



CSL

ARCHAEOLOGICAL SURVEY OF INDIA

AS-001970

59

REPORT

ON THE ILLUSTRATION OF THE

ARCHAIC ARCHITECTURE

OF INDIA, &c.

DR. FORBES WATSON,

APPENDICES

MR. FERGUSSON, GENERAL CUNNINGHAM, AND COLONEL MEADOWS TAYLOR, &c.

SIMLA LIBRARY.  
 REVENUE AND AGRICULTURAL DEPARTMENT.  
 No. \_\_\_\_\_

INDIA MUSEUM.

1869.

10857



CSL

## ARCHÆOLOGICAL SURVEY OF INDIA.

## REPORT

ON THE ILLUSTRATION OF THE

## ARCHAIC ARCHITECTURE,

OF INDIA, &amp;c.,

BY

DR. FORBES WATSON,

WITH

APPENDICES

BY

MR. FERGUSSON, GENERAL CUNNINGHAM, AND COLONEL  
MEADOWS TAYLOR, &c.

INDIA MUSEUM.

1869.



REPORT by Dr. FORBES WATSON on the Illustration of the Archaic Architecture, &c., of India.

---

The subject of the illustration of the Archæological remains of India may be arranged under two heads, the first having reference to their pictorial representation, by means of photographic and other processes, and the second to the utilization of the materials and of the information obtained.

Under the first head come :—

1. Photographs ;
2. Drawings ;
3. Plans, Sections, and other Architectural Drawings ;
4. Models ;
5. Moulds and Casts.

All these involve operations distinct in themselves, and each requiring a special training on the part of those conducting them.

1. *Photographs.*—It is scarcely necessary to refer to the vast importance of photography as a means of affording a truthful delineation of structures of every description, and of imparting an accurate impression of their architectural features.

To effect this, however, it is necessary that the pictures should be of considerable size, at least 8 in.  $\times$  10 in., and it is essential that the operator should take his views from the points best calculated to ensure results of value, architecturally considered.\*

In order to be able to indicate what already exists in the way of photographs of Indian buildings, I obtained from Mr. James Fergusson the memorandum which will be found annexed at page 7.

It will be observed that the list of existing photographs given by Mr. Fergusson consists mainly of those obtained by himself from various sources, and prepared for the late Paris Exhibition.

Since that time, considerable additions to the stock of photographs of Indian structures have been made in connexion with the scheme of the Government of India for the conservation and illustration of the architectural remains existing throughout the country, and, although much has yet to be done, it is evident that the time is not far distant when it will be possible to make a *selection* which, with plans and drawings, and with full verbal information—the whole classified so as to show succinctly the various Indian architectural styles and periods—will probably constitute the most valuable work on art produced in the present century. To this end it is, however, essential that the negatives of the different subjects should be obtained and forwarded to this country, and that in the instances in which these cannot be procured fresh ones of the best quality should be taken. In all cases the negatives should be carefully numbered and packed, and proofs of each negative, dated, numbered and labelled, should be likewise forwarded.

The important memorandum by General Alexander Cunningham, formerly Archæologist to the Government of India, which will be found

---

\* In order to give an idea of the size of the building, one or two ten-foot rods or scales, divided into feet, should be employed, so as to come into the photograph,—one being set upright, the other placed horizontally, in some convenient position, where it will not interfere with the view of important details.

at p. 25, gives a brief account of the various styles of architecture which exist in the country, and indicates groups of subjects of which it is desirable that photographs should be obtained.

2. *Drawings, coloured.*—Whilst the employment of the art of photography for the production of illustrations of sculptured structures is not only valuable, but indeed indispensable, there are many buildings in India—the Taj Mahal for instance—which it is impossible to represent by means of photography alone, in consequence of the introduction of colour in the form of inlaid marbles or mosaics, or of coloured tiles, brick, or stone, or even of fresco paintings.

It will, therefore, be necessary to have drawings taken of such buildings, giving, as nearly as possible, an exact representation of the colour, as well as of the form.

These drawings, especially in the case of large buildings, should not be of less size than 24 in. × 18 in. In some instances it will be desirable to have drawings made of particular portions, such as the ornamentation of panels or other points of special artistic merit.

