





SOLANI AQUEDUCT, GANGES CANAL.

THE MILITARY ENGINEER IN INDIA.

VOLUME II.

THE
MILITARY ENGINEER
IN INDIA.

BY

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TO MY COMRADES
OF
THE CORPS
OF
ROYAL ENGINEERS.

PREFACE TO VOLUME II

THE publication, in September, 1933, of the first volume of this work, dealing with the achievements of the military engineers of India in fortification and war from 1640 to the present day, left me free to undertake the remaining task of recording the services of these men while working as engineers, scientists and administrators under the civil Government. That record has now been completed, and it demonstrates clearly the extent to which India is indebted to the three Engineer Corps of the East India Company's Armies, and subsequently to the Corps of Royal Engineers, for their civilian labours. The use of the chronological method, followed generally in Volume I, has not been possible in Volume II; for whereas the forty campaigns of the first volume could be formed into a consecutive narrative, the dozen branches of civil employment, which appear in the present volume, have needed separate treatment. The work of excavating a canal has nothing in common with governing a Province: the minting of money has no connection with the education of Indian youth. Accordingly, it has been necessary to pass from one branch of civil engineering to another, and then from civil engineering to allied professions. In so doing I have been compelled to imagine myself in turn an irrigation engineer, a constructor of dams and hydro-electric installations, a road engineer, an architect, a railway engineer, a designer of steel and masonry bridges, a builder of docks and lighthouses, a scientific surveyor and explorer, a student of archæology and geology, a layer of telegraphs, the head of a mint, a political officer, a financial adviser, and a professor! Awaiting my shy and hesitating appearance in each new character was a group of critical and experienced experts; yet they were there to help and not to rend me, and it is through their good offices alone that I have been able to reach the end of an arduous journey through a maze of engineering wonders.

So many officers of the Royal Engineers have assisted me in the collection of the varied information necessary for this volume that I can do no more than offer to all my grateful thanks for their willing help. In particular, however, I desire to acknowledge the assistance of Major-Generals A. C. de L. Joly de Lotbinière, C.B., C.S.I., C.I.E., Sir Sydney D'A. Crookshank, K.C.M.G., C.B., C.I.E., D.S.O., M.V.O., and G. H. Addison, C.B., C.M.G., D.S.O., Engineer-in-Chief, Army Headquarters, India; Brig.-General Sir William D. Waghorn, C.B., C.M.G.; Colonel Sir Sidney G. Burrard, Bart., K.C.S.I., F.R.S., Sir Gerald P. Lenox-Conyngham, F.R.S., Sir Buchanan Scott, K.C.I.E., Sir Gordon R. Hearn, C.I.E., D.S.O., Sir George H. Willis, C.I.E., M.V.O., Sir Charles F. Close, K.B.E., C.B., C.M.G., F.R.S., H. E. S. Abbott,

C.B.E., D.S.O., W. M. Ellis, C.I.E., S. L. Craster, C.B., C.I.E., H. E. C. Cowie, C.B.E., D.S.O., H. de L. Pollard-Lowsley, C.M.G., C.I.E., E. T. Rich, C.I.E., H. A. D. Fraser, C.B., H. M. Jackson, M. N. Macleod, D.S.O., M.C., and M. Stagg, O.B.E.; Lieut.-Colonels L. E. Hopkins, D.S.O., O.B.E., and A. S. Holme, O.B.E.; Majors A. D. G. Shelley and D. Fitz J. Fitzmaurice, and Captain R. B. Emerson.

Brig.-General Sir James E. Edmonds, C.B., C.M.G., late R.E., and Sir William Foster, C.I.E., have kindly read the typescript, chapter by chapter; and Sir Thomas Ward, K.C.I.E., M.V.O., Sir Evan Cotton, C.I.E., Sir Frederick Cunningham, K.C.I.E., and Brig.-General Sir Percy M. Sykes, K.C.I.E., C.B., C.M.G., have given me valuable information and advice. Through the death, in April, 1934, of Lieut.-Colonel P. H. Kealy, R.E. (retd.), Secretary of the Institution of Royal Engineers, I lost an indefatigable helper. His knowledge of the history of his Corps was remarkable both for its extent and accuracy. The duties connected with the publication of this volume, since Colonel Kealy's death, have been ably performed by his successor, Lieut.-Colonel E. V. Binney, D.S.O., R.E. (retd.). My acknowledgments are due also to Mr. J. G. Scott, the Librarian of the Corps Library in Whitehall, Mr. J. Hurwitz, Chief Clerk of the Institution of Royal Engineers and to the officials of the India Office Library and Records Department.

