

# THE CYCLOPEDIA OF INDIA.

| COMMANDS<br>with Staffs of ditto. |  | DIVISIONS<br>with Staffs of ditto. |  | BRIGADES<br>with Staffs of ditto.           |  |
|-----------------------------------|--|------------------------------------|--|---|--|
| Western                           | Lt.-Genl. Comdg.<br>Asst. Military Secy.<br>A.-D.-C.<br>Dy. Adj.-Genl.<br>2 Asst. Adjts.-Genl.<br>2 Dy. Asst. Adjts.-Genl.<br>Asst. Qr.-Mr.-Genl.<br>Col. on Staff, R. A.<br>Dy. Asst. Adj.-Genl., R. A.<br>Comdg. Engineer.<br>Inspector, S. and T. Corps.<br>Principal Medical Officer.<br>Sanitary Officer.<br>Staff Officer, Army Bearer<br>Corps.<br>Dy. Judge Advocate-Genl.<br>Recruiting Staff Officer.<br>Inspecting Veterinary Officer.<br>Inspector-Genl. of Ordnance,<br>Southern Circle.<br>Inspector of Army Schools.<br>Inspector of Army Signalling,<br>Southern Circle. | 4th (Quetta)                       | Genl. Officer Comdg.<br>A.-D.-C.<br>2 Asst. Adjts.-Genl.<br>Dy. Asst. Adj.-Genl.<br>Comdg. Royal Engineer.<br>Offr. Comdg., Divnl. Supply.<br>Offr. Comdg., Divnl. Transpt.<br>Principal Medical Officer.    | Karachi                                     | Col. on Staff Comdg.<br>Brigade-Major.<br>1st Class Staff Officer.<br>Asst. Comdg. Royal Engr.<br>Principal Medical Officer.   |
|                                   |  | 5th (Mhow)                         | Genl. Officer Comdg.<br>2 A.-D.-Cs.<br>2 Asst. Adjts.-Genl.<br>Dy. Asst. Adj.-Genl.<br>Comdg. Royal Engineer.<br>Offr. Comdg., Divnl. Supply.<br>Offr. Comdg., Divnl. Transpt.<br>Principal Medical Officer. | Nasirabad<br>Jubbulpore<br>Jhansi           | Genl. Officer Comdg.<br>Dy. Asst. Adj.-Genl.<br>Brigade-Major.<br>Genl. Officer Comdg.<br>Dy. Asst. Adj.-Genl.<br>Brigade-Major.<br>Asst. Comdg. Royal Engr.<br>Principal Medical Officer.<br>Col. on Staff Comdg.<br>Brigade-Major.<br>1st Class Staff Officer.<br>Principal Medical Officer.   |
|                                   |  | 6th (Poona)                        | Genl. Officer Comdg.<br>2 A.-D.-Cs.<br>2 Asst. Adjts.-Genl.<br>Dy. Asst. Adj.-Genl.<br>Comdg. Royal Engineer.<br>Offr. Comdg., Divnl. Supply.<br>Offr. Comdg., Divnl. Transpt.<br>Principal Medical Officer. | Belgaum<br>Bombay<br>Ahmednagar             | Col. on Staff Comdg.<br>Brigade-Major.<br>1st Class Staff Officer.<br>Genl. Officer Comdg.<br>3 Dy. Asst. Adjts.-Genl.<br>Brigade-Major.<br>Principal Medical Officer.<br>Genl. Officer Comdg.<br>Dy. Asst. Adj.-Genl.<br>Brigade-Major.   |
|                                   |  | Independent Brigade                |  | Aden  | Genl. Officer Comdg.<br>A.-D.-C.<br>Dy. Asst. Adj.-Genl.<br>Brigade-Major.<br>Asst. Comdg. Royal Engr.<br>Principal Medical Officer.   |
| Eastern                           | Lt.-Genl. Comdg.<br>Asst. Military Secy.<br>A.-D.-C.<br>Dy. Adj.-Genl.<br>2 Asst. Adjts.-Genl.<br>2 Dy. Asst. Adjts.-Genl.<br>Asst. Qr.-Mr.-Genl.<br>Dy. Asst. Qr.-Mr.-Genl.<br>Col. on Staff, R. A.<br>Dy. Asst. Adj.-Genl., R. A.<br>Comdg. Engineer.<br>Inspector, S. and T. Corps.<br>Principal Medical Officer.<br>Sanitary Officer.<br>Staff Officer, Army Bearer<br>Corps.<br>Dy. Judge Advocate-Genl.<br>4 Recruiting Staff Officers.<br>Inspecting Veterinary Officer.<br>Inspector of Army Schools.  | 7th (Meerut)                       | Genl. Officer Comdg.<br>A.-D.-C.<br>2 Asst. Adjts.-Genl.<br>Dy. Asst. Adj.-Genl.<br>Comdg. Royal Engr.<br>Offr. Comdg., Divnl. Supply.<br>Offr. Comdg., Divnl. Transpt.<br>Principal Medical Officer.        | Meerut (Cavalry)<br>Bareilly<br>Garhwal     | Col. on Staff Comdg.<br>Brigade-Major.<br>1st Class Staff Officer.<br>Genl. Officer Comdg.<br>Dy. Asst. Adj.-Genl.<br>Brigade-Major.<br>Asst. Comdg. Royal Engr.<br>Principal Medical Officer.<br>Genl. Officer Comdg.<br>Dy. Asst. Adj.-Genl.<br>Brigade-Major.<br>Asst. Comdg. Royal Engr.<br>Principal Medical Officer.   |
|                                   |  | 8th (Lucknow)                      | Genl. Officer Comdg.<br>A.-D.-C.<br>2 Asst. Adjts.-Genl.<br>Dy. Asst. Adj.-Genl.<br>Comdg. Royal Engineer.<br>Offr. Comdg., Divnl. Supply.<br>Offr. Comdg., Divnl. Transpt.<br>Principal Medical Officer.    | Fyzabad<br>Assam<br>Allahabad<br>Presidency | Col. on Staff Comdg.<br>Brigade-Major.<br>1st Class Staff Officer.<br>Col. on Staff Comdg.<br>Brigade-Major.<br>1st Class Staff Officer.<br>Genl. Officer Comdg.<br>Dy. Asst. Adj.-Genl.<br>Brigade-Major.<br>Asst. Comdg. Royal Engr.<br>Genl. Officer Comdg.<br>Dy. Asst. Adj.-Genl.<br>Brigade-Major.<br>Asst. Comdg. Royal Engr.<br>Principal Medical Officer. |





## THE CYCLOPEDIA OF INDIA.

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COMMANDS  
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|  |                       |  |                           |  |
|--|-----------------------|--|---------------------------|--|
| Independent Divisions under<br>Army Hd.-Qrs. | 9th<br>(Secunderabad) | Genl. Officer Comdg.<br>A.-D.-C.<br>2 Asst. Adjts.-Genl.<br>2 Dy. Asst. Adjts.-Genl.<br>Comdg. Royal Engineer.<br>Offr. Comdg., Divnl. Supply.<br>Offr. Comdg., Divnl. Transpt.<br>Principal Medical Officer.<br>Dy. Judge Advocate-Genl.<br>2 Recruiting Staff Officers.<br>Inspecting Veterinary Officer.<br>Sanitary Officer.<br>Staff Officer, Army Bearer<br>Corps.<br>Inspector of Army Schools. | Bangalore                 | { Genl. Officer Comdg.<br>Dy. Asst. Adjts.-Genl.<br>Brigade-Major.<br>Asst. Comdg. Royal Engr.<br>Principal Medical Officer. |
|  |                       |  | Bangalore<br>(Cavalry)    | { Col. on Staff Comdg.<br>Brigade-Major.   |
|  | Burma                 | Genl. Officer Comdg.<br>A.-D.-C.<br>2 Asst. Adjts.-Genl.<br>2 Dy. Asst. Adjts.-Genl.<br>Offr. Comdg., Divnl. Supply.<br>Offr. Comdg., Divnl. Transpt.<br>Asst. Judge Advocate-Genl.<br>Principal Medical Officer.  | Madras                    | { Col. on Staff Comdg.<br>Brigade-Major.<br>1st Class Staff Officer.<br>Asst. Comdg. Royal Engr.<br>Senior Medical Officer.  |
|  |                       |  | Southern                  | { Col. on Staff Comdg.<br>Brigade-Major.<br>1st Class Staff Officer.<br>Principal Medical Officer.                           |
|  |                       |  | Secunderabad              | { Genl. Officer Comdg.<br>Dy. Asst. Adjts.-Genl.<br>Brigade-Major.<br>Asst. Comdg. Royal Engr.                               |
|  |                       |  | Secunderabad<br>(Cavalry) | { Col. on Staff Comdg.<br>Brigade-Major.   |
|  |                       |  | Mandalay                  | { Genl. Officer Comdg.<br>Dy. Asst. Adjts.-Genl.<br>Brigade-Major.   |
|  |                       |  | Rangoon                   | { Col. on Staff Comdg.<br>Brigade-Major.   |

For table showing Strength and Distribution of the Army, see page 74.

Appointments are made by selection, and all staff appointments are tenable for three years, extensible to five years. It is with few exceptions a general rule that all staff appointments are equally divided between officers of the British and Indian services. To qualify for staff employment an officer must be a Staff College graduate, or have qualified for promotion to Major, and must have passed the Higher Standard Examination in Hindustani.

Certain appointments usually carry certain ranks: the appointment of Commander-in-Chief carries the rank of General; the command of the Northern, Eastern or Western Command, of the Burma Division, and the appointment of Chief of the Staff carries the rank of Lieutenant-General; command of a division, also appointment as Secretary to Government in the Army Department, as Adjutant-General, as Quarter-Master-General, as Inspector-General of Cavalry, Artillery or Volunteers, and as Director-General of Military Works, Ordnance or Supply and Transport, and 12 Brigade Commands carry the rank of Major-General. The following appointments qualify, if the recipient is a Brevet-Colonel or a Lieutenant-Colonel with three years' full pay service in that rank, for the rank of substantive Colonel:—Deputy Adjutant or Quarter-Master-General, Judge Advocate-General, Deputy Secretary to Government in the Army Department or Department of Military Supply, Assistant Adjutant-General or Quarter-Master-General, Military Secretary to

the Viceroy or Commander-in-Chief, Deputy Director-General (or Inspector-General) of Ordnance, Military Works or Supply and Transport, Chief Engineer (Military or Public Works), Commanding Royal Engineer of a Division and Superintending Engineer, Public Works Department.

The rules for command of a British unit are similar to those in force at home; the tenure of command of a native regiment is limited to five years, extensible to seven years.

Officers commanding regiments are responsible for the training of their officers except in subjects such as musketry, signalling, gymnastics, and mounted infantry, transport and veterinary training, for which special classes are held. Officers have to pass technical examinations before promotion to Lieutenant, Captain and Major respectively, and before obtaining command of a regiment.

Entrance to the Staff Colleges at Camberley and Quetta (in temporary quarters now at Deolali) is gained by passing a competitive examination, or by obtaining a special nomination. No officer can compete unless recommended by the General Officer under whom he is serving, and who has personally to test his capabilities, as likely to make an efficient Staff Officer. He can compete for Camberley or Quetta at his option, as the syllabus and method of instruction in both colleges only differ to the extent necessitated by climatic and local circumstances. At the Indian Staff College there is a



Commandant (a Brigadier-General) with six military Professors usually Lieutenant-Colonels or Colonels, who form the teaching staff. The course lasts two years, and comprises theoretical and practical training in all military subjects. Twenty-four students are admitted annually, of whom approximately one-third are from the British service and two-thirds from the Indian Army. On graduating finally, an officer is entitled to the letters "p. s. c." after his name, and is qualified for staff employ. The actual nature of the staff work on which he is employed subsequently depends upon the report made upon his capabilities by the Commandant and Professors of the Staff College. An officer at the Indian Staff College draws full Indian regimental pay and allowances; at Camberley, British pay of rank and allowances.

British officers with Native regiments, in staff appointments open to the Indian Army, and in Army Departments and civil employment to which engineer, artillery and medical officers have not necessarily to be appointed for their technical knowledge, are borne on one list, called the Indian Army.

Although appointed primarily for military duty in India, any officer on this list can, at the option of the Governor-General in Council, be detailed for work of any nature. A certain number of direct appointments to the Indian Army are offered annually to candidates for commissions from the Royal Military College, Sandhurst, and are accepted usually by those passing out among the highest on the list. Officers appointed in this way are attached to a British regiment in India for one year before being appointed to a Native regiment. Other vacancies are filled up by the appointment of officers volunteering from British regiments. No officer can leave a Native regiment for staff, departmental or civil employment until he has three years' service and has passed the necessary examination in Hindustani and in professional subjects.

Promotion in the Indian Army is regulated by a time scale. Unless an officer's promotion is accelerated or retarded specially, he attains the rank of Captain after 9, of Major after 18 and of Lieutenant-Colonel after 26 years' service respectively. Accelerated promotion may be granted to a limited number of Lieutenants and Captains annually for good service, and to a Major obtaining command of a regiment or an appointment on the Staff which qualifies for the rank of Colonel. Promotions to the rank of General are made entirely by selection: the establishment of these for the Indian Army is:—Generals 3, Lieutenant-Generals 5, Major-Generals 22.

Officers appointed permanently to civil employ are struck off the roll of their regiments, and after ten years' absence from military duty are borne on a supernumerary list, on which they can rise, under the time scale, to the rank of Lieutenant-Colonel, but no higher. The pay of officers in the Indian Army on military duty consists of pay of rank *plus* staff pay, except in the higher appointments where a consolidated salary is given. Pay of rank never varies, and is as follows (monthly rates):—Lieutenant, Rs. 225; Captain, Rs. 374; Major, Rs. 640; Lieutenant-Colonel or Colonel, Rs. 827. Staff pay varies according to the nature of

work on which an officer is employed; in a Native Cavalry regiment, it rises from Rs. 150 to Rs. 700; in a Native Infantry regiment, it rises from Rs. 100 to Rs. 600; and in Staff employ, it rises from Rs. 200 to Rs. 1,000 till it reaches the consolidated scale, when an officer's pay and allowances can rise to the Rs. 4,500 of a Lieutenant-General of a Command or the annual Rs. 100,000 of the Commander-in-Chief.

Furlough to England up to a year, extensible to two years on urgent private affairs, is granted if the officer's services can be spared, at any time in an officer's service: while thus absent, he draws special sterling rates of pay, which rise from £200 to £600 a year. If absent for more than two years from ill-health, an officer is transferred to the temporary half-pay list. Pensions on retirement are granted after 20 years' service, and are as follows:—After 20 years, £250; after 25 years, £365; after 26 years, £438; after 28 years, £500; after 32 years, £700; while Major-Generals, Lieutenant-Generals and Generals get pensions of £800, £900 and £1,000 a year, respectively. For other conditions of service, reference should be made to the small pamphlet (price 1d.) on the subject, issued by the India Office.

British Corps\* in India are organized on the same Organization and strength lines as those of the same of British Corps. branch serving at Home, while their armament, equipment and clothing are identical, except for the differences necessitated by climatic conditions. Each unit has an establishment of Native followers, such as lascars, bhists, sweepers, syces, etc., and a proportion of these, as well as a limited number of officers' private Native servants, accompanies the unit on field service.

Artillery batteries and ammunition columns have a certain number of enlisted native drivers: the numbers of these vary slightly in each kind of unit, but they are calculated on the principle that all 'first line' vehicles should be manned by British drivers.

The strength of the different units is as follows:—

|                              | Officers. | N. C. Os. & Men. | Total. |
|------------------------------|-----------|------------------|--------|
| Cavalry regiment             | 29        | 598              | 627    |
| R. H. A. or R. F. A. battery | 5         | 157†             | 162    |
| Heavy battery                | 5         | 91†              | 96     |
| Howitzer battery             | 6         | 217              | 223    |
| Mountain battery             | 6         | 141              | 147    |
| Garrison Artillery Coy.      | 5         | 140              | 145    |
| Infantry battalion           | 29        | 1,004            | 1,033  |

Although there is no objection to enlisting suitable men in India, practically all the recruitment and enlistment for the British forces in this country is carried out at Home, under terms arranged by the War Office, who are responsible for keeping units up to proper strength. Units come out to India under a regular system of reliefs and remain for about 10 years if they are Cavalry or Artillery units, and about 16 years if an Infantry battalion.

\* Cavalry regiments in India have 4 squadrons.  
† These numbers are under revision.





During this period the rank and file change frequently, as the average tour of service of the private soldier in India is a little over 5 years. While in India, all charges on account of these units are paid by the Indian Government, who, in addition, pay the War Office a regular proportion of the cost to the latter of enlisting and training officers and men, and of the pensions, gratuities and other contingent expenses incurred by them.

In accordance with the recommendation of the Royal Commission in 1858, a definite proportion between the numbers of British and Native troops is still maintained. Originally, this proportion was 1 British to every 2 Native soldiers in Bengal and to every 3 Native soldiers in Madras and Bombay, respectively. The proportion now, taking into account reserve and auxiliary forces, is about 1 British to 2½ Native soldiers throughout India.

Native Cavalry and Infantry regiments are practically all organized on the class regiment or the class squadron or company system. This means in the first case that the whole regiment is composed of one class, *i.e.*, Sikhs, Dogras, Gurkhas, Rajputs, Hazaras, Moplahs, etc., and in the second case that every squadron or company is formed entirely of one class, though there may be, and generally are indeed in the Infantry, more than one squadron or company of each class in one regiment. The reasons for this system are to a certain extent political, as tending to prevent any such formidable coalition against us as occurred in the Indian Mutiny; they are also on the grounds of efficiency, for it is found that the class system is popular, and consequently attracts a better class of men; moreover, it creates a reasonable spirit of rivalry between units.

There are the following class regiments:—

#### CAVALRY:—

*Musalmans.* 1st and 2nd Lancers, 17th Cavalry.

*Jats.* 14th Lancers.

#### INFANTRY:—

*Sikhs.* 14th, 15th, 35th, 36th, 45th and 47th Sikhs and 23rd, 32nd and 34th Pioneers.

*Dogras.* 37th, 38th and 41st Dogras.

*Gurkhas.\** 1st, 2nd, 3rd, 4th, 5th, 6th, 7th 8th, 9th and 10th Gurkhas.

*Brahmans.* 1st and 3rd Brahmans.

*Rajputs.* 2nd, 4th, 7th, 8th, 11th, 13th and 16th Rajputs.

*Jats.* 6th and 10th Jats.

*Mahrattas.* 114th, 116th and 117th Mahrattas.

*Garhwalis.* 39th Garhwalis (2 Battalions).

*Moplahs.* 77th and 78th Moplah Rifles.

*Hazaras.* 106th Hazara Pioneers.

All other regiments have class companies or squadrons, even though called "Sikhs" like the 53rd Sikhs, or "Pathans" like the 40th Pathans. For details of these, reference should be made to the current Indian Army List published by Army Head-Quarters.

Each Cavalry regiment is organized in 4 squadrons, and has 13 to 14 British officers in addition to a British Medical officer; namely, a Commandant, 4 Squadron Commanders (of whom one is 2nd-in-Command), an Adjutant and 7 to 8 Squadron Officers. There are 625 Natives of all ranks, including Native officers; of the latter the Risaldar-Major is the senior and there are, usually, in addition, 3 Risaldars and 4 Ressaidars, each commanding a half squadron, and also 9 Jemadars: the non-commissioned officers are called "Daffadars" and the privates "Sowars." All Cavalry regiments, except the 26th, 27th and 28th Light Cavalry are what is termed Sillahdar regiments. Broadly speaking, this means that every man contracts with the State for a fixed monthly payment for his own services; mounted and armed, and that, beyond this fixed monthly payment and the usual pensionary charges, the State incurs no pecuniary responsibility on his account. As a matter of fact, the State now supplies rifles and ammunition and gives compensation if a man's rations and his horse's food cost more than a certain sum.

Each Infantry battalion is organized in 4 double companies (of 2 companies each) and has, usually, 13 to 14 British officers in addition to a British Medical officer; these are, a Commandant, 4 Double Company Commanders (of whom one is 2nd-in-Command), an Adjutant, a Quarter-master and 6 to 7 double company officers. There are 912 Natives of all ranks, including Native officers; the latter are 1 Subadar-Major and 7 Subadars, each commanding a company, with 8 Jemadars: the non-commissioned officers are Havildars and Naicks, and the privates are called "Sepoys."