In the India Museum collection there are two or three excellent drawings of the kind now referred to, and it is probable that the authorities in India will experience but little difficulty in obtaining on the spot the services of native artists possessed of much skill in this sort of work, and well able to execute fac-simile drawings of minute details, as, for instance, of some of the mosaics alluded to in the last paragraph of General Cunningham's memorandum, or of the paintings found on the walls of certain buildings, some of which are of extreme interest.

3. *Plans, Sections, and other Architectural Drawings.*—For the execution of these it will be necessary to obtain the services of properly qualified draughtsmen. The importance of having ground plans, sections, &c., drawn to scale,\* of many buildings, has already been alluded to in the Despatch of the Secretary of State, No. 165 (Public), of 9th December 1867.

It is anticipated that, when the field of action has once been planned, there will be no difficulty in finding in the Public Works, or other Departments, subordinates capable, under proper supervision, of carrying out this kind of work.

4. *Models.*—The admirable harmony of design in many Indian structures can only be fully understood when they are seen in their entirety, and of such it is desirable that models should be constructed to some convenient scale. This would involve an amount of skill in carving which, in Europe, could only be obtained at immense cost, but, on the spot, an aptitude for and skill in such work, probably unequalled in any country, can be readily procured at a comparatively cheap rate, and should accordingly be taken advantage of.

5. *Moulds and Casts.*—The importance of representing the different styles of Indian architectural ornament, and even of more or less complete structures, by means of casts, having been brought under consideration by the Lords of the Committee of Council on Education, a series of experiments were instituted with the view of determining the best methods of accomplishing this object.

---

\* In order to ensure uniformity, the following has been suggested by Lieutenant Cole, R. E., as the scale for plans and drawings, and is that which should, for the future, be adopted in all cases, viz., 10 feet to an inch for plans and drawings, 50 feet to an inch for groups of buildings, and 1 foot to the inch or full size for details.



The reproduction in this Department of Montgomery Martin's large relief map of India, covering an area of 144 square feet, in *papier-mâché* and *carton-pierre*, suggested the application of the same materials to the production of light but durable moulds from which casts in plaster might afterwards be taken.

The problem to be solved was to secure, by a process which would be easy of execution, certainty of fac-simile, solidity, lightness, and the power of obtaining a number of copies from the same mould. It is believed that these objects will be attained by following the processes described at p. 39 *et seq.*

The point which mainly required consideration, in order to make the processes in question applicable to the operations now in view, was how to render the moulds impermeable to moisture, and consequently capable of retaining their form, and of allowing several casts to be taken from the same mould.

M. De Laval, the author of a small treatise, entitled, "*Manuel complet de Lottino-plastique*," claims the credit of having been the first to demonstrate practically the efficiency of the paper-moulding process—a modification of which was the method first adopted in this Department—and his observations on the subject are the more valuable from the fact that the operations which he describes were carried out in Persia and Arabia, and that their object was similar to that which is now under consideration with respect to India.

A translation, by Lieutenant Waterhouse,\* R.A., of all that has reference to the process, is appended at p. 45.

#### *Objects of which it is desirable to obtain Casts.*

The memorandum at p. 20 received from Mr. Fergusson, indicates a number of objects of interest of which it is considered desirable that casts should be obtained, and others are referred to in the memorandum by General Cunningham at p. 25.

The application of the processes described would, it is believed, admit of good moulds being readily obtained from the great majority of the objects alluded to. Even in the case of large erections like the gateways to the Sanchi Tope, it is not anticipated that, under proper supervision, there will be any serious difficulty in taking moulds from which copies may afterwards be made.

What probably will chiefly determine the propriety of attempting to take casts of *structures of large size* will not so much be the question of cost as that of the artistic value of the copies when set up. It is very doubtful if large *stucco* erections, however faithfully they may reproduce the form, impart a satisfactory impression of the original. Casts of certain complete and large structures set up in this country would no doubt prove both curious and interesting, but it is probable that, from an artistic point of view, and especially as concerns exhibition in India, the course which would best repay the labour and cost would be to confine the operation of moulding to the production of casts from portions of pillars or other smaller objects exhibiting examples of peculiar ornamentation, &c.

In short, while moulding is undoubtedly a valuable agent for the production of copies of architectural ornament and details, its application is limited. After the objects or structures attain certain dimensions, the employment of photography, or of drawing, can generally be had recourse to more successfully and satisfactorily, whilst in many instances well made models will prove still more effective.