The system adopted for the spelling of names is that of the *Imperial Gazetteer of India*, this being more widely known than the "Hunterian System." As the sources of information are given in footnotes, a bibliography has not been included. Sketch maps of India and Burma (duplicates of those in Volume I) will be found in a pocket at the end of this volume.

During the course of twenty-eight years' service in India I learnt something of her nature. I explored her mountains and plains, enjoyed her unrivalled sport, visited her ancient cities, experienced her extremes of climate, fought alongside her sons in war and worked with them from end to end of the peninsula. In June, 1929, I was invited to compile the history of my Corps in India, and then began to collect the necessary information. Proceeding to England, in the following spring, on leave pending retirement, I commenced the writing of Volume I in June, 1930; and now, after more than four years of continuous effort, I have finished my task. My aim has been to show not only the achievements of the Royal and East India Company's engineers in India, but the steady advancement of that country towards the prosperity and distinction which she has now attained under British rule and guidance. If that end has been secured I can lay down my pen with satisfaction, and so make my farewell bow to India.

E. W. C. SANDES.

19th August, 1934.

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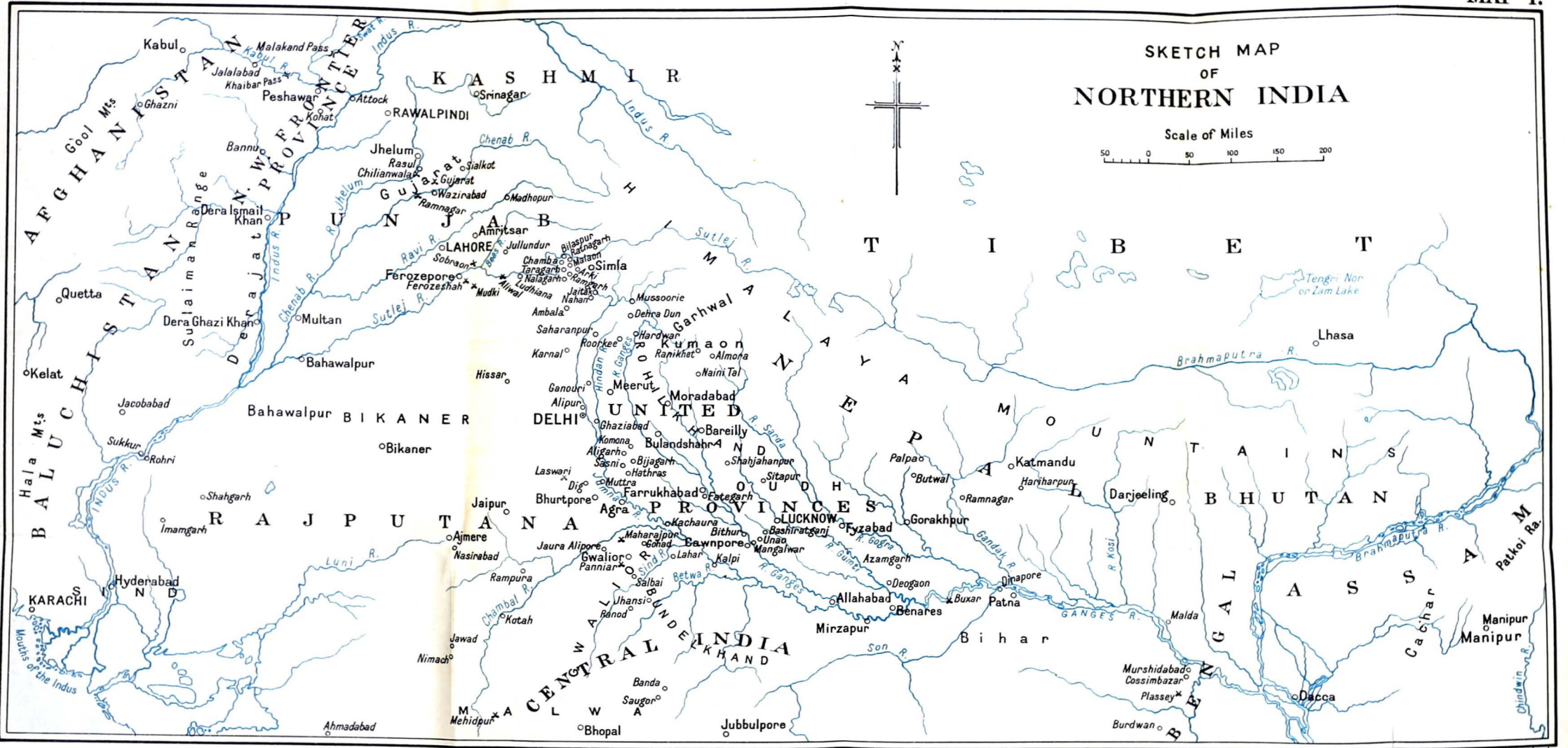
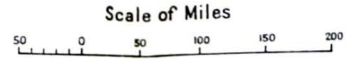
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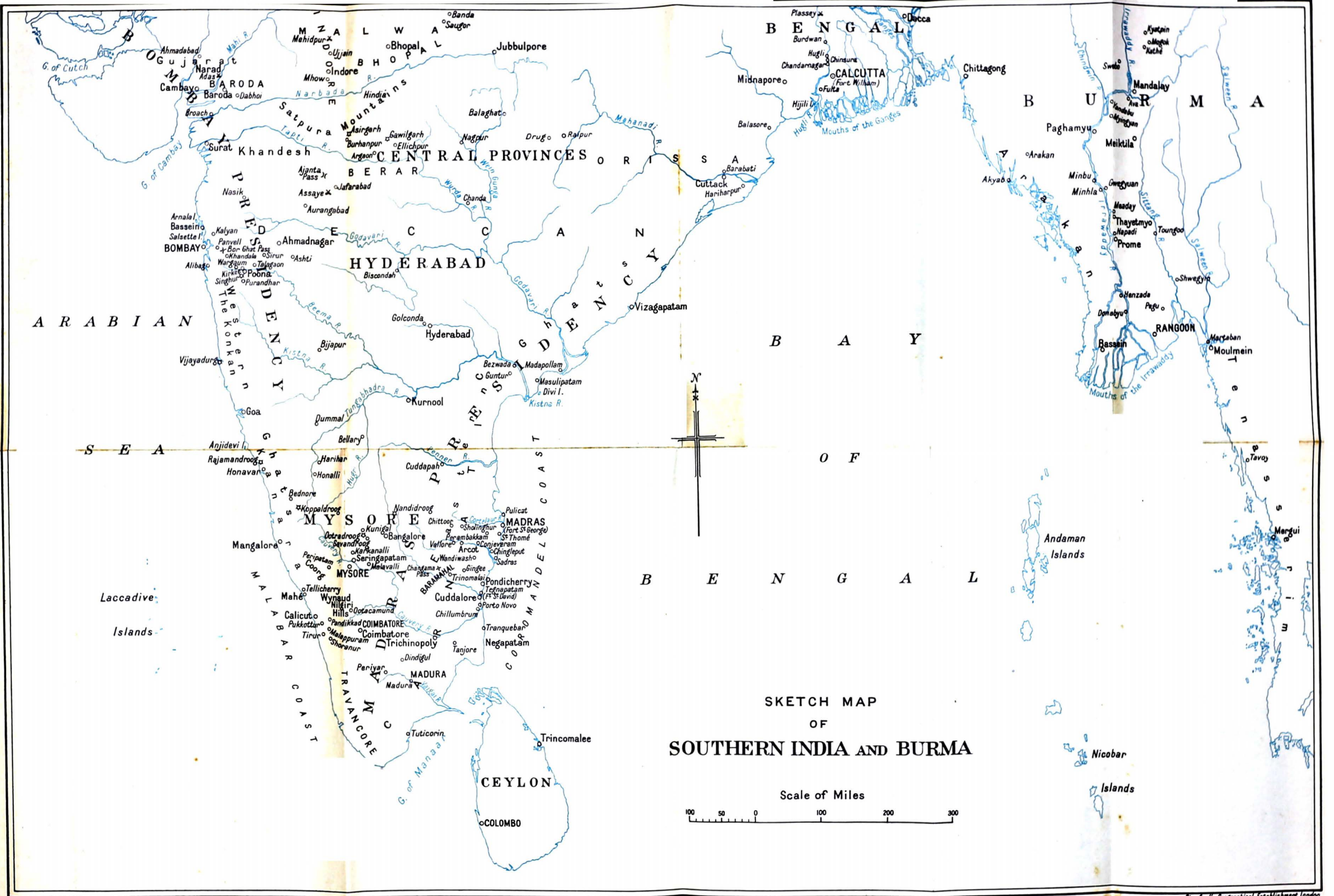
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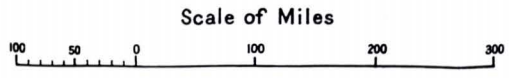
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SKETCH MAP OF NORTHERN INDIA