A Native Mountain battery has 6 guns and is divided into 3 sections. There are 5 British officers who belong to the Royal Garrison Artillery and not to the Indian Army, namely, 1 Captain \* and 4 Lieutenants; there are 135 Native gunners, including Native officers (of whom there are 3) and non-commissioned officers and 234 Native drivers, including non-commissioned officers.

A Company of Sappers and Miners usually consists of 2 British officers and 2 non-commissioned officers of the Royal Engineers and 170 Native ranks, including 3 Native officers.

Recruiting staff officers are appointed for each of the principal classes and castes composing the Native Army, and recruiting is mainly conducted under their supervision, though many men are

\* All the Gurkha regiments, except the 7th and 8th, have 2 battalions.

\* Majors are shortly to be appointed to command all Native Mountain batteries.



recruited through relatives and friends and join regiments direct. There are the following recruiting staff officers :—

| Class or Caste.   | Head-quarters of R. S. O. |
|---|---------------------------|
| Sikhs ... ..  | Jullundur and Amritsar.   |
| Dogras ... ..   | Jullundur and Dharmasala. |
| Pathans ... ..  | Peshawar.                 |
| Punjabi Mahomedans ... ..                               | Jhelum.                   |
| Gurkhas ... ..  | Gorakhpur.                |
| Mahrattas and Dekhani Musalmans ... ..                  | Poona.                    |
| Hindustani Hindus ... ..                                | Lucknow.                  |
| Jats and Hindustani Musalmans ... ..                    | Delhi.                    |
| Rajputana and Central India Hindus and Musalmans ... .. | Agra.                     |
| Madras Musalmans ... ..                                 | Bangalore.                |
| Madras Hindus and Christians ... ..                     | Trichinopoly.             |

Enlistment is for general service, within or outside British territories and beyond sea if necessary: the age of enlistment is usually 16 to 25 and the standard of height 5 ft. 7 ins.: in ordinary times a man may claim his discharge after 3 years' service.

Commandants of Native corps have considerable disciplinary powers, especially in the authority which empowers them to hold 'summary' courts-martial, of which they alone constitute the court, although other officers are required to 'attend' such a court-martial. For further details regarding disciplinary powers, a reference should be made to the Indian Articles of War to which all Native ranks of the army in India are subject.

Native regiments move in relief every 3 or 4 years and as a general rule are located in cantonments within reasonable distance of the area from which their men are recruited. Thus, men recruited in the Punjab are generally stationed in a cantonment of one of the first 3 divisions (Peshawar, Rawalpindi and Lahore); men recruited in Rajputana, Central India, the United Provinces and Nepal in cantonments of the Meerut and Lucknow divisions; men recruited in the West of India and the Dekkan in cantonments of the Mhow and Poona divisions; and men recruited in Madras in cantonments of the Secunderabad Division. At the same time, all corps are liable to, and do, serve in any part of India, and troops of all castes and classes are found serving on the frontiers, in Burma and in the colonial garrisons of Hong Kong, North China, Singapore and Ceylon. The principle of having local regiments for service in Burma, Baluchistan and the N.-W. Frontier is gradually being discontinued, and shortly the only localized regiments remaining will be those of Gurkhas.

Urdu (or Hindustani) is understood throughout the Language of Native Army. Native Army, although most classes have a language or dialect of their own, and British officers serving with Native corps have, in addition to passing in Urdu, to pass a colloquial test in the language spoken by the majority of the men of their unit.

The pay of the Infantry sepoy is Rs. 9 per month, and it rises, as he may get promotion, to Rs. 150 a month of the Subadar-Major. The Cavalry sowar gets Rs. 31 a month, and this amount rises to the Rs. 300 a month of the Rissaldar-Major. All Native soldiers have to

feed themselves out of their pay, but they receive compensation from Government when the cost of their food exceeds a certain limit. The Cavalry sowar has also to feed his horse and to clothe and equip himself and his horse out of his pay, but he receives assistance from Government in the provision of grass, and when the cost of grain exceeds a certain amount, and he is provided free with his rifle and ammunition. Extra pay, called good conduct pay, can be earned by the soldier, and rises from Re. 1 to Rs. 3 a month; in the case of the non-commissioned officer it is called good service pay, and rises from Re. 1 to Rs. 4 a month.

Pensions after 21 years' service, or if invalided, after 15 years' service, rise from Rs. 4 a month for a private, to Rs. 30 a month for a Rissaldar or Subadar-Major, and after 32 years' service from Rs. 6 to Rs. 50 for the same ranks.

Pensions are also granted for wounds received on field service, and to the families of soldiers deceased during field operations or on foreign service.

It is open to all ranks of the Native Army to rise to the highest grade of Native officer, and these in retirement receive the honorary rank of Captain. Certain educational and technical military tests are required from candidates for promotion, for the position of Native officer is one of considerable responsibility. A certain percentage of commissions are given direct to Native gentlemen who are recommended for these by the civil, and approved by the military, authorities: before final confirmation in these appointments, Native gentlemen have to serve on probation for 2 years.

As in the case of the British service, the rank and file of the Native Army can earn a medal for long service with good conduct, while the Native officer can earn the "Order of British India" for long, faithful and honourable service. For personal bravery there is an "Indian Order of Merit" in three classes. All of these medals and orders carry monetary allowances.

Most Native units have a fixed establishment of reservists, to which men of over 3 years' service with the colours and under 32 years of age may be transferred. The total sanctioned establishment of the reservists for the Indian Army stands at present at about 30,000, but it is being increased annually, until it shall reach a strength of 50,000. At present the establishments for each of the different units is generally as follows :—

|                           |     |         |
|---------------------------|-----|---------|
| Ammunition Column, R.H.A. | ... | 25      |
| Do. do. R.F.A.            | ... | 63      |
| R.G.A. Coy.               | ... | 13      |
| Mountain Battery, R.G.A.  | ... | 44—48   |
| Native Mountain battery   | ... | 66—70   |
| Sapper and Miner corps    | ... | 180—304 |
| Railway company           | ... | 260     |
| Native Cavalry regiment   | ... | 20—40   |
| Native Infantry battalion | ... | 60—334  |

Reservists are trained annually or biennially at fixed territorial centres, where their arms, equipments and clothing are stored. On mobilization, they are called upon to rejoin the colours at the depôts



of their former units (or of one of the linked units) as required. A reservist receives Rs. 2 a month when away from the colours or when not up for training.

**Artillery.**—Heavy batteries of Artillery are armed generally with a B. L. 5-inch gun, the Horse and Field Artillery are being rearmed with the 13½ and 18½-pounder Quick-Firing gun, respectively, and mountain batteries have a 10-pounder gun.

**Cavalry and Infantry.**—The Cavalry and Infantry have the short Lee-Metford magazine rifle with bandolier equipment. In addition the Cavalry also carry a sword and lance, or a sword. Each regiment with a place in the field army has also 2 Maxim machine guns.

**Engineers.**—The Corps of Sappers and Miners have railway, bridging, telegraph, balloon and other technical units in addition to the usual engineer equipment. There are also 12 battalions of Native pioneers with special Pioneer equipment for engineering work.

The ordinary clothing for British and Native troops for the cold weather is serge; blue, red, green, or drab, according to the regimental pattern. Khaki drill is the field service and usual hot-weather dress for all troops, while white drill is worn by British troops on Ceremonial and Church Parades, etc. British troops are supplied with clothing and necessaries by the Army Clothing Department, some of the clothing being made up regimentally; and the same agency supplies the Native army, except the Sillahdar Cavalry (who arrange for the whole of their clothing themselves), with serge clothing. For the rest of his clothing and necessaries the Native soldier (except in the Sillahdar Cavalry) receives a fixed sum on enlistment as kit money, and afterwards an annual half-mounting allowance, arrangements being made regimentally for the supply.

The British soldier always receives free rations in this country, and these are arranged for by the Supply and Transport Corps. The Native soldier makes his own arrangements for food during peace time, and receives compensation from Government if the cost of his ration exceeds a fixed monthly limit: on field service he receives free rations, which are arranged for by the Supply and Transport Corps.

There is no permanently organized body of Mounted Infantry in India. There are Mounted Infantry Schools at Sialkote, Ambala, Poona, Fatehgarh and Bangalore, and selected officers and men are sent from the different British and Native Infantry regiments to undergo courses of instruction at these schools. From these trained men, who do annual repetition courses, the necessary number of Mounted Infantry battalions would be formed on mobilization. A Mounted Infantry battalion is 500 to 600 strong, is organized in four companies, and has a machine gun section.

One of the greatest difficulties in the case of a big war, will be to obtain a sufficient supply of officers for the Indian Army. The formation of an Indian Army Reserve of officers was sanctioned in 1894, but the numbers have never exceeded 40 or 50.

The reserve is open to any officials and private gentlemen in India who are not military officers, to certain retired military officers and to volunteers. They must be recommended by the General Officer Commanding the District in which they reside, they must have attained a certain degree of efficiency in military training, and they are all liable to military service in case of necessity. They undergo no training, and have merely to report their whereabouts twice a year.

The Judge Advocate-General and his 5 Assistants are the advisers of the Army on military law matters. They are recruited from officers of the Indian Army.

The Principal Medical Officer, His Majesty's Forces in India, is usually an officer of the Royal Army Medical Corps, and is responsible, under the orders of the C-in-C., for all military medical arrangements in India. Military medical duties in India are carried out by officers of the Royal Army Medical Corps and Indian Medical Service, by Assistant Surgeons and Hospital Assistants of the Indian Subordinate Medical Department, by Nurses of Queen Alexandra's Military Nursing Service for India, by the Army Bearer Corps, and by the menial servants of the Army Hospital Corps and those attached to Native units.

Officers of the Royal Army Medical Corps, which is organized and administered under the orders of the Army Council, come out to India on a five-years' tour of duty in regular relief. Their work in India is primarily the medical charge of British troops, although at times they have Native troops also under their care. The fixed establishment of R. A. M. C. Officers in India is at present 337. There is a Principal Medical Officer in each Command and Division and in some of the Brigades; in the remainder of the Brigades and in all stations, there is a Senior Medical Officer: all the military medical arrangements of the Command, Division, Brigade or Station are supervised by these officers acting under the orders of the General or other Officer Commanding. The appointments of Principal Medical officer are divided equally between the Royal Army Medical Corps and the Indian Medical Service. Medical officers are not attached to British units during peace time, as all British troops are treated in Station Hospitals.

The Indian Medical Service is recruited for duty in India and is primarily a military service: but a very large number of its officers are permanently employed on purely civil duties, of whom a certain proportion, however, are available to return to military duty on mobilization, if required. The head of the service is the Director-General, Indian Medical Service, and his main duties are civil, for which purpose he is under the Home Department of the Government of India; but he is also the adviser of the Department of Military Supply on all questions relating to the military portions of the Indian Medical Service and the Indian Subordinate Medical Department. Each Native Cavalry regiment and Infantry battalion has an officer of the Indian Medical Service who is in medical charge of



the unit. In addition, the Indian Medical Service maintains Medical Store Depôts at Calcutta, Madras, Bombay, Lahore and Rangoon for the supply of medical stores and equipment. All officers of the Indian Medical Service have at first to do a certain period of military duty, and in attaining the rank of Colonel are liable to be recalled to military duty as Principal Medical Officers. The present strength of the Indian Medical Service is 727 officers.

The Indian Subordinate Medical Department is recruited and trained in India for duty in India with the Army and in civil employ. The present establishment is 672 Assistant Surgeons and 932 Hospital Assistants, of whom large numbers are in civil employ, but of whom a certain proportion is available for military duty on mobilization, if required. The Assistant Surgeons in military employ do duty almost exclusively with British troops, while Hospital Assistants are almost always attached to Native units, of the smaller of whom they are sometimes in medical charge.

Queen Alexandra's Military Nursing Service for India is recruited in England for service in India and with British troops. The present establishment is, 4 Lady Superintendents, 15 Senior Nursing Sisters and 65 Nursing Sisters. Nursing Sisters come out under a 5-years' agreement, which can be extended.

The Army Bearer Corps is organized in 32 companies of 100 Kahars (or bearers), each under an Assistant Surgeon. There is a Medical officer as Staff officer of the Army Bearer Corps in each of the 3 Commands, and there is one for the Secunderabad and Burma Divisions, whose duties are the administration and general superintendence of the bearer companies in his Command. The main duty of the Bearer Corps is the carrying of dhoolis (a sort of covered stretcher carried by 4 men).

The Army Hospital Corps is organized in 11 companies, and comprises all the Native menial servants on duty with British Station Hospitals, such as ward orderlies, cooks, bhists, sweepers, dhobis, etc. Native units have establishments of these menials, and have also 1 or 2 enlisted soldiers as ward orderlies.

Medical assistance to men in the fighting line (so to speak) is afforded by Medical officers attached to units, British and Native: unless a man's wound or ailment is trifling, he is then sent to a Field Hospital; these are equipped with 100 beds each and some accompany troops to the front, while others remain at posts on the lines of communication: if a man requires lengthened treatment, he is sent down to one of the nearest General Hospitals, which are each equipped with 500 beds and are situated at the different advanced and other convenient bases: from here the man either returns to the front or is invalided to his home, proceeding possibly by hospital train and hospital ship.

The Supply and Transport Corps arranges at all times for the food of British troops and for forage for their horses, and for their bedding, barrack and hospital supplies and, on field service and in certain localities, it performs the same functions for Native troops: the whole of the military transport maintained in peace is in its charge, and it looks after the registration of transport animals. Part of the Corps is under the Department of Military Supply with a Director-General of Contracts and Registration at its head and separate staffs in each command and division. The remainder of the Corps is under the Quarter-Master-General, with an Inspector-General at its head; with Inspectors in each command; with an Officer Commanding Divisional Supply, an Officer Commanding Divisional Transport, and a Divisional Accounts Officer in each division; and with various assistants at Army and Command Head-quarters and in divisions, brigades and stations. The present strength of the Corps is 271 officers and 524 warrant and non-commissioned officers. The portion of the Supply and Transport Corps under the Department of Military Supply arranges for the contracts of supplies and for the registration of transport, while the part of the Corps under the Quarter-Master-General arranges for the supply to troops of the various articles with which it deals, and is in charge of the transport maintained during peace. The greater part of the latter is organized in corps or cadres; the first are kept up at full strength and ready for mobilization, while the latter are expanded on mobilization by means of men from the transport reserve and enlisted for the occasion and by animals hired or purchased on mobilization, a large number of which have been registered for this during peace. There are the following corps and cadres:—

**MULE TRANSPORT:—**

- 4 Cavalry Brigade Mule Corps, each with a carrying power of 121 tons.
- 3 Cavalry Brigade Mule Cadres.
- 17 Pack Mule Corps, each with a carrying power of 48 tons.
- 15 Pack Mule Cadres.

**PONY TRANSPORT:—**

- 2 Pony Cart Train Cadres.

**CAMEL TRANSPORT:—**

- 9 Silladar Camel Corps, each with a carrying power of 157 tons.
- 4 Grantee Camel Corps.

**BULLOCK TRANSPORT:—**

- 121½ Bullock Half-troops.

In addition to the above, there are mule, camel and bullock transport maintained with certain regiments and for special services on the frontier.

The various cantonments in India are administered under the authority of the Cantonment Code by a Cantonment Committee composed of military officers. The Secretaries to these Committees are Cantonment Magistrates who are military officers; they are borne on a separate list and are held to be in civil employ. They carry out the orders of the Cantonment Committee and perform the judicial duties

Medical arrangements on Field Service.

Army Hospital Corps.

Army Bearer Corps.

Queen Alexandra's Military Nursing Service for India.

Supply and Transport Corps.





of the cantonment. Cantonment Magistrates, of whom there are at present 38, with 6 Assistant Cantonment Magistrates, are under the Quarter-Master-General in India and to a certain extent (mainly in regard to their judicial duties) under Local Governments. The Quarter-Master-General has an Inspecting Officer of Cantonments to assist him, who is selected usually from among the Senior Cantonment Magistrates.

Officers of the Army Veterinary Corps come out to India for a tour of duty in the same way as officers of the Royal Army Medical Corps, and their duty lies principally with British troops. Some of them, however, are attached to the Army Remount Department and assist in supervising breeding operations. There is also a Civil Veterinary Service in India, appointments to which are made from the Army Veterinary Corps. Native Veterinary Assistants are trained at the Veterinary Colleges in India, and are appointed to Native Cavalry regiments, Transport corps, etc., where their work is supervised by Inspecting officers of the Army Veterinary Corps.

The Director-General of Military Works, a Major-General in the Army, is the head of the Royal Engineers in India. He is to a certain extent a Staff officer, as he is technical adviser to the Commander-in-Chief, but he is responsible to the Department of Military Supply for the construction and maintenance of fortifications and other military works and buildings.

The present establishment of officers of the Military Works Services is 181, of whom 15 are at present civilians, and the remainder Royal Engineers. There is no fixed scale for the subordinate establishment which, in addition to a large number of military warrant and non-commissioned officers, comprises a certain number of civilians. The officers are graded according to their seniority in the Corps of Royal Engineers, and the organization has been adjusted to suit the different Army commands. In each command there is a Chief Engineer with a Staff officer, in each division a Commanding Royal Engineer, and in each independent brigade an Assistant Commanding Royal Engineer.

The present authorized strength of Royal Engineer officers in India is based on the war requirements of the Army and is 392; the War Office, however, have not yet completed the establishment to this strength. There is no longer 'continuous service' for Royal Engineer officers in India, but they can qualify for an Indian pension after 20 years' service in this country.

They are eligible for appointments on the Army Staff, in the Military Works Services, with the different Corps of Sappers and Miners or Sub-Marine Miners, and in the Public Works, Survey and various other Civil Departments. Those in the Public Works and Civil Departments are liable to be recalled to military employ in case of war.

The Director-General of Ordnance, an officer of the rank of Major-General, is technical adviser to

the Commander-in-Chief, but is responsible to the Department of Military Supply for the administration of the various arsenals and factories, from which the Army and auxiliary forces (including Imperial Service Troops, Frontier Militia and Police) are supplied with all munitions of war and with most of their equipment. He has under his orders 72 officers (seconded from the Royal Artillery) and 501 warrant and non-commissioned officers, in addition to many civilian engineers, mechanics, etc. The Ordnance Department is also responsible for the maintenance during peace of the authorized reserves of munitions and stores of ordnance supply required for the Field Army. Under the Director-General there is an Inspector-General of Factories, who is responsible for the various manufacturing establishments, while the arsenals are administered, also under the orders of the Director-General, by Inspectors-General of whom there are 2, namely, one for each of the Northern and Southern Circles.

The various manufacturing establishments of the Ordnance Department are as follows:—

|                                 |                                |
|---------------------------------|--------------------------------|
| Harness and Saddlery Factory    | at Cawnpore.                   |
| Do. do. Workshops               | „ Madras.                      |
| Gun Carriage Factory            | „ Jubbulpore.                  |
| Cordite Factory                 | „ Aruvankad (near Wellington). |
| Gun and Shell Factory           | „ Cossipore.                   |
| Rifle Factory and Rolling Mills | „ Ishapore.                    |
| Small Arms Ammunition Factories | „ Dum-Dum and Kirkee.          |

The following are the different arsenals and depôts:—

| NORTHERN CIRCLE.  |                            | SOUTHERN CIRCLE.                                   |  |
|---|----------------------------|--|--|
| Arsenals.   | Depôts.                    | Arsenals.  | Depôts.  |
| Ferozepore.<br>Rawalpindi.<br>Fort William.<br>Allahabad. | Agra.<br>Dera Ismail Khan. | Bombay.<br>Madras.<br>Quetta.<br>Mhow.<br>Rangoon. | Aden.<br>Ahmedabad.<br>Poona.<br>Trimulgherry.<br>Fort Dufferin. |

The Army Remount Department, which is under a Director-General (an appointment which qualifies for the rank of Colonel), with 14 officers as Superintendents, and 8 Veterinary officers, controls the breeding and the supply of horses\* for military purposes. The following are the remount depôts:—Saharanpur, Babugarh (or Hapur), Mona, Ahmednagar and Hosur with a young stock run at Sargoda. The Civil Veterinary Department controls horse, mule and donkey breeding outside the Punjab, Baluchistan, Sind, the Bombay, Deccan and part of the United Provinces, inside which areas lies the work of the Army Remount Department. The principal source of

\*The Native Silabdar Cavalry arrange for the supply of their own horses.



supply of horses is at present Australia; Arabs are also imported; and likely young country-bred stock are bought and reared on runs. Mules for ordnance purposes are purchased locally, and mules for all purposes (to the extent that they cannot be purchased locally) are imported by the Army Remount Department. Mules for transport purposes are purchased locally by officers of the Supply and Transport Corps.