In the case of inscriptions, it will be found, in the majority of instances,

---

\* Lieutenant Waterhouse is practically acquainted with the processes here described, having worked at them with Mr. Griggs, in this Department, before leaving for India in January last.

that well executed photographs will prove equal, if not superior, to casts as well for scientific as for exhibition purposes.

With reference to the question of the transference from India to this country of originals instead of casts, there will doubtless be instances in which, from the existence of duplicates, it will be possible to send hither original specimens of sculpture, which would be regarded with deep interest, and which would tend to foster an appreciation of Indian art, and to excite admiration and respect for a people whose past as well as present give evidence of such taste and skill.

While this important object is not forgotten, it must be kept in view that it is also of great moment that India should receive her just share in such distribution. Every opportunity should be taken in our Indian Museums to place before the Native artisan the best examples of his country's skill, and in this way to conserve for his use the monuments of an artistic power which still lives in him, and the fostering of which is one of the highest duties of the State.

At the same time, however, it has to be remarked that all antiquities are more interesting *in situ*. There are doubtless many objects which may with advantage be removed to Museums, but, unless for some good reason, localities ought not to be deprived of their historical relics.

On the subject of the organization required in India for the purpose of carrying out the various objects referred to, and also for determining the history, date of construction, and present use and condition of the different architectural remains existing in the country, the annexed letter from Mr. Fergusson, (p. 23), will receive the consideration it merits, coming as it does from one who is so well qualified to speak on such matters, and who takes the deepest interest in a scheme from which he anticipates very important results to art, both in India and in Europe.\*

Mr. Fergusson makes some observations on the expediency of appointing, in each Presidency at least, an officer possessed of a sufficient amount of archaeological knowledge and love for the subject, whose duty it would be to devote his whole time and attention to the work.

This opens up an important aspect of the question, as affecting the value of the work executed. In the absence of a responsible head, possessed of the requisite knowledge to decide on what should be done, and able to look after its execution, it is not difficult to foresee that time is likely to be wasted in taking casts, photographs, or drawings of objects of little value when compared with others.

But while a certain number of appointments of the kind in question would appear to be essential to the systematic production of good work, it should not be lost sight of, that, in dealing with such a vast field as India presents, it would be necessary to obtain assistance from a variety of sources, and this can best be done by getting as many persons as possible to take an interest in the matter.

In addition to the Superintendents, whose business it would be to see that the work in each of the Presidencies was properly carried out, the members of our Indian Asiatic Societies, and others who take an interest in the subject, might, with great advantage, be induced to form

---

\* Since the above observations, and those which follow, were written, the remarks by General Cunningham, appended to his memorandum at page 33, have been received, and may be referred to with advantage.



themselves into committees, capable of rendering valuable information and assistance.

With regard to the question of the best mode of obtaining the photographs, drawings, plans, &c., which are required, the following observations are submitted.

As regards photographs, it is clear that, for the purpose of securing the illustrations required for carrying out the present scheme of the Government, it will be necessary to make arrangements for the employment of either amateur or professional photographers, during the whole working season of the next four or five years. Unless this be done, the work, if done at all, will be extended over a great number of years; whereas, if systematically set about, and prosecuted with energy, the whole may be satisfactorily completed in a comparatively short time.

Although largely indebted to amateurs for numbers of beautiful photographs of Indian subjects, still there can be no doubt, that, as a rule, the work executed by professional artists is of superior quality, and therefore, unless in exceptional cases, it will probably in the end be found both better and cheaper to employ the latter.

The views to be taken of any structure should be determined by competent persons, and in entering into a contract it should be arranged that good negatives only would be accepted, and that all negatives, by whomsoever taken, should become the property of the Government, and be thus available for multiplication.

With regard to the coloured drawings, these can readily enough be made the subject of contract with Native artists for such number of copies as may be required. So also with regard to the models, the execution of which might, in like manner, be assigned to Native workmen.

For the production of ground plans and sections, and other strictly architectural drawings, it will be necessary to obtain from the Public Works Department, from our schools of art, or from other sources, persons skilled in this class of work.