SKETCH MAP
OF
SOUTHERN INDIA AND BURMA

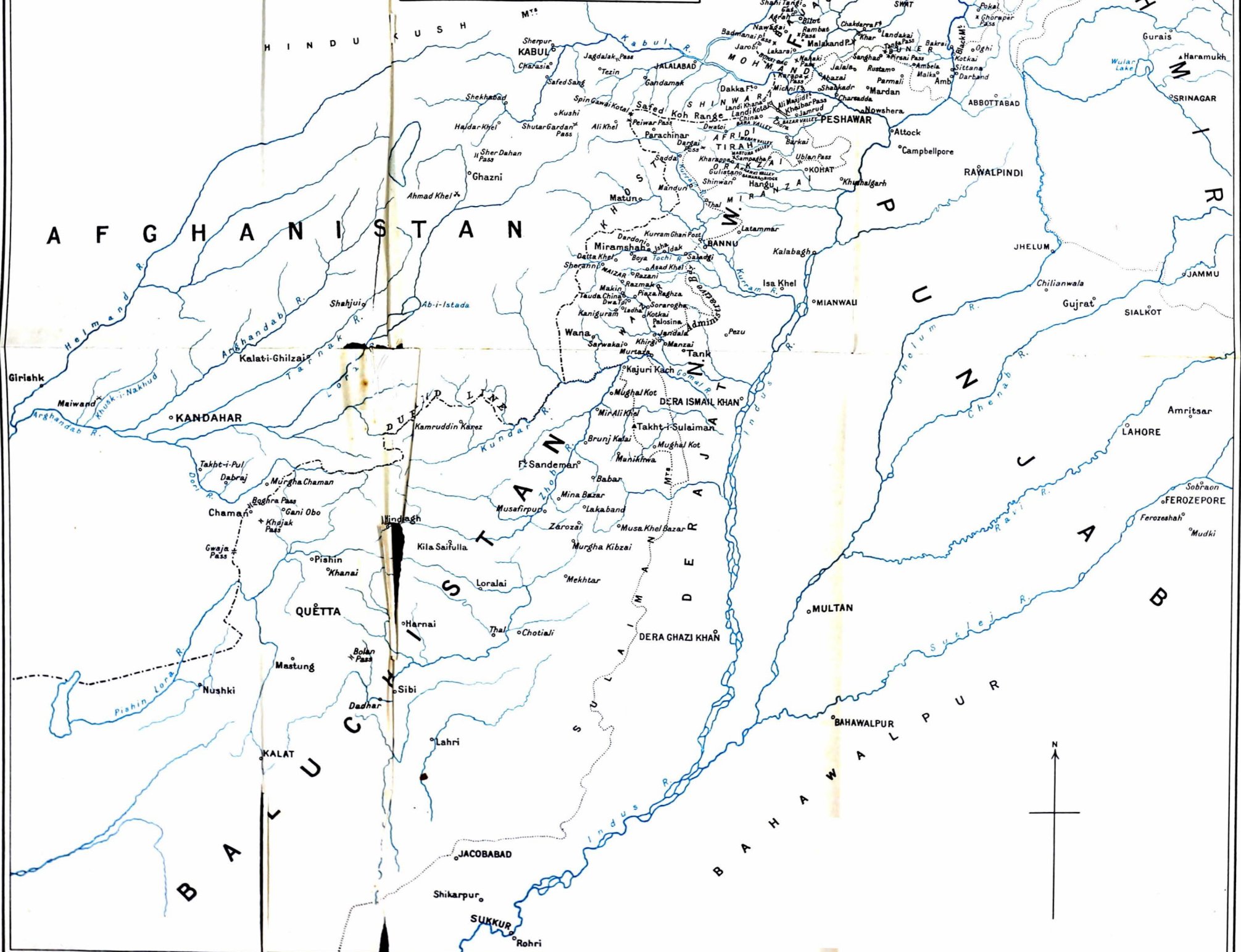
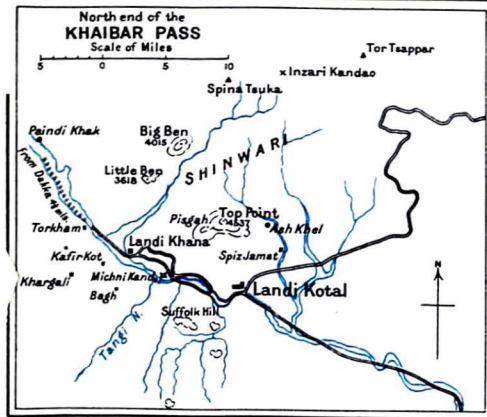


Sketch map of the
NORTH-WEST FRONTIER
including
AFGHANISTAN

SCALE OF MILES
0 20 40 60 80 100

Railways are not shown.

Mazar-i-Sharif



Sketch map of the NORTH-EAST FRONTIER
Scale of Miles
0 20 40 60 80 100