The Army Clothing Department has factories at Madras, Calcutta and Fatehgarh, and is under a Director of Army Clothing with 5 officers as assistants. The greater part of the clothing required for the army in peace time and all the special clothing required for the Field Army is manufactured in, and supplied from, these factories.

The Military Accounts Department under an Accountant-General (an appointment which qualifies for the rank of Colonel) is under the Military Finance Section of the Finance Department of the Government of India, in which the Accountant-General is *ex-officio* Deputy Secretary. It audits all Army accounts and compiles military expenditure. There are at present 4 Controllers of Military Accounts, of the Northern, Eastern and Western Commands and of the Secunderabad and Burma Divisions, respectively. There are 44 other officers as assistants. Officers are recruited from the Indian Army.

The Church of England Ecclesiastical Establishment in India consists of Bishops, Archdeacons (and Commissaries), and Senior, Junior and Probationary Chaplains. It is a civil department under the Home Department of the Government of India, and the incumbents are borne on four separate lists, namely, Bengal, Madras, Bombay and Rangoon. Chaplains, etc., for purely military purposes are detailed from among those on these lists. Presbyterian and Roman Catholic Chaplains are also entertained to a limited extent for military duty.

Grass and Dairy Farms are formed, or being formed, in all of the larger cantonments in India, under the control of Generals Commanding Divisions. They supply grass to all Government animals and dairy produce to all military services.

The Inspector-General of Imperial Service Troops, a Major-General of the Indian Army, has 11 Inspecting officers, a Deputy Assistant Adjutant-General for Musketry, an Inspector of Signalling, and 8 Assistant Inspecting officers, all of the Indian Army, to assist him in his work of superintendence of the training of the different Imperial Service corps. The cost of this inspecting staff is paid by the Indian Government, who bear no other part of the cost of the Imperial Service Troops; for these are absolutely under their own rulers, in whose territories they are recruited. Their armament and equipment is practically identical with that of our own Native army, to whom they approximate in efficiency.

The following table shows the various Corps of Imperial Service Troops: these are all of varying strength. The aggregate strength on the 1st April 1906 was 20,728.

| NATIVE STATES. | Mountain Batteries. | Cavalry Corps. | Camel Corps. | Mounted Infantry. | Sappers and Miners. | Infantry. | Transport Corps. | REMARKS. |
|----------------|---------------------|----------------|--------------|-------------------|---------------------|-----------|------------------|----------|
| Hyderabad      | ...                 | 2              | ...          | ...               | ...                 | ...       | ...              |          |
| Mysore         | ...                 | 1              | ...          | ...               | ...                 | ...       | ...              |          |
| Jodhpur        | ...                 | 2              | ...          | ...               | ...                 | ...       | ...              |          |
| Jeypur         | ...                 | ...            | ...          | ...               | ...                 | ...       | 1                |          |
| Bhartpur       | ...                 | ...            | ...          | ...               | ...                 | ...       | 1                |          |
| Bikanir        | ...                 | 1              | ...          | ...               | ...                 | ...       | ...              |          |
| Alwar          | ...                 | 1              | ...          | ...               | ...                 | 1         | ...              |          |
| Indore         | ...                 | ...            | ...          | 1                 | ...                 | ...       | ...              |          |
| Bhopal         | ...                 | 1              | ...          | ...               | ...                 | ...       | ...              |          |
| Bhavnagar      | ...                 | 1              | ...          | ...               | ...                 | ...       | ...              |          |
| Junagadh       | ...                 | 1              | ...          | ...               | ...                 | ...       | ...              |          |
| Jamnagar       | ...                 | 1              | ...          | ...               | ...                 | ...       | ...              |          |
| Gwalior        | ...                 | 3              | ...          | ...               | ...                 | 2         | 1                |          |
| Kashmir        | 2                   | 1              | ...          | ...               | ...                 | 4         | ...              |          |
| Patiala        | ...                 | 1              | ...          | ...               | ...                 | 2         | ...              |          |
| Jhind          | ...                 | ...            | ...          | ...               | ...                 | 1         | ...              |          |
| Nabha          | ...                 | ...            | ...          | ...               | ...                 | 1         | ...              |          |
| Kapurthala     | ...                 | ...            | ...          | ...               | ...                 | 1         | ...              |          |
| Bahawalpur     | ...                 | 1              | ...          | ...               | ...                 | 1         | ...              |          |
| Faridkot       | ...                 | ...            | ...          | ...               | ...                 | 1         | ...              |          |
| Nahan          | ...                 | ...            | ...          | ...               | 1                   | ...       | ...              |          |
| Malerkotla     | ...                 | ...            | ...          | ...               | 1                   | ...       | ...              |          |
| Total          | 2                   | 15             | 2            | 1                 | 2                   | 14        | 3                |          |

Since the days of the Mutiny the Volunteers have had little opportunity of seeing active service. A Mounted Rifle company of the Rangoon Volunteers served in Upper Burma in 1885, a company of the Calcutta Volunteers took part in the Manipur Expedition of 1891, Lumsden's Horse (a corps raised from Indian Volunteers corps) took part in the South African War, and various corps have at different times been called out for military duty in aid of the civil power. The existence of Volunteers in India is especially necessary in view of the different nationalities by which we are surrounded, and their value would be evident in case of a general mobilization of the regular forces for operations across the frontier. In these circumstances the security of a large part of the European inhabitants in India would depend on the Volunteers, on whom we should also rely to a large extent to maintain the railway communications throughout the country.

All Europeans and Eurasians in India are eligible to become Volunteers. The advisability has been mooted more than once of making service in the Volunteers compulsory for all Government servants and also for all European and Eurasian residents, but the question has not been pressed; at present, all railway employees, who are eligible, have to serve in their Railway Volunteer corps; and in case of a general mobilization it appears probable that the greater part of the European and Eurasian residents would come forward voluntarily to enrol themselves as Volunteers. All Volunteer corps are under the orders of the General Officer Commanding the divisional area in which they are located. Junior officers are elected regimentally, but promotion to Captain and to ranks above Captain have





to be recommended by the Local Government. The Inspector-General of Volunteers, an officer of the rank of Major-General, is a regular officer serving under the Adjutant-General; he inspects all Volunteer corps throughout India, and generally looks after the interests of the force. Adjutants and Sergeant Instructors are detailed from the Regular Army to the different corps, as at Home.

There are 82 Volunteer corps in India, among whom are the Calcutta, Rangoon, Karachi and Aden Port Defence or Naval corps with Artillery and Submarine and Electric Engineers, 14 Light Horse or Mounted Rifle corps and 7 Garrison Artillery corps. Of the 32,156 Volunteers in India on 1st April 1906, 30,378 were "efficients." There is also a small Volunteer Reserve, formed in reserve companies, which numbers about 1,600.

Volunteers are armed with the Lee-Metford Magazine Rifle, and the various rifle meetings held in India and at Home testify to their proficiency with it.

This corps, which was initiated by Lord Curzon, has its Head-Quarters at Dehra Dun, and gives a military education and training for a period of 2 to 3 years to Native noblemen. The numbers under training vary from 12 to 20, and a certain number receive a commission in the British Army at the end of the course. There are at present 4 officers holding such commissions. Two are in command of corps of Imperial Service Troops and two are on the staffs of Majors-General of Divisions. There is a British Commandant and a British Adjutant to the corps.

Owing to the policy of withdrawing regular troops from across the frontier, the numbers of the Frontier Militia have recently been increased. During peace time they are under the orders of the Local Administrations (*i.e.*, the Agent to the Governor-General in Baluchistan or the North-West Frontier Province), but when on military duty where regular troops are also employed,

they come under the orders of the Officer Commanding the troops. They are officered by 2 or 3 British officers per battalion, they are armed with Martini-Henry rifles, and they are equipped and trained on the same lines as the Native Army.

In the North-West Frontier Province there are:—The Khyber Rifles (2 battalions), the Kurram Militia (2 battalions), North Waziristan Militia, South Waziristan Militia, the Dir, Swat, Chitral, and Bhattani Levies and the Chitrali Scouts. In Baluchistan there is the Zhob Levy Corps (partly mounted) and the Mekran Levy Corps. They serve entirely in the district whose name their corps bears.

There are the following Military Police.

BURMA.—12 battalions, commanded by British officers of the Indian Army.

ASSAM.—6 battalions, commanded by British officers of the Indian Army.

NORTH-WEST FRONTIER PROVINCE.—Samana Rifles and Border Military Police, commanded by Police officers.

PUNJAB.—Border Military Police at Dera Ghazi Khan.

They are armed with the Martini-Henry rifle, and are equipped and trained on the same lines as the Native Army. Their duty lies principally in holding various frontier posts.

Nearly all the independent Native States, whose number is some 120, keep up bodies of armed retainers. The numbers of these forces vary, but they may be taken as aggregating approximately 90,000 to 100,000, of whom about three-quarters are infantry. They are of little military value, for their armament, discipline and training are inferior, except in Kashmir, Gwalior and Hyderabad. At the same time the *personnel* in the States of the Punjab and Rajputana is generally excellent. In certain circumstances these so-called armies might prove a menace to the internal peace of the country.

## APPENDIX.

### STRENGTH AND DISTRIBUTION OF THE ARMY.

The following table shews the present distribution by Divisions and Independent Brigades of the combatant units of the regular army in India serving under the orders of the Commander-in-Chief. It is undergoing yearly alteration as the redistribution scheme progresses:

*For table see next page.*



# THE CYCLOPEDIA OF INDIA.

TABLE SHEWING STRENGTH AND DISTRIBUTION OF THE ARMY.

| DIVISIONS OR INDEPENDENT BRIGADES. | UNITS.            |                   |                                    |                         |                           |                   |                              |                                   |                            |                           |                              |                             |
|------------------------------------|-------------------|-------------------|------------------------------------|-------------------------|---------------------------|-------------------|------------------------------|-----------------------------------|----------------------------|---------------------------|------------------------------|-----------------------------|
|                                    | R.H.A. Batteries. | R.F.A. Batteries. | Ammunition Cols. (R.H.A. & R.F.A.) | Mountain Battr., R.G.A. | Companies (Heavy), R.G.A. | Companies, R.G.A. | Batteries, Native Artillery. | Sapper and Miner and Railway Cos. | British Cavalry Regiments. | Native Cavalry Regiments. | British Infantry Battalions. | Native Infantry Battalions. |
| 1st (Peshawar) Division ...        | ...               | 1                 | ...                                | ...                     | ...                       | ...               | 1                            | 1                                 | ...                        | 4                         | 3                            | 11                          |
| 2nd (Rawalpindi) Division ...      | 2                 | 3                 | 3                                  | 3                       | 2                         | 2                 | 4                            | 5                                 | 2                          | 4                         | 4                            | 11                          |
| 3rd (Lahore) Division ...          | 2                 | 5                 | 1                                  | 2                       | 1                         | 1                 | ...                          | ...                               | 1                          | 5                         | 7                            | 14                          |
| Kohat Brigade ...                  | ...               | ...               | ...                                | ...                     | ...                       | ...               | 2                            | ...                               | ...                        | 1                         | ...                          | 4                           |
| Bannu Brigade ...                  | ...               | ...               | ...                                | ...                     | ...                       | ...               | 1                            | ...                               | ...                        | 1                         | ...                          | 2                           |
| Derajat Brigade ...                | ...               | ...               | ...                                | ...                     | ...                       | ...               | 1                            | ...                               | ...                        | 1                         | ...                          | 3                           |
| 4th (Quetta) Division ...          | ...               | 3                 | 1                                  | 3                       | ...                       | 3                 | ...                          | 2                                 | ...                        | 3                         | 3                            | 9                           |
| 5th (Mhow) Division ...            | 2                 | 9                 | 2                                  | ...                     | 2                         | ...               | ...                          | ...                               | 1                          | 6½                        | 5                            | 21                          |
| 6th (Poona) Division ...           | ...               | 6                 | 1                                  | ...                     | ...                       | 3                 | ...                          | 6                                 | ...                        | 3                         | 5                            | 12                          |
| Aden Brigade ...                   | ...               | ...               | ...                                | ...                     | ...                       | 3                 | ...                          | 1                                 | ...                        | ½                         | 1                            | 2                           |
| 7th (Meerut) Division ...          | 2                 | 4                 | 2                                  | ...                     | 1                         | 4                 | ...                          | 6                                 | 2                          | 4                         | 8                            | 14                          |
| 8th (Lucknow) Division ...         | 1                 | 6                 | ...                                | ...                     | ...                       | 3                 | ...                          | ...                               | 1                          | 4                         | 7                            | 10                          |
| 9th (Secunderabad) Division ...    | 2                 | 8                 | 3                                  | ...                     | ...                       | 1                 | ...                          | 7                                 | 2                          | 3                         | 5                            | 13                          |
| Burma Division ...                 | ...               | ...               | ...                                | ...                     | ...                       | 2                 | 2                            | 1                                 | ...                        | ...                       | 4                            | 7                           |
| In China and the Colonies ...      | ...               | ...               | ...                                | ...                     | ...                       | ...               | ...                          | ...                               | ...                        | ...                       | ...                          | 7                           |
| TOTAL ...                          | 11                | 45                | 13                                 | 8                       | 6                         | 22                | 11                           | 29                                | 9                          | 39½                       | 52                           | 140                         |

The total of the above units in numbers is approximately as follows :—

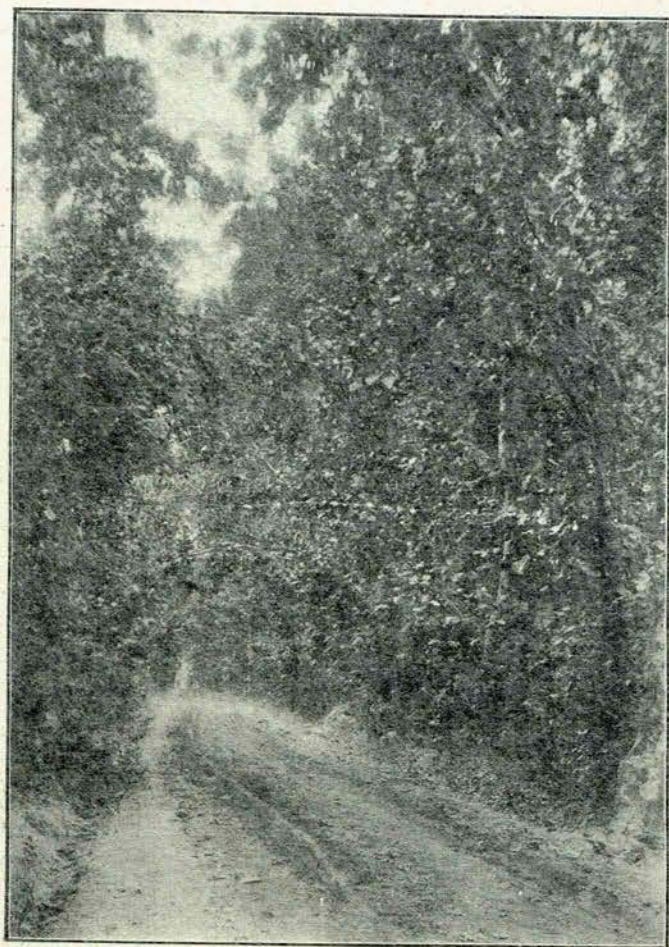
- 4,734 British officers.
- 70,689 British warrant and non-commissioned officers and men.
- 154,485 Native officers, non-commissioned officers and men.
- 40,584 Horses.
- 2,462 Ordnance mules.
- 468 Guns.

In addition to the above, there are the following reserve and auxiliary forces :—

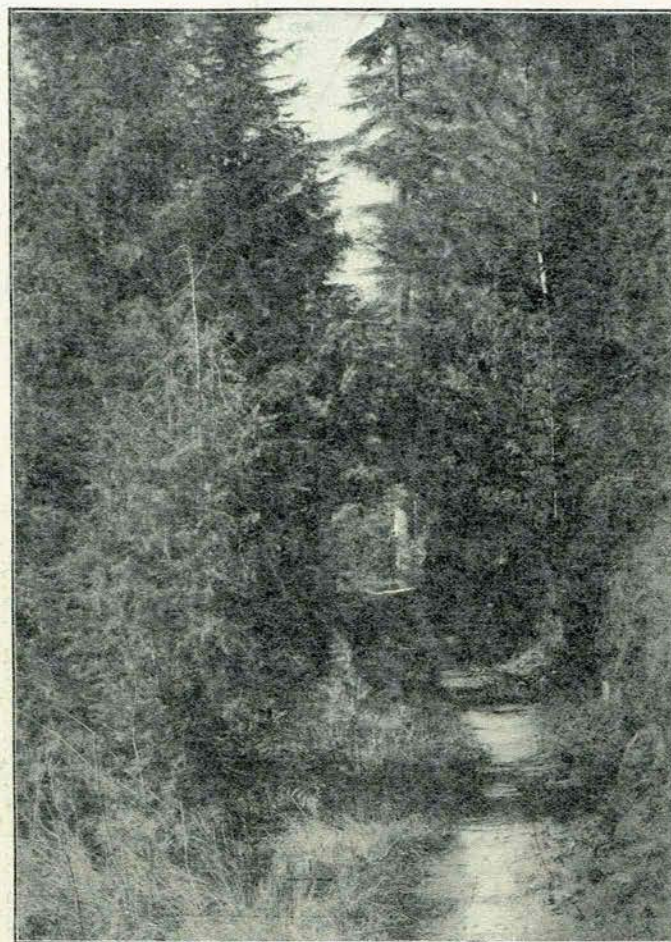
- Indian Army Reserve .. 28,236
- Bodyguards and Escorts .. 357
- Military Police, Militia and Levies .. 34,653
- Imperial Service Troops .. 20,728
- Volunteers .. 32,156







SAL FOREST UNDER FIRE PROTECTION.



MIXED FOREST OF DEODAR AND BLUE PINE, ABOUT 6,000 FEET  
ELEVATION.

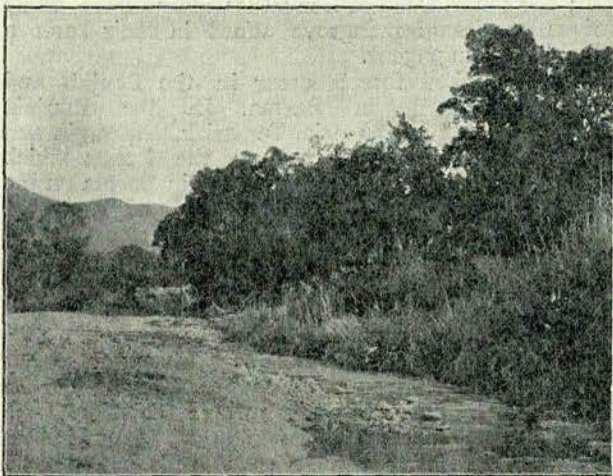


The

## Forest Department of India.

EVEN at the present stage of progress in India the extent and importance of its forests are far from fully recognized. Statistics shew that at the close of 1903-4

Introduction.



A FOREST STREAM.

there were 232,701 square miles of State forest under the charge of the Forest Department, while the forest area owned by Native States or private individuals, probably extended over an additional area of some 120,000 square miles, so that roughly speaking about one-fifth of the Indian Empire is occupied by forest vegetation. It must not, however, be supposed that the whole of this vast area is covered with tree growths; there are indeed tracts of many thousands of miles which yield valuable timber, but in others only scrub jungle grows and in others again the chief yield may consist of grass and of other minor forest produce. But diversified as these forests may be, their existence over large extents of the earth's surface affect a country in two ways, first by their general climate and physical effects, secondly by the economic advantages they confer, and the value of both depends largely on the agricultural and commercial development of the country which possesses them. The hotter and drier a country, the more important becomes the action of forests in equalizing the air and soil temperature, and increasing the relative humidity of the air, in absorbing and retaining the moisture in the soil, and in protecting its surface from erosion by water; while at

the same time not only is timber one of the few commodities which is increasing in value all over the world, but the greater the prosperity of a country, the greater the demand for forest produce, and the higher the price it commands. In India where agriculture is the main industry, the value of the climatic and physical effects of forests can hardly be overrated, while their economic importance is proved by the fact that the supply of cheap or free timber and fuel has hitherto been adequate for the requirements of the people, while permitting of the export of the more valuable woods; thereby bringing wealth both to the Government Exchequer and to the private individual.