With reference to that part of the scheme which involves the operation of casting, it is a question whether it would not be expedient to organize and send out a party of men already trained to the work, with a view to their being employed in taking moulds of such *large* structures as may be *specially* required for the purposes of the Science and Art Department in this country.\*

The next point for consideration will be how to utilize the photographs, drawings, plans, casts, &c., as well as the information obtained in the course of carrying out the scheme of the Government.

In the first place, then, it is desirable that copies of the whole of the photographs, plans, sections, &c., should be taken in duplicate, one set to be retained in India and the other forwarded to this country. The negatives, for the reasons given in the Despatch of the Secretary of State of 9th December 1867, should in all cases be sent with the photographs to this Office.

With respect to coloured drawings and to models, duplicates of these should, in many instances, be likewise taken, one set being retained for exhibition in the Central Museum nearest to the locality in which the original building is situated.

---

\* Since the above was written, Lieutenant H. H. Cole, R.E., has been deputed to this country for the purpose indicated.



The question of the supply to museums\* in India of copies of the carbon prints from the photographs and drawings would afterwards come under consideration, as it is undoubtedly important that India should be made extensively acquainted with her own works of art. In no way can this be so readily accomplished as by showing her faithful representations of these, and for this purpose photography is an agent of unequalled power—one the value of which has been much enhanced by the processes for obtaining *permanency* which have been lately introduced.

With regard to casts of moderate size for exhibition in India, if care be taken to select only what is artistically important as exhibiting fine examples of ornamentation, it may be assumed that copies would frequently be required for use in India as well as in this country, and, with this view, looking to the simplicity of the processes before alluded to, it is recommended that moulds of such objects should be taken in duplicate, one to be retained for use in India, and the other to be sent to this country.

The subject of *utilizing the general information* forwarded to this country along with the photographs, drawings, &c., has now to be considered. A vast amount of important descriptive matter relating to the architectural remains of India, will certainly accumulate in this Office, and after everything has been done to use the photographs, &c., for museum purposes, there will still remain the important question of the best mode of giving publicity to the knowledge thus acquired; and on this point it may be observed, that the great facilities for illustration, arising from the means now available in this department, afford an opportunity for the production of a series of volumes worthy of the enterprise which the Government of India has undertaken.

To this end, however, it would be essential to secure the services of some one acquainted with the subject, and able to select and deal with the accumulated stores of information in the manner best calculated to accomplish this important object.

Indeed, having regard to the vast extent of the subject, and to the fact that it admits of a natural division into several sections, it will probably be expedient to divide the labour, and to obtain, if possible, the services of two or more Editors, who would each undertake to deal with a particular branch of the subject.†

J. FORBES WATSON.

The India Museum, India Office,  
15th March 1869.

---

\* With the facilities at command in this Department for mounting such objects cheaply and effectively, it will be possible to furnish museums in India with whatever illustrations it might be deemed proper to exhibit in them at less cost than if got up in India.

† In General Cunningham's memorandum (p. 25), it will be found that the archaeological remains of India are divided into the following groups,—1st, Architecture; 2d, Sculpture; 3d, Inscriptions; and, 4th, Coins. The last group, as forming an enduring record of, as well as key to, literary and historical facts of the highest interest, is worthy of a place in any scheme which, like the present one, has for one of its objects the illustration of the antiquities of India.

The memorandum (p. 35) by Colonel Meadows Taylor, on the Pre-historic Archaeology of India, will likewise be read with interest. It indicates the various points regarding which specific information is required, and it supplies an important section, which does not come directly within the scope of General Cunningham's memorandum.



## APPENDIX.

- A. Memorandum by Mr. Fergusson regarding the architectural objects in India, of which it is desirable photographs should be obtained.
- B. Memorandum by Mr. Fergusson regarding objects in India of which it is desirable casts should be obtained (p. 20).
- C. Extract from letter by Mr. Fergusson, referring to the scheme for the conservation and representation of ancient monuments in India (p. 23).
- D. Memorandum by General Cunningham on the archæological remains of India (p. 25).
- E. Memorandum by Colonel Meadows Taylor on the pre-historic archæology of India (p. 35).
- F. Description by Dr. Forbes Watson of process for taking moulds from sculptures in bas-reliefs, &c., in India (p. 39).
- G. Description of M. Lottin de Laval's process for taking moulds from bas-reliefs, &c. (p. 45).

A.—MEMORANDUM by Mr. FERGUSSON regarding the Architectural Objects in India, of which it is desirable Photographs should be obtained.

