rest assured that we are never tired of seeing mountains, and even if we were we should be afraid to say so, especially in the presence of Sir Francis Younghusband and others. Will you therefore, Colonel Schomberg, accept from this audience and from the Society our most sincere and cordial thanks for the admirable work which you have done in the Tien Shan, and for the charming way in which you have recounted it to us.