But the economic value of the forests, great as this may be, dwindles into insignificance when compared with the value of their physical effects. The Englishman living in his island home in a moist atmosphere is secure from the effects of drought and uninterested in the investigations which have been steadily proceeding in continental countries to ascertain the influence of forests in storing up the aqueous precipitations and distributing them over the country throughout the year. He is, as a rule, unaware of the important facts that have been established in this regard, and which have been accepted in practice by the Governments of those countries not so favourably situated as his own. Thus it is explained that in India also the importance of this subject has frequently been overlooked, so that at this time complaints are not uncommon of the irregularity of the water-supply, of local scarcity of water, and even of the silting up of once navigable rivers, while disastrous floods become more and more common.

India is blessed with seasonal rainfall, which is only to a comparatively slight degree dependent on the configuration of the ground or in its surface covering, but the importance of retaining the available moisture for use throughout the dry months of the year is paramount; and the fact remains that forest-clad areas are capable of storing up the aqueous deposits and of giving off their moisture gradually, while on bare denuded slopes the falling rain passes off rapidly into the main rivers, causing harm by erosion and by floods, instead of being utilized for the beneficial irrigation of the arable lands. Thus may ignorance of facts, or failure to profit by knowledge, turn a blessing into a curse, and the destruction of nature's reservoirs necessitate the costly construction of others, artificial, but infinitely less effective.



The forests of the Indian Empire are situated between the 8th and 35th degree of north latitude, and flourish from sea-level up to an elevation of 12,000 ft. and even higher; they lie between the 62nd and 102nd degrees of east longitude, and within these limits 4,750 woody plants are recorded, of which 2,513 are trees, 1,430 are shrubs, and 807 are climbers, without taking into consideration other forms of forest vegetation, such as grasses, etc., which may yield valuable commercial materials. The classification of forest growth by botanical zones, however correct and interesting this may be, is hardly necessary in an article which aims at placing before the reader an accurate general impression of the forests. Some trees, it is true, are characteristic of Northern or Southern India, but others are richly distributed over the whole country, so that latitude alone will not suffice as a basis for the classification of the forest vegetation. Of other influences the rainfall is perhaps the most important, for its amount and distribution, regulated by the physical features of the locality as well as by its geographical position, decide to a great extent the character of the forest growth. It is simpler, therefore, to divide the country into zones as follows: the wet with over 75" rainfall, the moist with over 50", the intermediate with over 30", and the dry with less than that amount. Within these zones the forests may be classified as Evergreen, Deciduous, and Dry, each with a typical vegetation, which, however, is seldom clearly defined by area, but merges insensibly into the neighbouring class; while where elevation tides and inundations have a still more marked effect than atmospheric precipitations, Alpine, Tidal and Riparian forests complete a sufficiently distinctive list.

The evergreen forests are found chiefly in the West Coast of India, in Burma, in the Andamans, and also in the sub-Himalayan tracts to the East. Characteristic of these forests are Terminalia, Cedrela, Dipterocarpus, Autocarpus, Calophyllum and other large trees, while teak, iron-wood, padouk and other valuable species often of very superior growth, occur sparsely scattered through the evergreen forests, tending in some cases to prove the invading power of the evergreen upon the deciduous species. The deciduous forests are the most valuable in India. They extend from the Himalayas throughout the Peninsula wherever the rainfall is sufficient, and occur in Burma where they comprise the extensive teak forests in that Province, yielding the major portion of the forest revenue of India. Next in importance to the teak comes the "Sâl" which is found in the United Provinces, in Central India, and extending through Bengal, crosses the Brahmaputra River into Assam. The timber is entirely consumed in the country. Other valuable woods in the deciduous forests are the iron-wood, red sanders, rose-wood and ebony, while Terminalia, Anogeissus, Acacia, Sterculia and other important genera are well represented. The dry forests occur chiefly in the Punjab and Central India. Their produce is of local importance, consisting of Acacia, Sterculia, Butea, Albizzia, Melia, Dalbergia and

The Classification of Indian Forests.

(a) The Evergreen Forests.

(b) The Deciduous Forests.

(c) The Dry Forests.

others, while in Baluchistan Juniperus, Pistacia and Olea, represent the chief forest growths.

The alpine forests comprise the great coniferous forests of India, of which in the West the most important tree is the Deodar or Cedar of Lebanon. Here also are found three pines, two silver firs, the spruce, cypress and yew, while oaks, maples, birch, holly, elder, box, horse-chestnut and other trees of the same genera as the chief trees of Europe are frequent. In the Eastern Himalayas are found spruce, fir, larch, yew, juniper, and both in the East and the West, the vegetation as it reaches lower elevations gradually passes into the deciduous or evergreen forests at the base of the hills.

The tidal forests are found in the Northern Coast districts of Madras, on the coast of Burma and in the Sunderbans. They contain valuable produce chiefly of local importance; the sundri wood of Bengal is widely known, while various species of mangrove afford in their bark a valuable tanning agent.

The riparian forests occur in the Punjab and in Burma. In the Punjab, Acacia, Tamarisk, Dalbergia and Poplar form the forests which spring from the sandy riversides, while in Burma on the muddy soil which borders the rivers and estuaries, Anogeissus, Mangifera, Eugenia and Elæocarpus of various species are found.

For the purpose of organization and management the State forests of British India are classified as, reserved, protected, and unclassified or public forest land, the legal status of each class being defined in Forest Law after a prescribed procedure.

The reserves comprise those areas which, in the interests of the State, it is intended to maintain for all time as forests, either with the object of assuring the water-supply of a district by protecting the catchment area of its watercourses, of affording a constant supply of produce to its inhabitants, or for other reasons. The process of reservation is marked by a careful enquiry, held by a specially appointed officer, into the rights of the surrounding population, and these, if existent, are either recorded permanently or extinguished by purchase or exchange. Thus in some cases the recorded rights in a reserve may be so numerous as to absorb the whole of its outturn, leaving the State to defray the expenditure on its maintenance with the object of reaping the indirect advantages conferred by the preservation of the forest. The area included in reserved forests amounted in 1903-4 to 91,567 square miles.

Protected forests are either those which it is intended in the near future to bring under the more stringent law applied to reserves, or of which the public importance is not so great as to justify this procedure. The enquiry into rights is here not so detailed, and as a rule it is considered sufficient to protect the more valuable species from maltreatment or annihilation by the surrounding population. The area comprised in protected forests amounted in 1903-4 to 9,865 square miles.

(d) The Alpine Forests.

(e) The Tidal Forests.

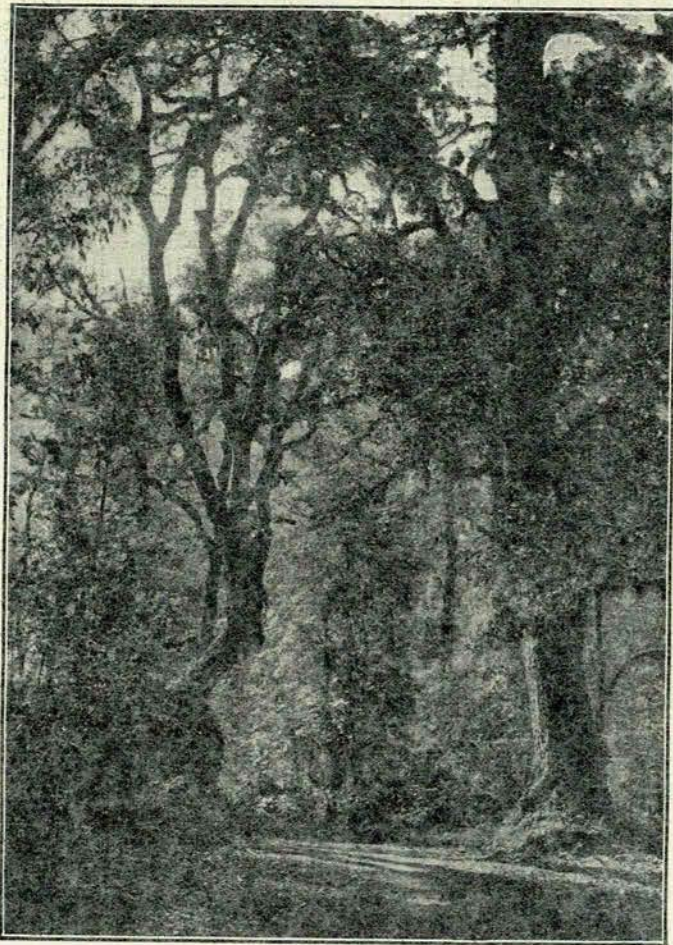
(f) The Riparian Forests.

The organization of Indian Forests.

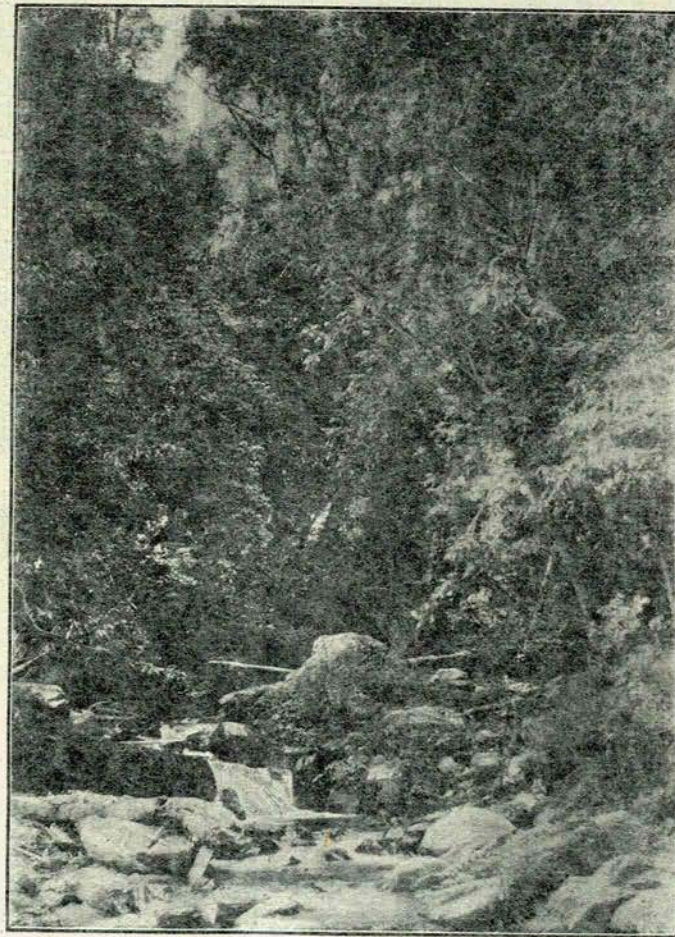
(a) Reserves.

(b) Protected Forests.





AN OAK FOREST, ABOUT 8,000 FEET ELEVATION.



A WELL-WOODED CATCHMENT BASIN.





Lastly come into consideration the unclassified forests, or public forest lands, which contain produce in excess of the requirements of the people, and which are at present not so accessible as to permit of very special protection. These areas are naturally largest in Provinces, such as Assam and Burma, where facilities for export have not been provided. The area of public forest lands was in 1903-4, 131,269 square miles.

All these types of forests are liable to alteration in classification according to the progress made in the development of the country. In the Central Provinces, for example, the area of reserves is being gradually reduced to make room for cultivation; in Burma, on the other hand, the area of reserves is constantly increased by excision from public forest lands, while the tendency in most Provinces is to transform protected into reserved forests as prosperity by increasing, raises the demand for, and value of, forest produce. In no case, however, is any classification of forest land permitted without the fullest enquiry into the rights of the people, and these rights may, moreover, be supplemented by the Local Government by the grant of privileges in free timber, grazing or other produce.

When forests have been classified and brought under the Forest Law, they come under the charge of the officers of the department, who are responsible for their future administration in accordance with the declared policy of Government. This policy may be set forth in a few words, namely, that the State forests are to be managed, first, with a view to the welfare of the country as a whole; second, with due regard to the welfare of the inhabitants in their vicinity, and throughout with the object of full utilization of all the products which the area can supply. But in order to effectively carry out this policy a fully equipped service is necessary, and the origin and constitution of this service must now be explained.

It was at the commencement of the 19th century that the importance of the teak forests of Malabar first attracted the attention of the British Government, and that their denudation gave rise to fears that there might occur a deficiency in material for the construction of fleets or of public buildings; but though teak was created a Government monopoly and desultory efforts were made to protect the forests, it was not till 1847 that Drs. Cleghorn and Watson were appointed Conservators of Forests in Madras and Bombay. Five years later the Province of Pegu was annexed and the value of the teak forests at once attracted attention, resulting in the appointment of Dr. (now Sir Dietrich) Brandis as Conservator, and the creation of a new State Department. That department was of necessity first recruited by officers drawn from various other services, whose tastes led them to adopt a forest life; but some years later professional knowledge was provided by the appointment of two officers from Germany, Drs. Shlich and Ribbentrop, both of whom rose to the Directorship of the department, while the former has for 20 years supervised, first at Coopers Hill and then at Oxford, the technical

education of the candidates appointed by the Secretary of State to the Indian Forest Service.

As now constituted, that service consists of three branches, the Imperial recruited in England after two years' training at Oxford, followed by a year spent in the continental forests; the Provincial recruited in India, and whose members for the most part have attended the curriculum of the Imperial Forest College at Dehra Dun, where a two years' course is given; and the Subordinate Executive Establishment manned by local officers. The members of the two latter services are not as a rule transferred outside the Province of their recruitment. Imperial Officers are, however, liable for service throughout the Indian Empire.

Subject to the general policy which has been already set forth, forest administration rests with the Local Governments. There is an Inspector-General who advises the Government of India in forest matters, and who tours through the Provincial forests in order to become acquainted with local conditions. There are Chief Conservators in Provinces where more than two forest circles exist, and Conservators who form the link between the Controlling Staff and the Provincial Governments. Below them are Deputy and Assistant Conservators, who hold territorial charges coincident with Revenue Districts. Members of the Provincial Service are either in charge of minor divisions or employed on various special works, while the Subordinate Executive Establishment is distributed throughout the forest lists on protective and other work.

The staff of the department at this time may be held to consist of an Inspector-General and 20 administrative officers, with 164 members of the Controlling Staff, all in the Imperial Branch of the Service. The Provincial Service consists of 128 officers, while the Subordinate Executive Staff shows a strength of 9,800 officials, which is augmented by a temporary establishment of about one-half that strength.

The salaries drawn by these officers are roughly as follows: in the Subordinate Executive Establishment from Rs. 7 to 150 per month; in the Provincial Service from Rs. 200 to Rs. 600 per month, and in the Imperial Service from Rs. 350 to Rs. 2,500 per month.

In India agriculture is so bound up with forestry that a most intimate connection must exist between Forest and Revenue officials. The Divisional Forest Officer is thus the Assistant to the Collector, while the Conservator and Commissioner consult on all forest matters affecting the welfare of the people. With regard to the forests in his charge, the first duty of the Forest Officer is to bring the area into full bearing of that product for which there is a local demand or an outside market, and to do this certain steps have to be taken to secure continuity of working over a prolonged period.

When Forest Settlement is complete, it must be followed by permanent demarcation and detailed survey; next comes the decision as to the produce which the area is to yield, which may be timber for export, small building material or fuel for local industries, or even the provision of grazing for the cattle of the rightholders; one or all of these may be demanded from the same area.

(c) Public Forest Lands,

The Forest Policy of the Government,

Constitution of the Forest Service,

The duties of the Forest Officer,

(a) Demarcation and survey.





The kind of produce and the method of its cultivation are prescribed in a working plan which is sanctioned by the

(b) Working plans.

Government of India and may not be altered without their approval, and with this plan as a guide to the silvicultural treatment of his forests, the Divisional Officer proceeds to the protection of the area and to the exploitation and disposal of its produce.

The protection of the forest against fire is one of his most arduous and important duties, for in the deciduous and

(c) Fire Conservancy.

alpine forests of India, the continuance of the forest by means of natural regeneration as well as the growth of sound timber is impossible unless this is successfully carried out. In the moist and evergreen forests protection is not so necessary, though even here the exclusion of fires has a beneficial effect in certain conditions. There were in 1903-04, 38,000 square miles of State reserves under special protection, involving the State in an expenditure of from Rs. 5 to 40 per square mile in the preparation of fire lines and in establishment. The percentage of success varies much with the season. Winter rain followed by an early monsoon will render the operations perhaps entirely successful, but in more adverse conditions there may be serious losses. Incendiarism is rare, and the good will of the people is an important factor in successful operations. In the year 1903-04 some 5,500 cases of forest fires occurred, and about 3,000 square miles of forest were burnt.

Protection against man and cattle is an easier task, and depends to a great extent

(d) Protection against Man and Cattle.

on the strength and spirit of the subordinate staff. It is now universally admitted that forest conservancy in India depends greatly on the attitude of the surrounding population, and endeavours are always made to interest the people in the forests by the offer of remunerative work and by rewarding them for any aid they may afford, by due consideration of their welfare, and by generosity in time of stress or need. In spite of sympathetic treatment, however, forest offences will occur and cattle trespass will continue. In 1903-04 the number of the former was recorded at 51,000, while as 13 million head of cattle grazed in the State forests during the year, it is not surprising that trespass was frequent.

The exploitation of the forest will next occupy the attention of the Forest Officer.

(e) Exploitation.

It was in the past, and still is to some extent in the present, the duty of the Department to create a market for its products and convey them thereto. But that necessity is happily fast disappearing for the strength of the service has never been based on an assumption that lumbering was a part of its duties, and the withdrawal of officers from work of a more professional nature has often resulted in hindering the improvement of the forest capital. At the present time the system prevails of selling standing timber and leasing the minor forest produce or issuing passes for its collection, while grazing fees are either collected by assessment on a community or, in the case of migratory herds, by payment on entering the forest.

Remunerative forest management in India is rarely

Communications and Buildings.

possible without a considerable outlay in rendering the forests accessible. Thirty years ago, in the absence of railways, roads, tramways and slides, water carriage was practically the only means of handling bulky forest produce without excessive expenditure. Since then, however, very large sums have been spent on communications, with the result that carriage has become easier and cheaper, while it now pays to remove much material that was formerly neglected. At the present time merchants in forest produce often prefer railway carriage even where transit by water is to hand, as the extra cost is more than covered by the rapidity with which the produce reaches the market; while in the hills, forest areas which only a few years ago were classified as inaccessible are now yielding their harvest by means of timber shoots, wet slides, and sledge roads. The Forest Officer is responsible therefore for opening out his forests by suitable communications with established trade routes, the more so that it has been proved by experience that this is one of the most remunerative forms of expenditure. During the year 1903-04 the cost of the upkeep and construction of roads and bridges amounted to Rs. 1,84,000.

The provision of suitable shelter for the Forest Staff is also a matter of primary importance. The Forest Officer has been in the past, and still is in some backward Provinces, the pioneer of civilization; he is throughout his service exposed to inconveniences and dangers which result in a high mortality rate. The improvement of communications brings him more into touch with the outside world and its amenities, but unless protected against climatic influences, he soon loses health and vigor. During the past few years greater activity has been shown in providing for the proper accommodation of officers of all branches of the service, but very much still remains to be done to obviate unnecessary exposure to the summer heat or autumn rain. The expenditure on upkeep and construction of buildings by the Forest Department in 1903-04 was Rs. 4,69,000.

The popular idea of the life of a Forest Officer in

The Regeneration of the Forest.

India is that he is engaged in sowing and planting trees. It has been shown that his work has a wider scope, that it may influence the welfare of a country, and that whole communities may be dependent for their comfort upon the success of his management. The theory of Indian forestry is similar to that recognized in Western countries, namely, that the forest stock represents the capital, and its yield the interest on that capital. When the forests of India came under the control of the British Government, it was speedily found that this theory, if known, had not been practised, but that the forest capital had been encroached upon to such an extent that the yearly interest had diminished or disappeared. During the last 40 years the work of the Department has consisted in the endeavour to restore the forests to a more normal condition, and to build up the forest capital, so that a full and permanent supply of produce might be available for the public. There is, indeed, good



reason to believe that in many parts of India the entire denudation of hills and other lands has resulted in completely altering those conditions under which, in former times, the inhabitants lived in comfort; and in such localities extensive works of afforestation by means of sowings and plantings would without doubt prove of the greatest benefit: but in India forestry has not yet advanced beyond the maintenance of existing forests, and here happily conditions can, as a rule, be regulated, so as to induce the natural regeneration of a young crop in order to replace the mature trees which are systematically removed.