The most convenient manner probably to explain what has been accomplished, and what still remains to be done, in photographing the ancient architecture of India, will be to base my observations on the catalogue of the collection I prepared for the Paris Exhibition of 1867. This consisted of about 500 representations of Indian buildings, which were selected out of a collection exceeding 1,000 in number, which I either possessed myself or had at my command, and as will be seen from the sequel they ranged over the whole continent of India.

In the following remarks I shall follow the same order as that on which the catalogue was compiled and begin with

*Orissa.*

The great temple, Bobaneswar, or Bhuvanewar.  
The Lion's Gate of the great temple.  
Tank to the east of the great temple.  
Group of temples to west of great temple.  
The Annuntu Basa Devi temple.  
The Mookteswar temple.  
The Pursuram Iswar temple.  
The Boital temple.  
The great temple of Juggernaut.  
Monolith in front of temple of Juggernaut.  
Monolith at Jagepore.

The photographs in this list, with the exception of the last two, are from a collection of about 30 published by Major Dixon. They fairly represent the buildings of the district, with the exception of the Black Pagoda, which is entirely omitted. This is to be regretted, as it is one of the most beautiful of the series, and fast going to ruin, being used as a quarry by the zemindars in the neighbourhood. If a party were despatched to Cuttack to cast the sculptures in the caves, I would recommend their being accompanied by a photographer. He would easily find plenty of interesting objects to employ himself upon, besides those



taken by Major Dixon, but I would not at present recommend any one being specially despatched for this purpose only. There are many more pressing objects.

*Behar.*

Lomas Rishi cave.  
Lomas Rishi cave.  
Sat Gurba cave.  
Temple at Boodhgya.  
Temple at Koch Behar.  
Temple at Deo.  
Temple at Oonga.

*Sarnath.*

Ancient Buddhist tope.  
Remains of brick tope.  
Carving on Buddhist tope.  
Carving on Buddhist tope.

*Benares.*

General view from opposite bank of Ganges.  
The river and bridge of boats.  
The city and ghâts from top of great mosque.  
The great mosque of Arungzebe and adjoining ghâts.  
The burning ghât.  
The temple of "Vishnū Pud."  
Rajah Jey Singh's observatory.  
Suméree temple at Ramnuggur.  
Suméree temple at Ramnuggur, showing carvings  
in lower portion.  
Carvings on Rajah Amehti's temple.

The same remarks apply to the Central Bengal Provinces. Although the above are a very imperfect representation of the buildings of Behar and Benares, they are selected out of a great number, and more might, I have no doubt, be easily procured. Plans are more wanted in this district than photographs, though if procurable without much expense, additions to our stock would be welcome.

The only important city of which I have never seen a photograph is Juanpore,\* though it is perhaps the most important in the district, whether regarded from an architectural, or antiquarian, or artistic point of view. If an amateur or professional photographer could be obtained to supply this want, at a moderate expense, it would be most desirable.

Gour has been thoroughly photographed by Mr. Ravenshaw, B.C.S., though impressions of his photographs arrived just too late for the Paris Exhibition.

*Kashmir.*

Ancient temple at Nowshera.  
Ancient temple at Nowshera; inner temple.  
Ruins of Martund, from south-east.  
Ruins of Martund; central building.  
Tukht-i-Soliman.  
Bridge on the Marqual Canal.  
Merchants' houses on the Marqual Canal.

*Srinuggur.*

Shah Hamadan Musjid.

*Shalimar.*

Nautch bungalow.

\* Since this was written, I have been told that some photographs of Juanpore have reached this country, though I have not seen them myself.

*Kangra.*

Ancient temple.  
Porch of temple at Byjnath.  
Stone bullocks in ancient temple.

*Chergaon.*

Temple.

*Simla.*

Temple near waterfall.

*Pangi.*

Temple.

*Chumba.*

Temples and bazaar.

*Derali.*

Small temples on the Ganges.

*Bheem Tal.*

The lake, from near the Dâk Bungalow.

*Lahore.*

Huzoori Bagh and fort.  
The city, from Wuzeer Khan's mosque.  
Runjeet Singh's tomb.  
View from palace in fort.

