

**INDIA AND INDIAN
ENGINEERING, THREE LECTURES
DELIVERED AT THE ROYAL
ENGINEER INSTITUTE, CHATHAM,
IN JULY, 1872**

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Chatham, in July, 1872 by Julius George Medley

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JULIUS GEORGE MEDLEY

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INDIA AND INDIAN ENGINEERING.

THREE LECTURES

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AT THE ROYAL ENGINEER INSTITUTE, CHATHAM,

In JULY, 1872.

BY

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SYLLABUS OF LECTURES.

INDIA—its area—physical features—climate—scenery. THE PEOPLE—Bengalees—languages—Hindooism—caste—conservatism of the East—the Mahomedans—Sikhs—Parsees. THE ENGLISH IN INDIA—their difficulties—the Anglo-Indian career—the mutiny—Christianity in India—arts and manufactures—general character of the people. ANGLO-INDIAN LIFE—in the station—in tents—cost of living—society in India—travelling—a tour in India.

The Indian Government—the Public Works Department. ROORKEE—the Thomason College—the Sappers and Miners—the workshops—career of a Royal Engineer—military engineering—miscellaneous duties of the Indian engineer—financial aspects of the Public Works Department—overseers—native subordinates—workmen.

BUILDING MATERIALS—stone—bricks—tiles—limes—timber—iron—wages and rates—weights and mea-

sures—absence of plant—water-raising machines—
carts. FOUNDATIONS—well-cylinders—Indian rivers.

BARRACKS—difficulties of ventilating and cooling—
private houses—churches—other buildings. BRIDGES
—temporary—permanent—waterway. ROADS—metal-
ling—hill roads. RAILWAYS—various lines—the per-
manent way—traffic arrangements. IRRIGATION WORKS
—their importance—the Ganges Canal—crops and
soils—design of canals—the head—velocity of stream—
falls and rapids—drainage works—irrigation details—
Madras weirs—tanks. RIVER WORKS—inundations—
spurs.

INDIAN SURVEY DEPARTMENT—the Great Trigo-
nometrical survey—Topographical survey—Revenue
survey.

INDIA AND INDIAN ENGINEERING.

In proposing to deliver the short series of Lectures which I commence this evening, I had two objects in view; First, to interest you in the work which your brother officers are doing at the other end of the world, and which I think is little understood or appreciated in this country; Secondly, to give to those amongst you who are likely to proceed to India some useful information about the country itself, the nature of the work you will be called upon to undertake, and the special subjects of study to which it is desirable on that account to direct your attention.

In the present lecture, I shall endeavour to give you some idea of the physical features of India, its climate, its people, and of the peculiarities of Anglo-Indian life. In the other lectures, I shall say something of the Government, and the great Department of State by which public works are executed, and of the special duties and probable career of the Royal Engineer officers who are there employed; and shall then pass on to the materials and modes of construction with which the engineer is called upon to deal, and those specialities which distinguish his work from English practice.

India, then, is about as large as Europe without

Russia. A line drawn from Cape Comorin at the south to Peshawur in the north will measure about 2000 miles; another line drawn from Kurrachee on the west coast to Calcutta will measure some 1500 miles; the total area of the whole peninsula, including British Burmah, is about 1,500,000 square miles, of which 900,000 are directly under British rule, while the remainder, though nominally under native governments, is more or less subject to us.

This vast area of country comprises almost every variety of physical configuration—lofty mountains and low hills; well-cultivated, alluvial plains, arid deserts, great forests, marshy swamps and dense jungles; long, broad rivers, numerous hill torrents, wide and deep nullahs. The varieties of climate to be found in this great continent are also numerous; for while the plains of Upper India are for several months parched up with a fiery heat, the summits of the Himalayahs are covered with perpetual snow; and while the rainfall of Sindh seldom exceeds four or five inches annually, there is a place in Assam called Cherra Poonjee, well known to geographers as the rainiest place on the earth's surface, the annual fall amounting to 650 inches.

The popular idea of India is that it is an extremely hot country, and speaking generally, the popular idea is correct. But the nights in Northern India are often excessively cold, and I have many times seen ice half an inch thick on the roadside puddles in the Punjab, while the hill stations at Simla, Mussorie, and else-

where, 7000 feet above the sea level, are covered with snow in January and February.

In Upper India, the part with which I am best acquainted, we enjoy a climate which for four months in the year—November, December, January, and February—is probably unequalled in the world both for health and pleasure: bright skies, a sun hot indeed, yet not too hot for exercise all day long, and nights cold, dry, and bracing, with a clear, still atmosphere, make an almost perfect climate. In October, March, and April, the mornings, evenings, and nights are still delightful, though the heat out of doors in the daytime is great. For the remaining five months, the climate, to a European at least, is simply detestable. You have either fierce hot winds like the blast from a glass furnace, with clouds of dust; or else a moist, stagnant atmosphere like that of a continuous vapour bath, and excessively depressing. The nights are rather worse than the days, and life is only bearable inside large and lofty rooms and under swinging punkahs. In Southern India, there is less extreme heat, but more moisture, and no real cold weather.

Yet the climate, with proper precautions and temperate habits, is by no means unfavourable to the European constitution, except in peculiar cases. As a rule, men now return from India looking much the same as their English contemporaries, and those whose minds are well employed and whose bodies get a fair share of exercise, are as healthy as their fellow-countrymen whose lot is cast in England or the

Colonies. Out of eight Engineer officers who left Chatham with me twenty-three years ago to go to India, six are now alive, and five out of the six are strong, healthy men. Nor is this at all an exceptional case; indeed, when an Anglo-Indian reaches a certain age he seems to live for ever, though the popular idea that this is because the Indian sun has dried him up into a mummy, is not founded on fact.

If I were asked whether India was a very beautiful country, I should reply that in general it is not, but that it has some of the finest scenery in the world. In travelling up the main line of railway, for instance, from Calcutta to Peshawur, your road lies for 1000 miles of that distance over a country that is one dead level, without even a hillock to break the monotony. If your journey is made (say) in March, as far as the eye can reach it rests on an enormous sea of wheat, diversified by groves of mangoe trees, and mud villages, or brick-built towns. No crystal streams,—no clear lakes,—no undulating downs,—no parks or country houses,—not even a grass field. Yet the rich cultivation, and the general signs of prosperity amongst the dense population are at least pleasing to the philanthropist; and if we leave the railway at Umballa and travel for forty miles eastward, we find ourselves amongst the dark pine forests, the mountain torrents, and the craggy heights of the Himalayahs, while their gigantic tops covered with eternal snow, 10,000 feet higher than "the monarch of mountains," look down upon us in their calm and solemn grandeur.

Nor are the great forests and mountain ranges of