To bring the ruined forests of India into a condition where natural reproduction is assured, and where the soil is covered by a full crop of trees of all ages, has been no easy task, nor indeed is this task complete at the present time. To remove the hollow and unsound stems discarded as valueless when the forests were being ravaged in former times, to suppress the inferior species, to control the luxuriance of the growth of climbers and underwood, and to ensure the germination of the fallen seed by keeping out fires and cattle has been the work of the past, which will be amply repaid in the future by a fuller harvest of forest produce and a largely increased State revenue. The preliminary treatment to which the forests are subjected in order to bring them into a normal condition is that of improvement fellings, a provisional operation with the object of favouring the growth of the principal species by the removal of those stems which hinder its progress. The result of carrying out these fellings over large areas is often to flood the market with a large amount of inferior material, much of which is useless for any purpose. But these fellings also yield railway sleepers and small scantlings, so that though in some cases they may be costly, in others, they produce a considerable revenue.

Following on the completion of the improvement fellings, whose sequence should have been arranged so that as far as possible the area under the various age classes should be approximately equal, a regular system of treatment is prescribed. In the deciduous forests, the selection, or the coppice method, is generally adopted according to whether large or small timber is in demand. The selection and removal of mature trees scattered throughout the felling area causes but slight interference with the forest canopy, insufficient to stimulate a rank growth of grass which would choke the seedlings, but sufficient to afford light for the germination of the seed. Where fuel is in demand the system of coppice is adopted, the crop of the future growing from the parent stools, and in order to gradually renew the forest stock "standards" or isolated stems are left scattered throughout the felling areas, so that their seed may produce new stems to replace the coppice stools which ultimately may become exhausted.

In the coniferous forests a system of regeneration fellings is often practised, whereby the standing crop is renewed by a series of successive fellings spread over a considerable period, the new growth replacing the mature trees as these are gradually removed.

Variations of these methods may be applied to the conditions of given localities, but the principle remains the same, that regeneration whether by seed or by stool

shoots should be left to nature and aided, but not performed, by the Forest Officer.

At the present time the yield of the State forests, though steadily increasing, forms only a small portion of what the forests should give were they in a normal condition and in full bearing. The maltreatment of centuries cannot be remedied in a few years, but when the timber trees which sprang from seed in the infancy of the Department shall have matured, the full value of the State forests will be better appreciated. Meanwhile, variations in the outturn of the forest due to local conditions are not infrequent. A failure of the monsoon rains at once influences the yield of forest produce, the floating streams run dry, and the demand for timber ceases when there is scarcity in the land.

The yield of the Indian forests is classified as major, including timber and fuel, and minor, including all other produce, save bamboos; and the average outturn of the last two years has amounted to 239,408,483 c.ft. of timber and fuel, Rs. 45,45,231 worth of minor produce, and 260,843,649 bamboos, most of which was consumed locally.

Of the timbers the most valuable are teak, sal, deodar, sissoo, ebony and rosewood, blackwood, cutch, sandal, babul, red sanders, iron-wood and padouk, but there are many others which have only to be known to be appreciated, though in some cases the supply is too limited to rouse the interest of the home market. The exports of forest produce from India during the year 1903-04 were, however, of great importance. Teak to the value of 91½ lakhs of rupees, sandal and other ornamental woods estimated at 12 lakhs, myrabolams to the amount of 42 lakhs, cutch and gambier nearly 20 lakhs worth, and caoutchouc 3½ lakhs worth were registered as having been shipped abroad, while 272 lakhs worth of lac were also exported. Not all of these valuable products came from the State forests; for instance, Mysore possesses the largest area under sandal, while lac, though originally a forest product, is largely cultivated in private estates and on field crops where protection and supervision are more easy than on trees scattered throughout remote jungles; the value of, and demand for, this product would appear to justify further efforts being made for the wider propagation of the lac insect in State forests.

It has before been remarked that in the constitution of State forests, the greatest care is taken to prevent any infringement of the vested rights of the people, and that Provincial Governments are at liberty to grant those resident in the vicinity of the forests privileges as regards the enjoyment of their products. But in spite of this liberal policy the introduction of restrictions on the liberty of the individual will always at first be resented until custom has made the new conditions better known. The opposition to the introduction of forest conservancy in India, which was at first intense, is still shown, though in a much modified form, and is now perhaps due more to the misdemeanours of the lower subordinates than to any other cause. The remedy is to increase supervision over the executive staff, though considering the vast extent of country to be controlled, this will always be a

Free Grants of Forest  
Produce.





difficult matter. During the year 1903-04 four million c. ft. of timber and 53½ million c. ft. of fuel, together with 13½ million bamboos and 11½ lakhs of rupees worth of minor forest produce, were distributed to right-holders and privileged persons, and in addition very valuable concessions were made for works of public utility, such as bridges, religious buildings, schools, rest-houses, etc., as well as for rebuilding villages which had been destroyed by fire. There is reason to hope that after the lapse of comparatively few years, at least the direct advantages of forest conservancy will be apparent to the people, for the destruction of forests proceeds with marvellous rapidity, and in many cases the coming generation would not have benefited by their present proximity to the forests, had not the Government taken the necessary steps to maintain the tree growth.

The question of grazing has for long been in India of great importance, and the restrictions thereon necessary for the maintenance of the forest have perhaps been amongst the most opposed and criticised of the actions of the Forest Department.

In those districts which possess no forest lands the cattle are stall fed, are not kept in excess of requirements, and are as a rule somewhat carefully bred. It is different in other localities where large areas of forest land are available. Here, the peasantry maintain large herds of forest-grazed cattle which are augmented by migratory herds whose owners have no interest either in the forest or in the land. Such cattle are inferior in every respect, and die by thousands in time of drought, yet sustenance must, if possible, be provided for them, and no entirely prohibitory tax can be imposed on their grazing. More stringent rules are enforced in the case of sheep and goats than in that of horned cattle, but even so, immense damage is done from the snow level to the sea by the intrusion of cattle which can hardly be said to be necessary to the domestic welfare of the people or even of economic value to the country. Only 16 per cent of the large area of State forests was in 1903-04 closed entirely to grazing, leaving 195,000 square miles open for this purpose, though of this area some 24,000 square miles were closed to sheep and goats; it cannot therefore be asserted that the restrictions imposed by Government in this direction were so excessive as to unduly interfere with the traditions of the people.

The financial results of Indian forest management afford a popular method of estimating the importance of the forests, but, as before pointed out, the indirect benefits they confer cannot be gauged by the cash revenues they yield. The increase, however, in these revenues has been remarkable, and is all the more welcome, in that means are thereby afforded by judicious expenditure for the improvement of the forest capital and for an increased outturn. The average revenue and surplus of the last 30 years is set forth in the statement below in thousands of rupees :—

|                  | Gross Revenue. | Surplus. |
|------------------|----------------|----------|
| 1873-4 to 1882-3 | 6,723          | 224      |
| 1882-3 to 1892-3 | 15,186         | 6,925    |
| 1892-3 to 1902-3 | 19,023         | 8,180    |
| 1902-3           | 22,217         | 10,050   |

It will be observed that the proportion of gross revenue to expenditure varies between 66 and 55 per cent and has remained at about the latter figure for some time.

The expansion of outturn and revenue in the future must be dependent on successful scientific management, for the preparatory operations for the improvement of the forest are, over large areas, within measurable distance of completion, and it is certain that the results of future working will far surpass those of the past.

With a large area under management and a comparatively small staff, the work of the Forest Department must chiefly be confined to the tending of the natural forests, but arboriculture and plantations have not been entirely neglected. For many years "taungya" plantations have been extended in Burma, where there are now nearly 100 square miles under teak and cutch. This system of cultivation where the seeds of forest trees are sown with field crops in jungle clearings has been successful to a certain extent, but the work of keeping the plantations clear of undergrowth and thinning them, is sometimes beyond the powers of the local staff and of the scanty labour supply of the country. In Madras, at Nilambur, teak plantations have, on the other hand, proved to be a remunerative investment.

Experiments with exotic trees are being constantly carried out, but, with the exception perhaps of the eucalyptus, the results have not influenced the forest wealth of the country. On the other hand, the distribution to other countries of the seed of Indian forest trees is largely increasing. In Africa the deodar has been found to flourish in the Transvaal, teak and bamboo succeeds on the East Coast, while Cape Colony absorbs as much seed of the more valuable species as can be supplied. There are also standing indents for large quantities of bamboo seed which is available only at long intervals, but which it is hoped may, in successful plantations later on, influence the economic wealth of some of our Colonies.

With regard to rubber plantations the Department has had, as in many other instances, to assume the risk of proving that a new industry may be remunerative. The *Ficus Elastica* plantations of Assam and those under *Hoevea*, in Burma, are now coming into bearing and have proved at least suitability of soil and climate for these species. Their commercial success also is proved by the expression of disapprobation of the policy of a Government Department in conducting commercial undertakings and by offer of purchase, the critics being unmindful of the necessity and expense of experimental work which has been the means of creating a new and important industry in India.

Besides these extensive plantations and experiments, many forest gardens are kept up whence distribution of young trees free or at a nominal price proceeds. As an example, the gardens at Chaubattia may be mentioned, which have been the means of the introduction of the best varieties of English fruits into the Himalayas and from which eucalyptus and indigenous forest trees are distributed.





It has been mentioned that the work of the Forest Department in India has not yet extended to the afforestation of large areas, but this important work cannot be much longer delayed, and indeed has in some provinces already commenced. The scarcity of fuel in the Punjab, caused by the success of the large colonization schemes, is necessitating the creation of extensive irrigated plantations, while the high price of fuel in the vicinity of important European settlements, both in the hills and plains, points to the advisability of planting quick-growing species in a systematic manner, in order to remove this inconvenience. In a suitable climate with a sufficient rainfall, or where irrigation is available, the value of eucalyptus and wattle as fuel cannot be overlooked.

It has before been mentioned that the technical education of the officers of the Imperial Branch of the Forest Service is now carried out at Oxford, and that of the other branches of the Service at Dehra Dun. The Forest School at Dehra Dun, which has been in existence for some 25 years, undertook the training of candidates for the Subordinate Executive Staff, whose members were eligible for promotion into the Provincial Service. But the progress of the Department and the increased demands on the professional Forest Officer were prohibitive to a continuance of this system. The school has now been raised to the status of a college, and a Research Institute has been created with a view to the study of scientific and economic problems, on the solution of which future progress must to a great extent depend. The College, when equipped, will receive forest students from all parts of India, and candidates from tropical colonies will probably utilize it to a greater extent than formerly, for with the revival of forestry in almost every country there should be no falling off in the acceptance of a free technical education of the highest order which is now offered by the Government of India.

The members of the Research Institute will also be fully employed in investigations which have been too long postponed. The richer the forest and the less the admixture of inferior species, the greater the danger to which it is exposed from insect and fungoid pests, the intenser its treatment and the more detailed the knowledge necessary to maintain it in a healthy condition. So that as progress is made in the organization of the forest crop with a view to deriving the greatest possible benefit from the forest areas, the greater becomes the need of scientific research and of its application to practical forestry.

The influence of the forest policy of the Government of India has been effective in attracting the attention of the rulers of Native States to the importance and value of their forests, and this is not extraordinary when they have seen instances where their forest revenues have increased under the supervision of a deputed officer of the Forest Department by ten times within as many years, so that now in some of the smaller States the forests afford the chief revenue of the country. Cash payments cannot be overlooked by the most unobservant, but the indirect value of the forests has now also

been recognized by the more enlightened of the Native Princes, and this is a point of the utmost importance to the interests of the Indian Empire. The catchment areas of the streams which go to make up the important rivers of Upper India lie within native territory, and the same is the case, though perhaps in a less marked degree, in Central and Southern India. If these catchment areas were denuded of forest, if the hill slopes were laid bare by injudicious fellings, the great irrigation works of the Empire would at once suffer from an inadequate supply of water at some seasons and from devastating floods at others. The value of timber has risen and must continue to rise with greater demand and improved communications, and the temptation to realize the forest capital by the individual must be always present. An inculcation of the elementary principles of the influence of forests on the water-supply is therefore the first step towards ensuring that those influences shall not be slighted in the future.

The forests of Kashmir extend over a large tract of country from about 14,000 feet elevation to the plains of the Punjab; alpine, deciduous and dry forest being represented. The reserved forest area was, in 1903-04, about 2,650 square miles, and they yielded a net revenue of nearly 8 lakhs of rupees. The Conservator is an officer deputed from the Imperial Forest Staff, assisted by deputed officers from the Indian Provincial Forest and Revenue Services and by a locally recruited staff. The forests are managed on the Indian system, and considerable progress has been made in their organization. They are of particular interest to the British administration, as they clothe the catchment areas of the Indus, Jhelam, and Chenab Rivers.

These forests contain valuable timber of deodar and pine, and are under the supervision of the local forest authorities who, while avoiding unnecessary interference, see that the forests are maintained and improved, the revenue being collected and paid to the owners.

The most important of these are in the Tehri State, and form the catchment area of the Ganges and Jamna Rivers. The former have passed from the control of the Forest Department, but the latter are still managed by its officers, and bring in a handsome net revenue of over one lakh of rupees annually to the owner.

The forests of Mysore extend over an area of about 4,200 square miles, and are in charge of a Conservator deputed from the Indian Provincial Forest Service. The system of management is based on that adopted in British India, and the staff is locally recruited. The forest revenue amounted in 1903-04 to about 5½ lakhs of rupees and the surplus to about 3 lakhs. Sandalwood is a specialty in this State, and brings in a revenue of about 10 lakhs of rupees annually, the operations being conducted by the Forest Department. But serious damage has occurred through the ravages of the "spike" disease during the past few years, and full investigation into its cause is now about to be made.

The Forests of Native States.

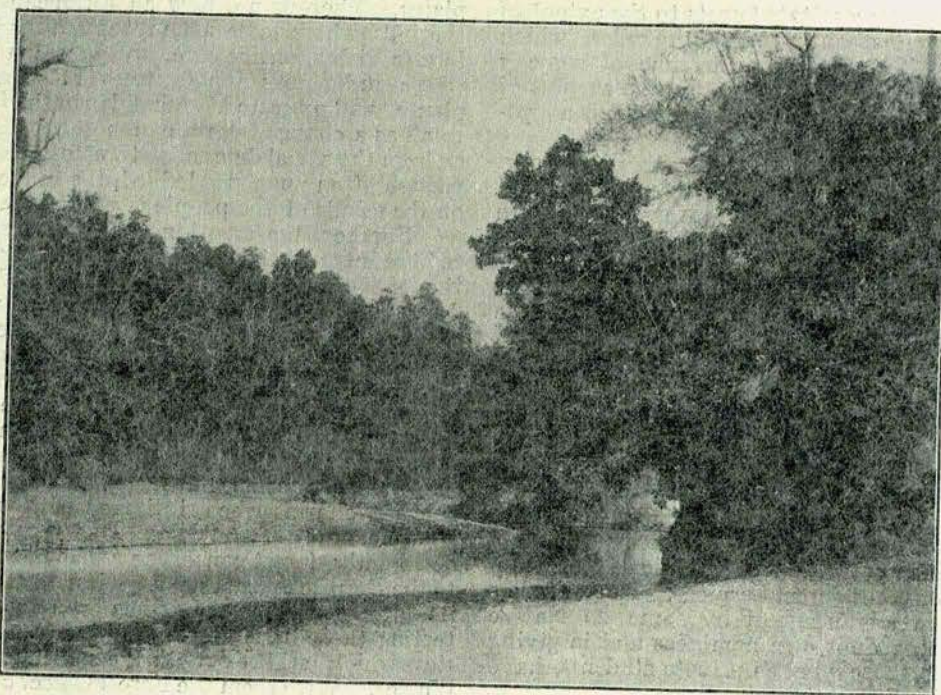
(a) The Forests of Jammu and Kashmir.

(b) The Forests of the Hill States of the Punjab.

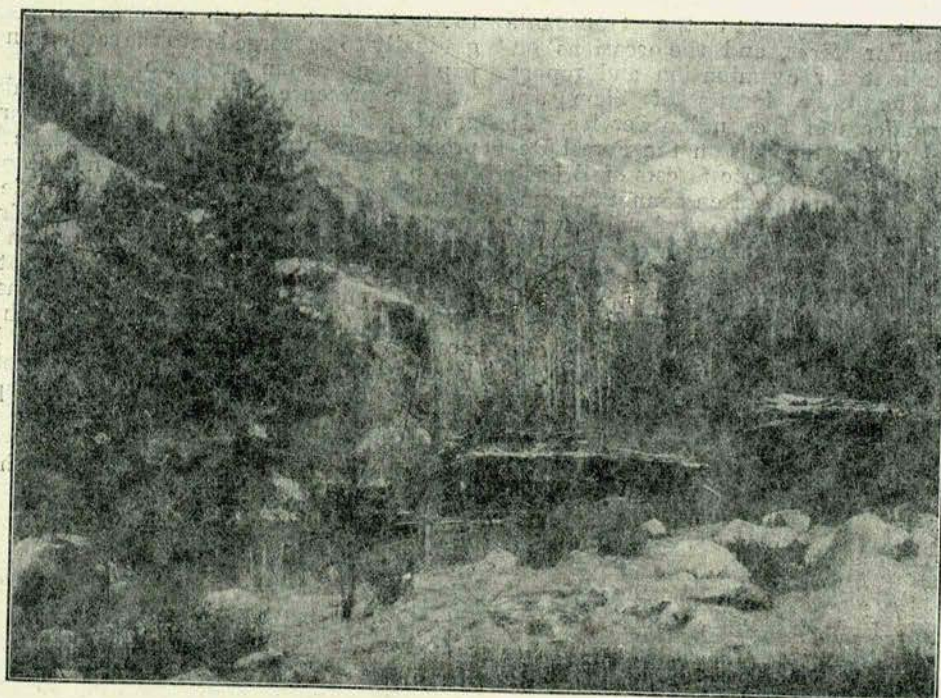
(c) The Hill Forests of the United Provinces.

(d) The Forests of Mysore.





TYPICAL SUBMONTANE FOREST.



FORESTS OF PROTECTION, ABOUT 10,000 FEET ELEVATION.



Travancore possesses State forests to the extent of about 2,500 square miles, which bring in a revenue of some 7 lakhs of rupees and a surplus of about 2 lakhs. The system of management is adopted from that in force in British India.

- (e) The Forests of Travancore. Other Native States, such as Jodhpur, Bhawalpur, Patiala, etc., have organized Forest Departments to supervise the management of their forest

lands and conduct their operations on the enlightened principles of the West. Of great interest are the forests of Central India, belonging to a number of the smaller Native States, which are not only valuable because they supply produce, but of vital importance in clothing the dry hills, thereby assisting in the maintenance of a constant water-supply. These forests have of late years come under systematic management.

It will thus be evident that the Government not only encourages in theory and by practice the spread of scientific forestry, but also materially aids in its application by the loan of trained officers to Native States and by the offer of a free technical education to candidates for their Forest Services. This offer has been freely taken advantage of by some 20 Native States in training their own nominees and in giving suitable posts to those who, as private students, have passed out of the Forest School.

The importance of the forests has been recognized in many of the colonies of the British Empire. Officers deputed from the Indian Forest Services, or who have been transferred to the Colonial Governments, manage the forests in Ceylon, the Straits Settlements, Southern Nigeria, British East Africa, Cape Colony and the Transvaal. Trinidad has a similar officer, and the occasions on which officers are lent for examination and report are numerous. The large forests of Siam are also managed by officers of the Indian Service. It will be seen therefore that the calls on the Forest Department for work outside the State forests of British India are numerous, and indeed often cannot be complied with owing to the paucity of the staff which is unable to cope with the rapidly increasing area entrusted to their care.