*Umritsur.*

Babatal temple.  
The golden temple.  
Gateway of the Rain, Bagh.  
Golden gate and entrance to the temple.  
The sacred temple.  
The Akal Boonga.  
Baba Atal's temple.  
View through piazza leading to Sikh temple.  
Interior of Sikh temple.  
Golden gate of Sikh temple.  
Street inside sacred tank area.  
Baba Atal's temple.

*Hurdwar.*

View from opposite bank of the Ganges.

*Delhi.*

The Kootub ; colonnade of Hindu pillars.  
The Kootub ; interior of eastern colonnade.  
Ala-ood-deen's gateway.  
Tomb of Shumsh-ud-deen Altumsh.  
Mausoleum of the Emperor Humaioon.  
View from top of Humaioon's tomb.  
The Jumma Musjid, from north-east.  
The Kila Kona mosque.  
Mausoleum of Sufter Jung.  
Tomb of Nizam-ood-deen.  
Tomb of Mirza Jehangir.  
Interior of Chousut Kûmba.  
The palace ; the Motee Musjid.  
The palace ; interior of the Dewan-i-Kass.  
Tomb of the Emperor Togluk.  
Ruins of the fort of Toglukabad.

The Kootub ; exterior of Hindu court.  
The Kootub ; Hindu court.  
The Kootub ; interior of Hindu court.  
The Kootub ; Hindu court.  
The Kootub ; interior of Hindu court.  
The Kootub ; part of the temple-mosque.  
The Kootub-Minar.  
The Kootub ; part of the front of the Mahomedan façade.  
The Kootub ; north-west corner of the inner enclosure.  
The Kootub ; central arch of Mahomedan façade.  
The façade on the south side of the outer enclosure.  
The Kootub ; gateway on south side.  
The Kootub ; marble tomb and gateway, south side.  
The Kootub ; tomb of Goree Shah.  
Tomb of Sufter Jung.  
Tomb of the Emperor Hoomayun.  
Tomb of the Emperor Hoomayun.  
The Jumma Musjid.  
The Jumma Musjid.  
The Jumma Musjid ; general view.  
The Jumma Musjid, from the courtyard.  
The palace ; Lahore gate.  
Modern Jain Temple.

*Agra.*

Front of the Motee Musjid.  
Interior of the Motee Musjid.  
The marble palace of Shah Jehan, with the Taj in the distance.  
The marble palace of Shah Jehan.  
The fort ; exterior of the Zenana.  
The fort ; exterior of the Zenana.  
The Taj Mahal.  
The Taj ; screen enclosing the sarcophagi.  
Mausoleum of Prince Etimad-Dowlah.  
Mausoleum of Prince Etimad-Dowlah, from the gate.  
Tomb of Etimad-Dowlah.  
Tomb of Etimad-Dowlah.  
The fort ; pavilions in the harem court.  
The great court of the fort.  
Dewan Khas, in the fort.  
Summun Boorj, in the fort.  
The Taj Mahal.  
Dewan Khas, in the fort.  
The Taj Mahal from the river.  
The Taj Mahal, from the garden.  
The Taj Mahal ; near view from the river.  
The principal gateway of the Taj.  
The Taj from top of gateway.  
Gateway of the Taj.  
Mootee Musjid.  
Akbar's Palace, in fort.  
The gate of the fort.  
The Jumma Musjid.  
The fort, from the south-west.  
Pillars in the palace of Akbar.

*Secundra.*

The entrance gate, from the garden.  
The Mausoleum of Akbar ; the upper marble sarcophagus.  
The mausoleum of Akbar, from an angle of the first terrace.  
Mausoleum of Akbar.

Gateway of mausoleum at Akbar.  
 View from top of entrance gate.

*Futtehpoore Sikri.*

The great gate, Futtehpoore Sikri.  
 The mosque on the western side of quadrangle.  
 Interior of the great quadrangle.  
 Interior of the great quadrangle, showing inner side of great gate.  
 General view of the ruins.  
 View of the ruins from top of the Dewan-i-Kass.  
 Akbar's office.  
 Tomb of Sheik Selim Chisti.  
 Two of the marble screens in tomb of Sheik Selim Chisti.  
 Pillar in tomb of Sheik Selim Chisti.  
 Temple of Gooroo-ki-Mandi.  
 The Panch Mehal.  
 The palaces of the Sultana of Constantinople.  
 The Dewan-i-Kass.  
 The palace of Beerbul.  
 The Elephant Tower.  
 Pillars in the Panch Mehal.