In the preceding paragraphs the influence of forests upon the country and the means employed to take full advantage of their benefits have been set forth, but there are yet other aspects of the subject which are of appreciable, though of minor importance. That the beauty of the Indian woodlands is not ignored is proved by the ever-increasing number of visitors, in search of relaxation and sport, to the forests of the hills and

plains. There is not now an European settlement in the hills where some attempt is not made to tend the forests with scientific care, not a station on the plains where indigenous jungle trees may not be found planted and protected. A holiday in the forests appeals to all as a change from the monotony of an official life or from the social demands of western civilization and, though often unacknowledged, the influence of forests on the minds of the people is always for good.

Further, the creation of State forests has permitted the introduction of rules preventing the annihilation of the interesting fauna of the Empire. Quietude during the breeding season, sanctuaries uncontaminated by man, a period of safety from hunters, and a limitation in the number of animals which may be killed, all these restrictions are necessary in view of the keenness of the modern sportsman and the superiority of modern weapons. The rules have been imposed with moderation and foresight, for, in the absence of animal life, a forest becomes a desert, and it loses one of its chiefest charms when intimacy with wild life is impossible.

Lastly, forest conservancy has not only preserved to the Empire at least a part of its forest wealth and of its interesting fauna, but has been the means of protecting those little known and independent communities which still exist in the solitudes of the Indian jungles. With them the Forest Officer comes into close connection and finds always something to interest and often something to admire. In the absence of their confidence and assistance his solitary work cannot be successful, and his sympathetic knowledge of their customs and requirements assures to them a continuance of the simple livelihood to which they have been accustomed for ages, so that they are afforded opportunity to slowly absorb western civilization and thus gradually to be merged into the settled and prosperous population surrounding them.

The presence of man is always inimical to forest growth; when civilized, he destroys it for his personal profit or advantage; when uncivilized, he fights against its oppression, so that he may not be overwhelmed. The insignificant clearing in the jungle is the first and surest sign that man is warring against the forces of nature, his strength lies in number, and his weapon of offence is fire, so that at last there is not a hill range in the Empire which does not bear the signs of conquest, and hardly a level plain which does not show either the vestiges of former forest growth, or at least possess ligends to bear witness to its former existence. With an ever-increasing population and prosperity, it becomes the duty of the Government to restrain the harmful and destructive action of its people, and how this is being done has been set forth in these pages.





## Indian Art and Architecture.

THE Art of every country is the unconscious record of its History. The surviving specimens tell posterity of the state of the aboriginal dwellers upon its soil; of their development; of their migrations; of the character of the races which invaded, mingled with, or superseded them.

While Art thus illuminates the facts of History, the events comprising History exercise the most potent influence upon the character, scope and degree of luminosity Art casts upon them. An invasion of barbarians, or the destruction caused by internal strife, may blot out for ever the artistic records of such elaborately civilized races as doubtless inhabited India from very remote times, down to the dawn of History; while, on the other hand, similar records of more primitive, but secluded nations, are handed down intact from the storehouses of antiquity, and afford us both minute and exact information of their past.

The climate and the soil of the country they live in, have a powerful influence upon the preservation, or destruction of the treasures, and records of bygone peoples. How much, for instance, of our knowledge of her Art and History, do we owe to the dry climate and sandy soil of Egypt; and how much of our ignorance of her past is due to the heat and moisture of the climate of India which exercise so destructive an action upon all animal, vegetable, and many mineral products; an action which is materially assisted by the swarms of minor animals and insects bred in her rich soil.

The social habits and religious customs of a people, are also determining factors in the same direction. Of these, the mode a nation adopts of disposing of its dead, exercises perhaps, the greatest influence. In India, the Archæologist, the Historian, and the Artist, have to deplore the fact, that from time immemorial, the people have burned their dead; and with them, there can be little doubt, have been destroyed many interesting, and valuable records of the remote civilizations which flourished upon her soil. Other reasons for the paucity of knowledge we possess of India's remoter past, are to be found in the apparently exclusive use of wood as a building material by her people before the year B. C. 250; their ignorance regarding the value of bronze, as a material for domestic utensils, ornaments, and weapons; and the absence of the practice of incised writing upon clay tablets hardened by the sun or fired into bricks, which has revealed the civilization of the ancient Assyrians to the archæologists of to-day. Few Indian gold, or silver coins, or ornaments of a very ancient date now exist, and no textiles as old even as the Bayeux Tapestries, let alone, the still older woven fabrics of Egypt are preserved, to

show posterity the beginnings of those traditional, and typical crafts of India.

It is to the remains of the stone and brick buildings of a date subsequent to the year B. C. 250, that we must turn, to infer the condition of the Art of India, before that date. The works now extant, prove conclusively, that a high degree of skill had been attained in the crafts of the Metal worker, the Carpenter, the Wood-carver, the Weaver and the Painter; for they afford evidence that distinct styles had been developed, placing them far in advance of the crude products of the primeval races inhabiting the country. The successive steps are missing, worn away by the slow erosion of time, or by one or other of the destructive agents mentioned above. Strangely enough, however, specimens of the "Primitive Art" still survive, and may be studied, among those aboriginal tribes, such as the Bhils, who, driven from the plains by the early invaders, settled in the mountain fastnesses and dense jungles, where undisturbed, they have carried on, unchanged, the same crude and simple crafts they practised thousands of years ago. These need not detain us long, for the specimens of musical instruments, basket and mat work, and jewellery produced by them, differ but slightly from similar articles, made by barbarous tribes in other parts of the world. They display the same feeling for pattern, and the childish fancy of all savage handiwork, together with a surprising degree of technical skill, when allowance is made for the crude appliances and the coarse materials employed in their manufacture. But the interest they excite being Ethnological, rather than Artistic, they can be dismissed, and attention turned to those Historic Styles of Architecture which form the basis of all Indian Art between B. C. 250 and the present time.

These are:—

1. Buddhist, dating from B. C. 250 to A. D. 750.
2. Jaina (1st period), dating from A. D. 1000 to A. D. 1300.  
" (2nd period) " " A. D. 1420 to the present time.
3. Indo-Aryan, (1st period) dating from A. D. 495 to A. D. 750.  
(2nd period) dating from A. D. 100 to the present time.
4. Chalukyan (1st period) dating from A. D. 500 A. D. 750.  
(2nd period) dating from A. D. 1000 to A. D. 1300.



5. Dravidian (1st period) dating from A. D. 700 to A. D. 1000.  
(2nd period) dating from A. D. 1350 to the present day.
6. Indo-Saracenic 2nd period dating from A. D. 1000 to the present time.

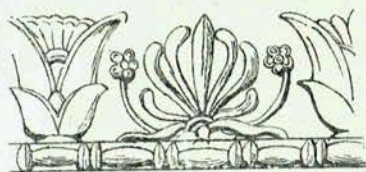
As the above dates show, some of these styles are perpetuated, in more or less developed, or debased forms, to the present day; two (the Buddhist and Chalukyan) have completely died out. Some are allied, and possess characteristic features, showing development one from another, or both from a common source; while one (the Indo-Saracenic), is based upon opposite ideas from the rest as regards construction and decoration. Scarcely any Buddhist, Jaina, Chalukyan or Dravidian buildings used for civil purposes exist, those extant being Temples or other religious edifices; but many examples of the Civil Architecture of the Indo-Aryan, and Indo-Saracenic styles remain, to illustrate the degree of skill attained by their designers and builders.

We propose to consider the general character of each architectural style separately, together with the Arts of Sculpture and Painting with which each is allied. We then propose to deal with those arts which do not directly depend upon Architecture for their setting, such as gold, silver and other metal work, illuminating and writing, ivory and sandal wood carving, jewellery, weaving and other minor arts.

#### BUDDHIST ART.

##### *Architecture.*

The Buddhist religion was founded about the year B. C. 660, but no work of Art connected with it is known to now exist, dating before the year B. C. 250, when King Asoka, who ruled over the whole of Northern India, was converted to the faith. He prosecuted a zealous missionary propaganda, not only throughout his own dominions, but over the rest of India, and beyond it, to Ceylon, Kashmir, Nepal, and Burma. As a means to the conversion of his people, he erected many hundreds of "Lats" or pillars, inscribed with the leading doctrines of the Buddhist religion. The greater number of these were probably of wood, for no trace of them can be found, but in a few instances the pillars were cut from solid blocks of stone, and have been discovered and restored. Their proportions and details point to a distinctly Persian influence, especially as regards the emblems which crown the capitals, the capitals themselves, and the bases. The other details would rather point to a Greek origin, for the neck of the pillar found at Allahabad, dating about B. C. 254, is ornamented with an almost exact reproduction of the honeysuckle design, used by the Greeks with the Ionic Order; and upon the other pillars are found both the "cable" and "bead and reed" ornament; but the capitals and bases,



THE HONEYSUCKLE DESIGN ON THE "LAT" AT ALLAHABAD, ALSO USED BY THE GREEKS WITH THE IONIC ORDER.

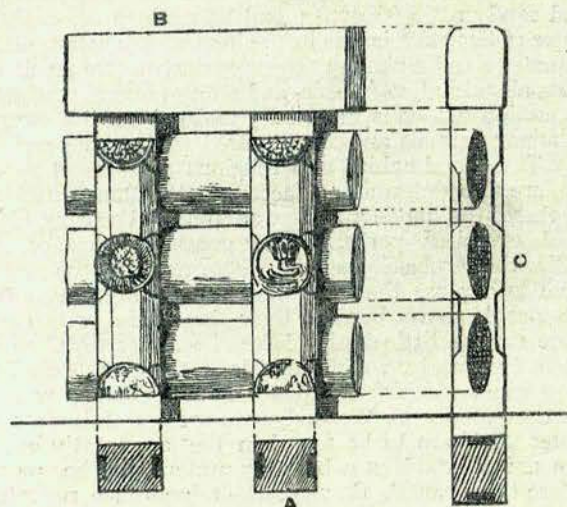
used by the Greeks with the Ionic Order; and upon the other pillars are found both the "cable" and "bead and reed" ornament; but the capitals and bases,

are so essentially Persepolitan, as to leave little doubt that both the Buddhists in India, and the Greeks in Europe, derived certain features of their Art from a common source. It is a fact worthy of notice, however, that the Greek details mentioned above, appear upon no other Buddhist works, either in the reign of Asoka, or at any subsequent period.

Before leaving these pillars it will be convenient to note the general characteristics of all Buddhist Columns; for whether used as isolated monuments, or as supporting columns for the roofs of Temples and Monasteries, they possess peculiarities distinguishing them from Greek, Roman or Gothic pillars. As they are the pattern from which the Jains entirely, and the Indo-Aryans and Dravidians partly, developed their pillars, this is important.

The great difference is, that the Buddhists did not adhere, as did the Greeks and Romans, to one or two simple and constant types, but they varied them indefinitely. They are generally square in plan for some distance up, when they become successively octagonal, sixteen-sided and round, ending with a square capital. Sometimes they terminate in a flat bulbous capital. When this happens, the shaft is decorated with shallow vertical flutings, which are cut by a horizontal ring at the neck, but continue over the capital. Their proportions are short and very massive, a characteristic due to the fact, that the only Buddhist roofed buildings known to exist at the present time, are caves excavated out of the solid rock, and the columns were therefore left with an ample margin of strength to support the weight of the rock above.

It must be here noticed, as a fact which had a determining influence upon their style, and therefore up-



A. PLAN.  
B. ELEVATION AND SECTION OF A BUDDHIST STONE RAIL.  
C. SHOWING ITS "WOODEN" CONSTRUCTION.

on the character of their decorations, that all Buddhist buildings, whether hollowed out of the virgin rock, as were the cave Temples, or built up of separate stones, as were the rails and gateways of the Topes or Stupas, were based constructionally upon the wooden buildings



which preceded them; that is upon the craft of the joiner, and not upon that of the mason. The roofs and the openings in the façades of the rock-cut Temples, imitate in stone, buildings which previously existed, constructed of wood; and the stones of the rails and gateways at Sanchi and Bharat are not built up in accordance with science of strains and joints practised by masons, but follow the system practised by joiners of wood. This peculiarity is characteristic of nearly all Indian Architecture, except that of the Saracens. Its artistic result is apparent in the use of square-headed openings in all constructed buildings; no pure arch with radiating voussoirs, such as are common in Europe, since the days of the Romans, being known to exist in India. The only pointed arches in buildings of purely Indian origin are firstly, the rock-cut roofs of the Chaityas or Temples of the Buddhists, which in the instance of the specimen at Karli is actually supported by wooden ribs, and in those at Ellora and Ajanta by ribs carved, cut in stone in imitation of their wooden prototypes; and, secondly, in the horse-shoe openings, cut out of the solid rock, of their outer façades. In constructional buildings such as those of the Jains, the openings invariably have horizontal stone architraves, supported upon bracketted pillars, with stone struts. The brackets and struts at the capitals of the vertical pillars serve to reduce the size of the openings of the window at the top, and cause it to assume a more or less pointed shape. It is only necessary to compare this method of construction which is a purely wooden one, with that practised by the Roman and Mediæval builders, to see at once the influence it had upon the nature and direction of their ornamental details.

The history of the art of India is full of mystery, and that of the sudden adoption of stone, as a material out of which to construct Temples and other religious buildings, is as puzzling to Archæologists as are the causes which so long deferred its use, in a country where stone suitable for building abounds, and is so easily accessible. The invasion of Alexander the Great and the settlement of the Græco-Bactrian kingdom close to the borders of India, are solutions of the problem, which have supporters, but, as the change of material made very little apparent difference to the character of the buildings, as regards style and decoration, the causes which brought it about are of more interest to Archæologists than to Artists, and need not be enlarged upon.

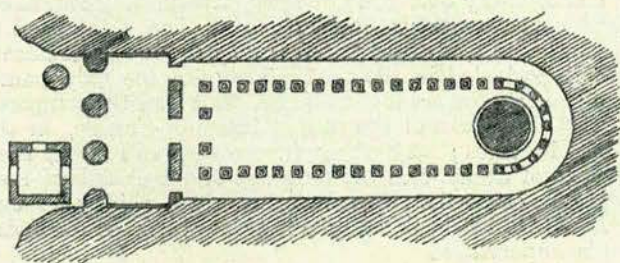
The most characteristic and impressive works of the Buddhists are the Chaityas or Temples, and the Viharas

or Monasteries, excavated from the solid rock. The former resemble in plan an English three-aisled Cathedral without transepts, but with the same semi-circular apse; that at Karli, on the Western Ghats, near Poona, being almost identical in general arrangement and dimensions with the choir of Norwich Cathedral. Their only light enters from a large horse-shoe shaped opening, cut through the external wall of the cave. This is placed high up above the somewhat narrow entrance, and formerly contained a pierced wooden screen, the precursor of the stone screens, which are such a characteristic feature of Indian Architecture. The principal decorative feature of the external façade is this horse-shoe window, and its shape is repeated in the form of niches or bands of ornament over the exterior face. The niches are generally filled with figures of saints, which are somewhat crudely carved, and lack the surface interest of their granite prototypes in Egypt, but attain a dignity, from the impressive character of their setting, which disarms or at least mitigates any critical objections to their details.

The Viharas or Monasteries are not of such comprehensive interest as the Chaityas. They lack the sense of a completely thought out plan that impresses the spectator so forcibly in the latter, while their arrangement gives less scope for decorative treatment, and picturesque light and shade. In plan the Viharas are rectangular, their low roofs being supported upon rows of massive pillars left for that purpose. In the middle of the interior wall, facing the opening, the cell or shrine is excavated, in which sits the image of Buddha, while along the side walls are the openings leading to the cells of the monks. Between these doors, panels in high relief, illustrating incidents from the life of Buddha, or Mythological subjects, are carved. The pillars vary indefinitely in shape, and are decorated with great taste and variety in their ornament. Placed amid their wild and picturesque surroundings, where the dressed and sculptured symmetry of their façades contrast so forcibly with the rugged cliffs from which they are wrought, and the wealth of undergrowth surrounding them, these Chaityas and Viharas of the Buddhists cannot fail to impress the spectator with a feeling of reverence for the imaginative power which conceived them, and the patient industry which brought them into being. There is a largeness in the Buddhist treatment of wall spaces, an appreciation of the value of contrasted plain and decorated surfaces, which raises their art above that of any succeeding style in India, except that of the Mahomedans, and links it more nearly to that of the Egyptians, the Assyrians, and the Greeks, than to those of the Jains or Indo-Aryans, who drew their inspiration from it.

#### BUDDHIST SCULPTURE AND CARVINGS.

The earliest Buddhist stone carvings afford the best evidence extant of the high degree of skill the wood-carvers of that age had attained to. When these craftsmen, for reasons not known, suddenly turned their attention to the carving of the harder and more lasting material, they showed not the slightest indecision regarding style. There was nothing crude or fumbling in their idea of form. All was as complete and fully developed as it was a thousand years afterwards. As



PLAN OF A BUDDHIST CHAITYA.



was the case with the constructional joiners, the stone carvers appear to have transferred to stone, the ideas and experience they had acquired as workers in wood. They went even further, for there is as much evidence in its favour as to the contrary that the rosettes which either entire, or in segments, form so important a feature in the decorations of the rails of the Topes, and the pillars, and beams of the Viharas, are derived from the metal pins, or nails, used to strengthen the joints in the wooden doors and posts of a previous age.

The earliest Cave Temples, although probably of a later date than the "Lats" and "Rails" are much simpler in their decorations. The explanation of this is, that when the Topes were the centres of religious ceremonial, the Cave Temples were only rough excavations made by hermits. As, however, the Temples gained popularity as the resorts of the religious, the Topes fell into disuse and decay, while the Temples became more resplendent with carving. The Buddhist religion was originally Buddhism without a personal Buddha, and remained so for some hundreds of years, but as the simple character of the faith became infused with the leaven of Brahminical mythology, the figure of Buddha himself was worshipped, and is found in all the later Viharas. Of all Buddhist Sculpture, these figures of Buddha are the most impressive. The sculptors seem to have caught some of the spirit of repose, which formed the basis of his religion, and have embodied it in their representations of the Apostle of the "Nirvana." This impression of calm repose is also undoubtedly due, in a great measure, to the size and material out of which the figures are cut, for the same inscrutable expression of perfect rest is found in the rock sculptures of Egypt and the colossal figures of the Jains in Southern India. Whatever the causes which produced this effect may be, certain it is that these gigantic figures affect the imagination in a manner and degree that no sculpture in Europe can match.

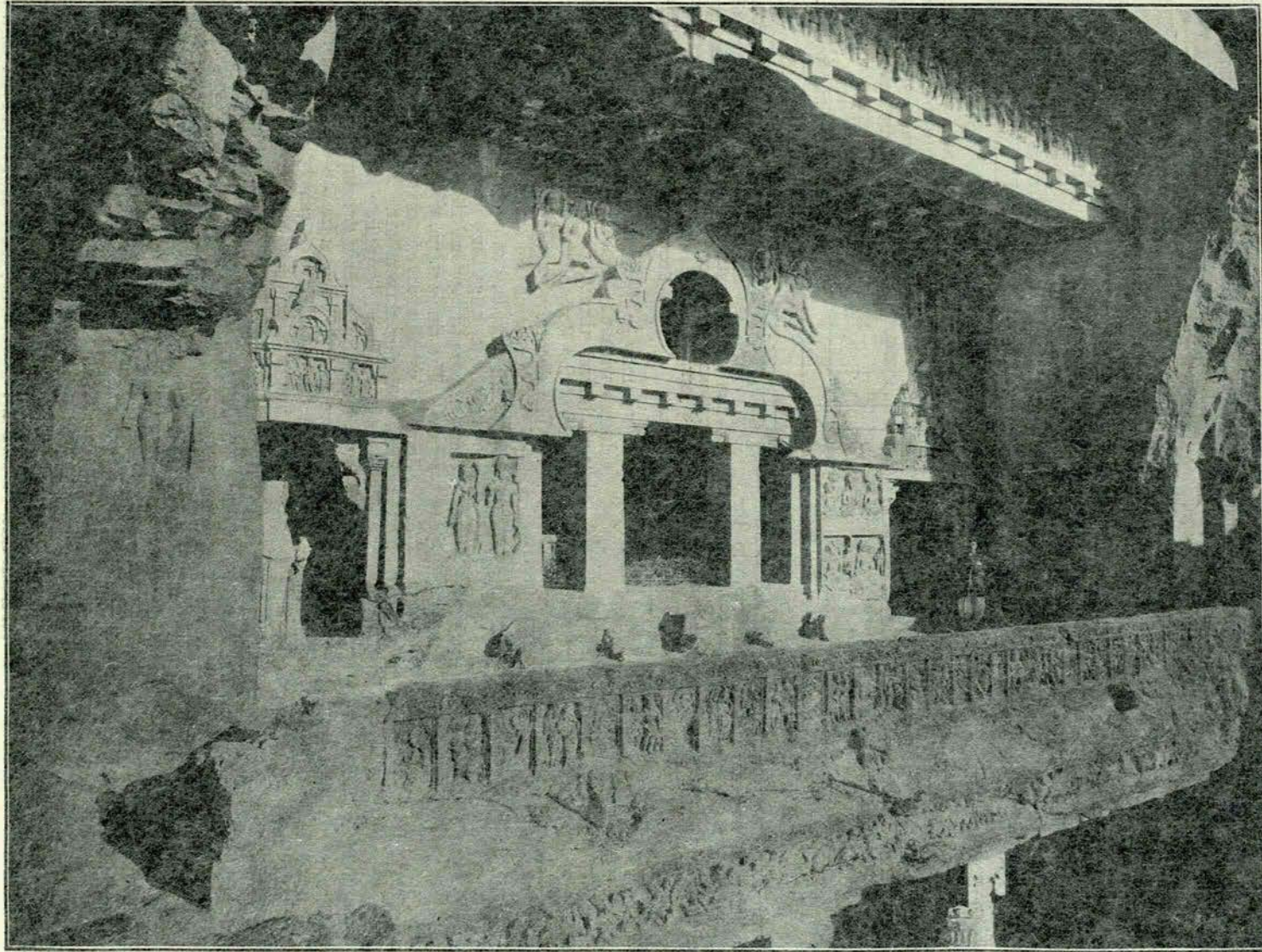
#### BUDDHIST PAINTING.

Although the façades of the Buddhist Cave Temples are now of sculptured and dressed stone, without colour, there is considerable reason to believe that formerly, many of them were covered with a thick coating of lime plaster, upon which designs were subsequently painted. That the Topes were so covered is certain, as shallow incised patterns have been found upon the plaster which still remains, although the colour which usually accompanied this style of decoration has disappeared. On the Kylas Monolithic Temple at Ellora, a considerable amount of painted plaster still adheres to the stone on both the decorated and plain surfaces; and although this Temple was of a somewhat later date than those of the Buddhist ones in the neighbourhood, there is very good cause for the belief that the practice was inherited by the workers who produced the later building from their predecessors who made the earlier. These fragments of painted plaster would give little idea of the skill of the draughtsmen who practised their Art in India, in the early years of the Christian era, were there no other remains to testify to it; but fortunately, at the Caves of Ajanta, there still

exists a series of wall-paintings which (to quote the words of Mr. John Griffiths, the Author of that standard work *The Buddhist Cave Temples of Ajanta*) "in spite of their obvious limitations, the work is so accomplished in execution, so consistent in convention, so vivacious and varied in design, and full of such evident delight in beautiful form and colour, that I cannot help ranking them with some of the early works of Art which the world has agreed to praise in Italy." This opinion, Mr. Fergusson, who visited the caves in 1838-39, anticipated when he wrote: "the style of the paintings cannot of course bear comparison with European painting of the present day; but they are certainly superior to the style of Europe during the age in which they were executed; the perspective, grouping, and details are better, and the story better told, than in any painting anterior to Orcagna and Fiesole. The style, however, is not European, but more resembles Chinese Art, particularly in the flatness and want of shadows; I, however, in China, saw nothing approaching its perfection." With regard to the painted ornament, the same authority said: "It is not at all unlike that still existing in the Baths of Titus." The similarity noticed between these paintings and those of such widely divided schools as the early Italian and the Chinese, only demonstrates the well-known fact, that the artistic expression of all nations and peoples keeps within extremely narrow limits during its primitive stages. It is only when civilization reaches a higher level that divergencies are developed. The perception, and science of light and shade, have apparently been hidden from, or have failed to interest, the artists of the East, whose development has been entirely in the direction of the decorative treatment of surfaces and the portrayal of action. In so far, therefore, as these paintings are without light and shade, and lack atmosphere they resemble both the early Italian and Chinese; while in a certain exuberance of action, and in their method of outline drawing, they distinctively suggest the paintings of the latter. The painted ornament is Chinese also in its naturalistic treatment, and at the same time, as has been mentioned by Fergusson, it suggests the wall paintings of the Romans and, it may be added, also that of the early Majolica painters of Italy. It is impossible in the small space at our disposal, to give any detailed descriptions of the paintings, except that the subjects are representations of the chief incidents in the life of Buddha, and that they vividly depict the costumes, habits, and types of the people of India eighteen hundred years ago. The pictures which number considerably over one hundred, have greatly darkened, probably by the action of the artificial light used to illuminate the caves; and have been cruelly defaced, and neglected in the past. They are the only paintings in India, on a large scale, that can be compared with the works of the wall painters of Europe, in the Middle Ages; but their inaccessible situation, their state of decay, and the darkness of the chambers they are in, cause the originals to be known chiefly through Mr. Griffiths' book, and the full-sized copies made under his supervision.

No other works of Art of the Buddhists have come down to the present time, but there can be little doubt





Façade of the Buddhist Cave Temple of Vishnavama at Ellora showing the horse-shoe opening, and the imitation in stone of the wooden joists of a previous period.

THE CACTUS OF THE



that the Arts of the Metal worker, the Potter and the Weaver were in as advanced a stage of artistic development as those of the Architect, Sculptor and Painter. But no trace of their skill has survived the social and religious upheaval, which brought chaos into India for three hundred years between A. D. 750 and A. D. 1050, and caused the practical extinction of the Buddhistic religion in this country.

Before leaving this, the earliest style of Indian Art, and that, from which succeeding ones, derived either the whole, or some part of their inspiration, a list of its principal monuments, and their localities, may here be given.

*Lats, or Pillars*—Allahabad, Delhi, Taukissa, Tirhoot.

*Topes, or Stupas*—Sarnath, Amravati, Gandhara, Jallalabad, Manikyal.

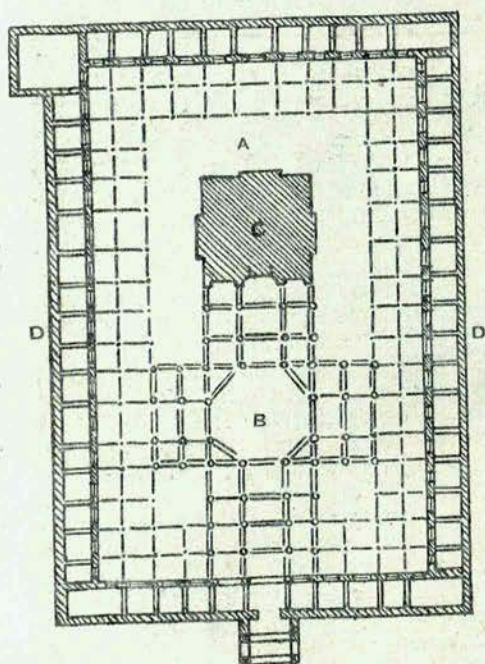
*Rails and Gates*—Bharhat, Mattra, Sanchi, Amravati.

*Chaityas and Viharas*—Behar, Karli, Nassick, Ellora, Ajanta, Kanheri, Gandhara.

#### JAINA ART.

##### Architecture.

It has been mentioned above that Buddhism was the religion of the greater part of India up to the year A. D. 750. Civil wars then began, which convulsed the Peninsula for three hundred years. When



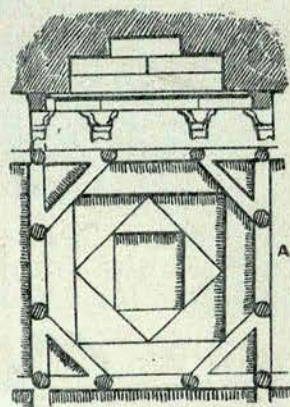
PLAN OF A JAINA TEMPLE.

A. COURTYARD. B. CENTRAL DOME OF THE PORCH. C. CELL OR SHRINE. D. D. CELLS SURROUNDING THE COURTYARD.

order once more reigned, Buddhism had ceased to exist, except in a corner of Bengal, and its place had been taken throughout the west by Jainism, while Vish-

nuism had usurped its inheritance in the East. In the South, the religion of Siva had been adopted by the mass of the people, and these three religions had all assumed new and complex forms, by having incorporated local superstitions into the simple forms of their earlier doctrine.

Although probably derived from early Buddhist temples, constructed of wood, those of the Jains differ



PLAN AND SECTION SHOWING THE CONSTRUCTION OF A JAINA TEMPLE.

A. PLAN. B. SECTION.

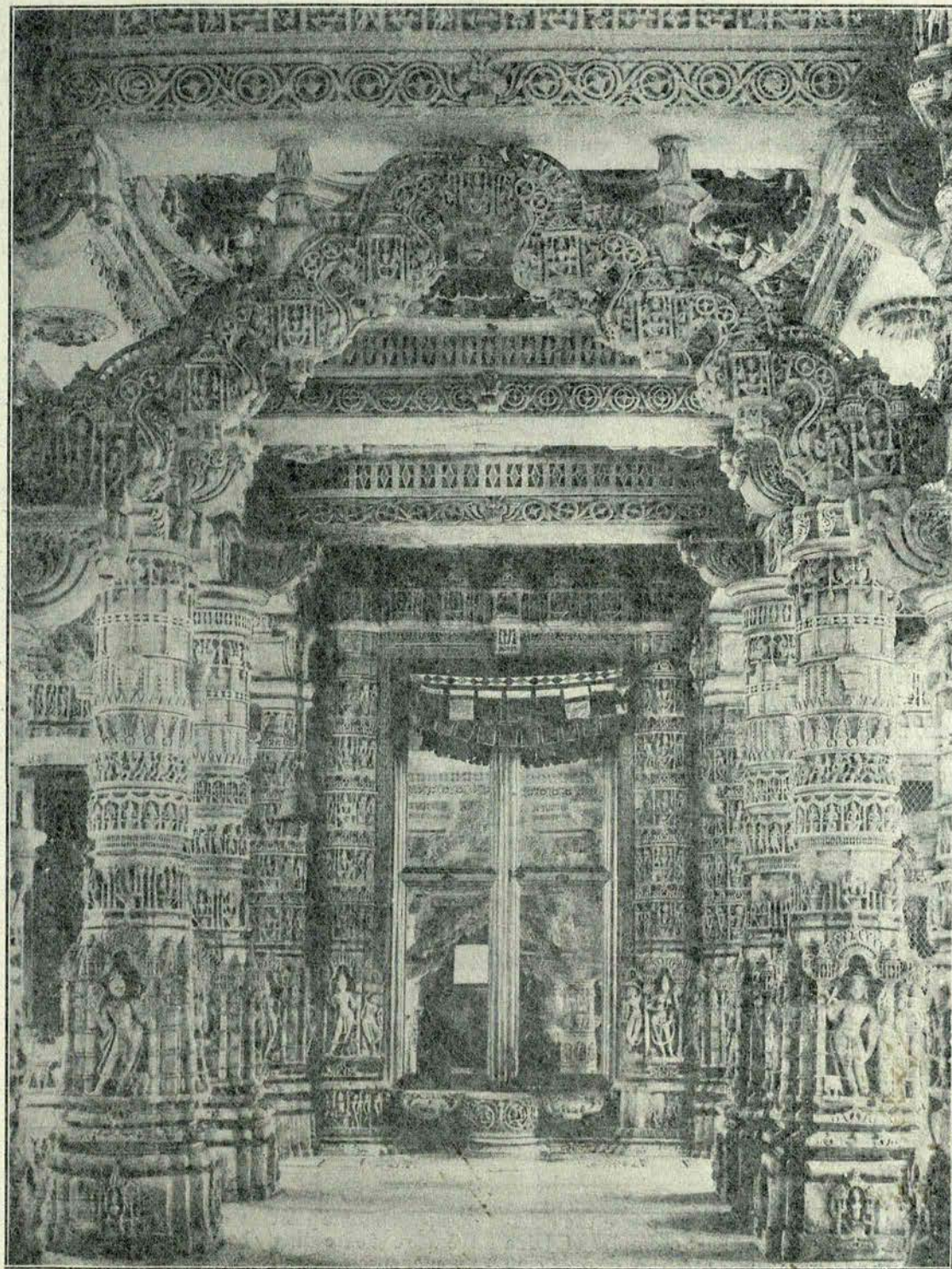
entirely from them in plan. They have a small square shrine cell, lighted from the door only, and crowned with a high pyramidal tower, with curvilinear sides, forming an imposing feature. In front, forming an entrance porch, is a hall, in the centre of which is a dome invariably built in horizontal courses of stone, and supported upon eight pillars, with four extra pillars at the angles, having bracket capitals. The peculiarity of this method of construction is that, however many domes there may be in a building, and how-

ever different their heights may be, they can be easily supported upon columns without the aid of buttresses, for there is no lateral thrust, as is the case with the arched domes of the Roman and Renaissance buildings. The decorative consequence of this mode of construction is that all the ornaments of Jain domes are horizontal, that is, bands of ornaments are arranged in concentric rings, one above the other, instead of being disposed in vertical ribs as in Roman and Gothic vaults. The single stone, which forms the apex of the dome, is usually carved on its underside, into an elaborately designed pendant. The columns supporting the roof of this hall radiate from the central octagon, so as to make the whole structure cruciform on plan; a feature which is shown in the elevations, and which renders these buildings extremely picturesque, as regards light and shade, each face as the sun travels round presenting some new and striking effect. The pillars supporting the roof and domes are lighter in character than those of the Buddhist Cave Temples. They are most elaborately carved, the shafts being as intricate in outline and as highly ornamented as the capitals or bases. The capitals are of the bracket type, and the whole construction is undoubtedly derived from a timber original. They have a peculiarity seen in no other style, namely, that of having an upper shaft superimposed upon the main or lower one. Upon these upper columns rest the great beams or architraves which support the dome; as, however, the bearing is, or appears to be, long, the weight is relieved by a curious angular strut or truss of marble or stone, which, springing from the capital of the lower pillar, seems to support the middle of the beam. The interior of the



THE JAIN TEMPLES OF MOUNT ABU

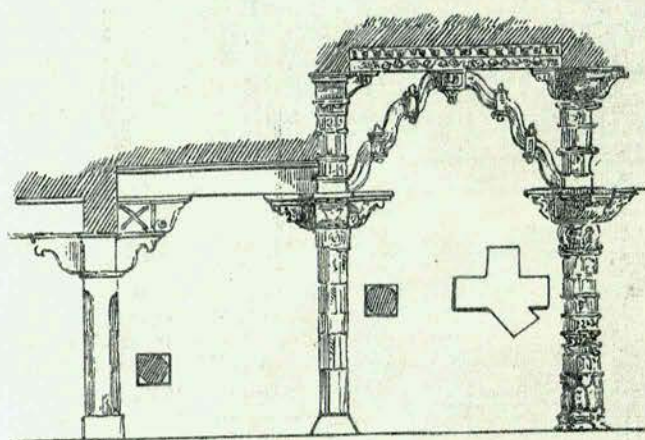
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Interior of a Dilwara Temple, Mount Abu, showing the Elaborate Carving of the Marble Columns, Capitals, Struts and Beams of the Jaina Style in the North of India.



domes, together with their supporting capitals, struts and beams are covered with a bewildering quantity of ornament which undoubtedly destroys the massive effect, expected in buildings of stone, while the repetition of the same conventional image of the particular saint in whose honour the Temple is built, further tends to weary the spectator. Despite the impression made by the ingenuity and boundless industry, displayed in the carving of the details of pure ornament, and the fine colour of the marble out of which the columns are frequently wrought, a feeling is induced that the right principles have been lost sight of, and that the style is decadent.



DRAWING SHOWING THE DOUBLE BRACKETED PILLARS WITH STRUTS FOUND IN JAINA TEMPLES.

It is of interest to note, that until the coming of the Moslems, the Jains were the only builders in India who attempted to construct an internal dome of stone. The Hindus tried a few timid imitations without much success, but the dome never became an essential feature of their style, as it always remained of that of the Jains. There is one peculiarity, however, common to both the Jain and Hindu Architecture of Northern India; it is the form of the pyramidal towers, called Sikras or Vimanas, which surmount the cells in which the sacred images are placed. On the outer elevations, the middle portions of the towers project slightly over their bases, but from this point to within three-fourths of their entire height they bend inward in a flat curve, and are surmounted by what is called an Amalaka. This is a flat bulbous cap, which appears to be based upon the shape of a melon or gourd; it is generally surmounted by a flat dome of reverse curvature, in the centre of which stands the kullus or pinnacle in the form of a gracefully designed vase.

This combination of a rectangular tower the sides curve inward toward its summit, surmounted by a circular cap and finial, is quite original, and is found in no other architectural style in the world.

Its origin is a complete mystery, for, like the existing Buddhist structures, the earliest examples of Jain Architecture are as fully developed and complete in all their parts as the examples built at any subsequent period.

As the greatest works of the Buddhists were their excavated rock temples, so the masterpieces of the Jains are seen in Temples constructed of stone and marble. They were never great Cave diggers; the nature of their religion not requiring great assembly halls, like the Chaityas of the Buddhists. Like the Brahmins, however, they followed the fashion, to which India had become accustomed to attach an idea of sanctity, and consequently we find Jaina Caves at Khandagiri near Cuttack, and at Ellora. The Indra Sabha Cave Temples at the latter place were finished about A. D. 700, but have a much greater affinity for the Dravidian style as seen in Southern India, and in the neighbouring Brahmanical Kylas monolithic temple, than to the Jaina Temples at Mount Abu, Palitana, Sadri and Girnar.

#### JAINA SCULPTURE.

Unlike the Buddhists, the Jains have many monuments in Southern India, but the development of the religion led to a different artistic expression in the South to that in the North. It has been noticed that the style in the North is remarkable for the elaborate and lacelike treatment of stone pillars and mouldings; the workmen appearing to revel in the labour of piling detail upon detail. In the South, its remarkable manifestation is seen in the three colossal images, each fashioned out of a single block of granite. The one at Shravana Begula is 70 feet 3 inches high; the second at Karkala is 41 feet 5 inches, and although it weighs 80 tons, was wrought at some distance, and subsequently moved to the place in which it now stands; and the third at Yannur, which is thirty-five feet high. In these figures, there is not a trace of energy being frittered away upon meaningless ornament, but they are treated with the grandeur and simplicity of the rock-cut monuments of Egypt, and with the seated Buddhas at Ellora, and the Trimurte at Elephanta, are among the most impressive examples of the Art of figure Sculpture in India. Two developments of Jaina Art remain to be noticed. The first being the two towers at Chittore, and the second, the Stambas or isolated pillars, found chiefly in Canara.

The two towers at Chittore were built at widely separated intervals of time; that of Sri Allat being erected and dedicated to Adnath, the first of the Jaina Tirthankars, in A. D. 896, while that of Khambo Rana was built to commemorate his victory over Mahmud of Malwa, in the year A. D. 1439. The earlier tower is 80 feet high, its extremely graceful exterior being covered with the most elaborate carving. The later one is 120 feet high, and is carved in the same profuse manner, but owing to the shape of the mass being simpler, and the ornament being upon a small scale, compared with the whole building, and less deeply cut, the effect is more satisfactory than in the earlier example.

The Stambas or pillars of the Jains are doubtless the lineal descendants of those of the Buddhists, for they occupy the same position outside the temples. Many of them are of exceedingly beautiful proportions. Standing upon a succession of wide sub-bases or platforms of stone, the base of the shaft which is square changes as it rises to an octagon, and thence into a polygonal shape



approaching a circle. Above, is a wide-spreading and elaborately carved capital, upon which rests a canopy, supported by four pillars. Extremely beautiful reminders of these Stambas are to be seen in the dove-cotes which adorn the streets in Ahmedabad. It must be allowed that in these Stambas, the Jains have solved in perhaps the most satisfactory manner possible, the type and proportions, isolated pillars should take. Those we erect in Europe are reproductions of pillars meant to support the architraves of buildings. They are solecisms when merely supporting statues, or nothing at all, and, that this is not generally recognized, shows how easily the eye may become accustomed to, and tolerate in artistic conventions, having the hall mark of antiquity.

#### JAINA PAINTING.

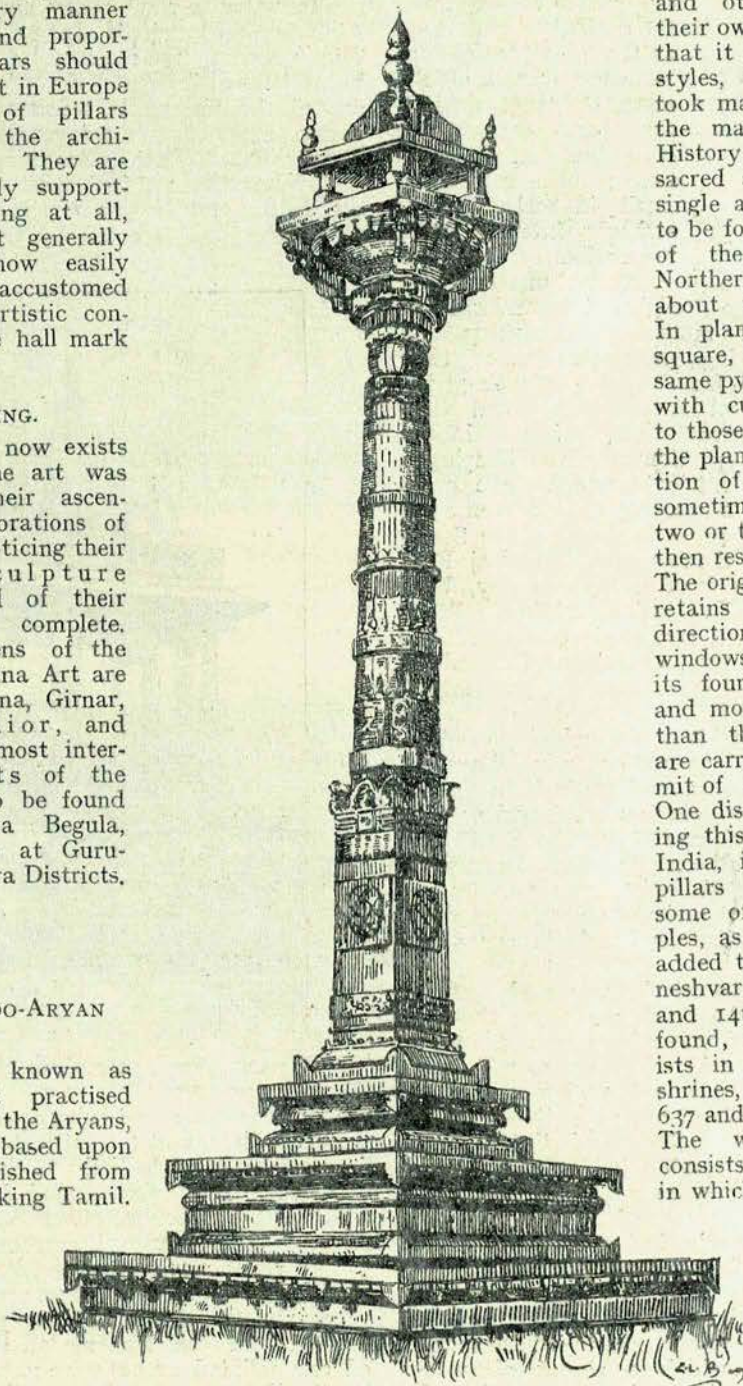
No Jaina painting now exists to show whether the art was practised, during their ascendancy, for the decorations of their Temples. In noticing their Architecture and Sculpture therefore the record of their distinctive style is complete. The finest specimens of the Northern style of Jaina Art are to be seen at Palitana, Girnar, Mount Abu, Gwalior, and Chittore; while the most interesting monuments of the Southern style are to be found at Yunnar, Shravana Begula, Moodbidri, and also at Gurusankarri in the Kanara Districts.

#### NORTHERN OR INDO-ARYAN STYLE.

The Architecture known as Indo-Aryan is that practised by the descendants of the Aryans, speaking languages based upon Sanscrit, as distinguished from the Dravidians, speaking Tamil. It is very unevenly distributed throughout the Northern, and West-Central portions of the Peninsula, where alone it is found; for there are more temples of this style in the Province

of Orissa than in all the rest of Hindustan put together, and it is more frequently encountered in the valley of the Nerbudda and in Gujarat than in the valley of the Ganges. This is due, in a great measure, to the manner in which the Moslem conquerors destroyed the

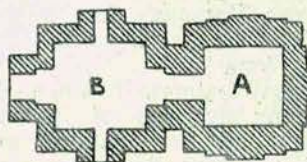
Hindu temples in the latter district, and utilized their pillars and other stones in building their own Mosques. Considering that it is one of the pre-historic styles, from which the Jains took many features, it is one of the many mysteries of Indian History and Art that in so sacred a city as Benares, not a single ancient Hindu temple is to be found; the earliest temple of the Indo-Aryan style in Northern India dating from about the 7th century A. D. In plan the Temples are always square, internally, and have the same pyramidal tower, or *sikra*, with curvilinear lines, common to those of the Jains. Externally the plan is modified by the addition of rectangular projections, sometimes one only, but often two or three. The external plan then resembles a serrated square. The original cell, however, always retains its square form and direction, and the entrance and windows keep their positions; its four corner angles are larger and more strongly accentuated than the others, and the lines are carried through to the summit of the pyramidal tower. One distinctive feature, separating this style from all others in India, is the general absence of pillars in the buildings. In some of the most modern examples, as for instance, the porches added to the temples at Bhuvaneshvar and Puri, in the 12th and 14th Centuries, pillars are found, but hardly one pillar exists in the 500 or 600 original shrines, erected between A. D. 637 and 1174, at the former place. The whole building generally consists of a temple, or a Vimana, in which the images of the gods are enshrined, and a porch: each being cubical in shape and of the same size. The temple proper, as has been noted, is surmounted by a curvilinear pyra-



JAINA "STAMBA" OR PILLAR FREQUENTLY SEEN IN SOUTH INDIA.



midal tower, of considerable height, but the porch is roofed by a straight square pyramid of a much lower pitch, contracting towards its apex in gradual steps, and surmounted by a single carved stone. Sometimes one or two more porches are added in front of the main one, but these are almost always afterthoughts, and



A. VIMANA OR CELL.  
B. PORCH.

PLAN OF INDO-ARYAN TEMPLE.

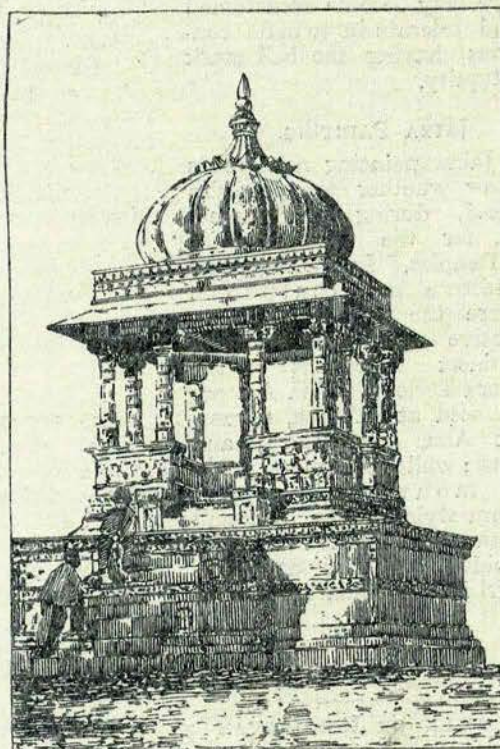
not parts of the original design. The carving upon the ancient temples, such as the great temple at Bhuvaneshvar, is of the most elaborate description, and extends to every stone in the elevations; but is sufficiently small in scale, not to seriously interfere with the outline of the building. While this minute elaboration of ornament is characteristic of the religious enthusiasm of the people, and their marvellous industry and patience, it equally brings into prominence their lack of the artistic faculty, of adapting the simplest and most direct means to the end they have in view. The greater part of the labour expended upon the upper portions of these temples is entirely wasted; for the intricate and lacelike ornament carved upon the stones cannot be seen by a spectator standing on the ground. Some of the Sculpture, such as that seen on the doorway of the Raj Rani Temples at Bhuvaneshwar, is of a high quality, both as regards conception and execution, while a solitary Stamba or pillar of stone, supposed to be of the twelfth or thirteenth century, at Jajepur, is excellent in its proportions, restrained in contours, and tasteful in its details.

The most famous temples of the Indo-Aryan style, uninfluenced by any other, are to be seen in Bhuvaneshwar, Kanaruc, Puri, Jajepur, and Cuttack in Orissa, but in Western India the style is seen struggling with the influence of the Dravidians from the South for supremacy. In the Southern Maratha Country, at Dharwar, stone-constructed Indo-Aryan temples are found, while at Ellora, in the Nizam's Dominions, rock-cut Temples of the Dravidians and Indo-Aryans stand side by side.

The difference between the constructed temples upon the West and the East are more those of scale and variation of planning than of taste, and the same may be said of the many Temples in Northern and Central India: but when excavation takes the place of construction, as is the case in the rock-cut temples, the influence of the material appears to assert itself, and a bolder and grander style results. The Hindu caves at Ellora are overshadowed by the masterpiece of the Dravidians, the Kylas monolithic Temple, but contain much fine work, free from the elaborate details and fatiguing sense of labour, so oppressive to the student of their buildings. Of their Sculpture we propose to speak later, but will now turn to that section of Hindu Architecture, which is absent altogether from the Buddhists, and only feebly represented in the Chalukyan and Jaina styles.

#### CIVIL ARCHITECTURE.

Under this denomination are comprised cenotaphs, palaces, ghats, reservoirs and dams. The practice of erecting chattries over the spots where the bodies of famous kings had been burnt was undoubtedly modern, and probably borrowed from the Mahomedans. Outside every Rajputana Capital will be found Mahasati, situated in some rocky and well-wooded locality. At Oodeypore hundreds of these chattries are to be seen. That raised to the memory of Singramsing, who was burnt here with twenty-one of his wives, in 1733, being one of the finest. It consists of a fifty-six pillared portico, supporting an octagonal dome, raised upon eight dwarf pillars. That to Amersing II, though simpler, is no less beautiful; in fact, these chattries and cenotaphs are, in the opinion of many judges, the most tasteful of all structures erected by the Indo-Aryans. They



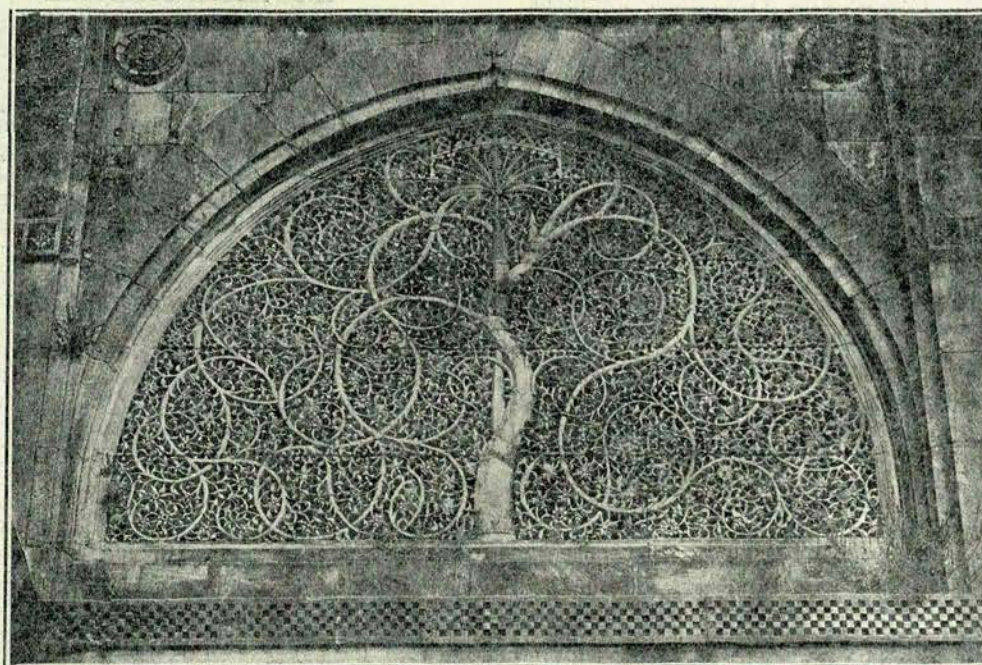
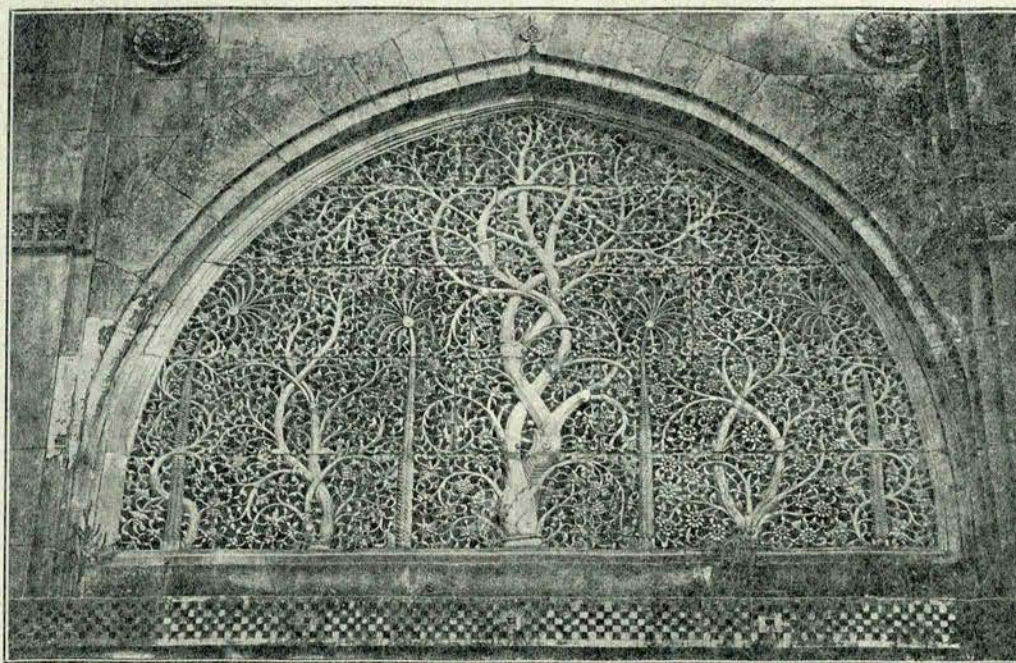
CENOTAPH TO AMERSING II AT ODEYPORE.

are small in scale, and being open upon all sides, their slender pillars, and the intricate lacelike style of their decorations, seem entirely fitting for their purpose, and add to the lightness and delicacy of their effect, which is their peculiar charm, enhanced as it is, as a rule, by their beautiful surroundings.

In Northern India, where the Jaina style was rarely used, the Hindus adopted an arched style for the doorways and windows of their palaces and cenotaphs, derived from their Mahomedan Conquerors. The cusped and foliated arches were not, however, true arches, in the Roman sense, but merely developments of the "bracketted" style, common to Jaina architecture.



MINISTRY OF CULTURE, GOVERNMENT OF INDIA



PIERCED STONE SCREENS OF THE WINDOWS OF A MOSQUE AT AHMEDABAD.



Another original feature, seen in no other style, is the curved cornices of the roofs projecting from the façade. This has been obviously derived, like so much other Indian stone work, from a wooden original. It first appears in one of the cenotaphs at Ulwar. It could not have been a particularly pleasing feature in its original material of bent bamboos, but it there had a sound utilitarian, and constructional basis, for its adoption. When transferred, however, to a material so inflexible and rigid as stone, the absence of horizontal lines, and the constructional incongruity, are displeasing, even when applied to small features, such as the coverings of the projecting canopies of balconies; and these failings are more apparent still, when the style is adopted for the roofing of an entire building. It is extremely popular, however, and despite its departure from the canons of sound taste, continues to be repeated to the present day.

*Palaces.*—As their cenotaphs embody the highest taste of the Hindu builders, so their palaces, rather than their temples, best exemplify their feeling for architectural magnificence. Every little capital possesses a royal residence, and in such cities as Jeypore and Oodeypore, they are of great extent and magnificence. They lack the massive character of the ancient fortress palaces, but for grace of outline and elaborate detail, they are almost as far in advance of them as the fortresses themselves are, from the rocks upon which they stand.

Among the most beautiful of these is the garden palace at Deeg, erected by Surajmull, the founder of the Bharatpore Dynasty. The whole palace was to have consisted of a rectangular enclosure, twice the length of its breadth, surrounded with buildings; with a garden in the centre laid out in the formal style of the East, interspersed with architectural ornaments, fountains and parterres.

One half only has been completed, but for elegance and beauty, it marks the culminating point of Hindu Civil Architecture.

The finest palaces in this style are to be seen at Jeypore, Amber, Oodeypore and Deeg, but many good examples are scattered throughout Rajputana, and Central India.

*Ghats or Steps.*—These are found on the banks of all the principal rivers, but those of the Ganges, are most remarkable for the number and interest of such structures. The City of Benares is famous for its ghats. The steps which afford access for bathers to the water are generally broken by small projections, often crowned by kiosks, which relieve the monotony of the long horizontal lines of the steps. Behind the ghat proper is always a building, often placed there for the sole purpose of architectural display, but also serving to afford shelter from the rays of the sun. In some cases, however, the solid base of this structure is surmounted by a temple.

When every river and tank in India has its ghat, it is impossible to give any detailed list of those that are interesting architecturally. Nothing perhaps is more typical of the country, nor more fascinating to the artist, than the picturesque scene, these river steps offer, at almost every hour of the day. The varying groups of brightly clad figures seen from below, at different elevations against the fine architectural background, or the same groups, with the line of bathers beyond, whose

skins shine like burnished bronze, against the pale green and blue water, afford innumerable subjects for the painter's brush, as does the infinite variety of characters found amidst those assembled there. Although Benares is most famous for such scenes, yet the Ghat at Maheshwar, on the Nerbudda, those at Ujjain, at Nassick, and other ancient cities upon the sacred rivers, almost rival it for beauty of architecture, and the picturesqueness of its crowds.

The heat of the climate of India has given birth to another form of architecture not found elsewhere, namely, to the reservoirs or "bowlees." These are wells dug sometimes 80 or 100 feet into the earth, till water is found. Externally, the only objects seen are two pavilions, from which steps, from twenty to forty feet wide, lead down by stages to the water. The stairs are supported upon pillars, or cut out of the rock, while a stone ballustrading or screen gives security to those who descend. The coolness of these subterranean galleries fully compensates for their inevitable gloom, and make them favourite places of resort during the hot hours of the Indian day. A very interesting example is to be seen at Ahmedabad.

The Bunds, or Dams of the artificial lakes, constructed for the purpose of pleasure or irrigation, are often made into works of great architectural beauty. The steps leading to the water are broken by masses of masonry, supporting kiosks, temples or pavilions, while the entrances to the outfall tunnels are fine in proportions, and often elaborately carved. When all these are of marble, and are set in a background of wooded hills, it is difficult to conceive a combination containing more of the elements of natural and artificial beauty.

#### INDO-ARYAN SCULPTURE.

In the carving upon both the religious and civil buildings of the Indo-Aryans, we see two qualities of the race impartially displayed, namely, their infinite patience and love of detail. In the former, these qualities are guided, but not diminished by the exuberant fancy, born of the worship of the gods of the Hindu Pantheon. This has been inimical to the cultivation of the taste for pure form, such as we know it, in the works of the Greeks. That much of their sculpture possesses imaginative quality, cannot be doubted, as much, perhaps as was possessed by the carvers of the decorative figures, upon the Gothic Cathedrals of the Middle Ages, in Europe; but at an early date, there appears to have been a sudden collapse of this imaginative impulse, the types of their gods and goddesses became stereotyped, and from a living art, their sculpture became a dead repetition. The fetters of this conventionalism have never been broken in their religious buildings; they are too strong to be affected by the art of the aliens, who conquered the country, or of those with whom they came into contact, in other ways. As their music is strongly rhythmic, but is lacking in melody, so their sculpture shows a certain regular pulsation of line, but lacks beauty; and having lost that hold of the actual, which gave restraint to the Greek, Roman, and Italian sculpture, it has degenerated into the absolutely feeble, or become wholly fantastic. By comparing the impressive sculptures in the Caves of Elephanta with those representing the same deities in modern Indian