*Muttra.*

Jumma Musjid.  
 Jumma Musjid.

*Lucknow.*

Tomb of Saadat Ali in the Kaiserbagh Palace.  
 Small mosque in the Kaiserbagh.  
 Mosque in the interior of the Hoseinabad Emambara.  
 The Shah Mujjuf.  
 The Hoseinabad Emambara.  
 Tomb of Asph-ud-Dowlah.  
 Buildings in the garden of the Hooseinabad.  
 View from the terrace of the Hooseinabad.  
 The Roumi Darwaza, in the fort.  
 Great Emambara and mosque.  
 General view from the fort.  
 Gateway of the Hooseinabad Bazaar.  
 The Hooseinabad Emambara.  
 View in the Kaiser Bagh.  
 The Kaiser Pasund ; from south-west.  
 The Chutter Munzil ; west side.  
 The Kaiser Pasund ; from north-west.  
 The Chutter Munzil.  
 The mermaid gate, Kaiser Bagh.  
 East gate of the Kaiser Bagh.  
 The Chutter Munzil, from the river.  
 Vinery and buildings in the Kaiser Bagh.  
 The Roum-i-Durwaza.  
 Roomi Gate and the Emambara.  
 Mosque inside Asph-ud-Dowlah's Emambara.  
 The Farad Buksh Palace, with bridge of boats.  
 Gateway leading into the Kaiserbagh.  
 General view of Hoseinabad from the Jumma Musjid.  
 The Martiniere.  
 The Begum Kotie.

*Gwalior.*

The palace and principal entrance.  
 The fort and city, from the ramparts.  
 The Happy Valley ; Buddhists figures cut in the rock.

Rocks, with sculptured figures.  
Jaina temple, in the fort.  
Jaina temple ; the entrance.

*Bindrabund.*

Hindu temple, erected during reign of Akbar, 1556—1605.  
Hindu temple.  
Group of modern temples.

*Goverdhun.*

The palace and tank.  
Upper portion of the palace.  
Gate of Shet Likhmechund's temple, Bindrabun.  
Cenotaph of Rajah Buldeo Singh, Goverdhun.  
Cenotaph of Rajah Sooruj Mull, at Goverdhun.  
Cenotaph of Rajah Sooruj Mull, at Goverdhun.

*Deeg.*

The fort from the north-west.  
General view from the fort.  
The palace and tank.  
The palace, from the garden.  
The Nūndh Bhōwūn ; interior

*Rajpootana.*

Palace of the Winds at Jeypoor.  
Palace and citadel, Ambèr.  
Inner court of the palace, Ulwur.  
The Motee Doongree palace, Ulwur.  
Temple at Parusuath, Jhalra-Pattun.  
The great temple, Jhalra-Pattun.  
Tank at Ulwur.  
Temples and tank, Ulwur.  
Temples and hill fort, Ulwur.  
A chutree at Rajgurh.  
The garden palace, Deeg.  
The garden palace, Deeg.  
The town and palace, Boondee.  
The palace, Boondee.  
Cenotaph of Rao Rajah Bukhtowar Singh, Ulwur.  
Gateway of the palace, Ambèr.  
Temple at Banghur.

*Oudeypore.*

Carvings on Juggernaut Raj Temple.  
Front of Juggernaut Raj Temple.  
Tomb of "Suggram Sing."  
Carvings on a Hindoo temple.  
Hindoo temple.  
Hindoo temple.  
Tripolio gateway to the Maharana's palace.  
Court and garden in the Jugneewaz water palace.  
Tomb of Ahmeer Sing.  
View in the royal burial grounds.

*Mandoo.*

The Water palace.  
Jumma mosque.

*Cawnpore.*

Screen surrounding the memorial well, designed by Colonel Yule; the marble statue by Marochetti.  
The memorial well, with English church in the distance.

*Benares.*

## Queen's College.

These photographs,—upwards of 200 in number,—were selected out of a collection containing 180 architectural photographs by Stephen Bourne, 64 by Major Impey, about as many by Beato, 14 by Captain Taylor, of Oudeypore, and some 40 or 50 by various amateurs.

They range from Cashmere to Cawnpore, and over the greater part of Rajpootana, and, as I know of the existence of others which I have not been able to obtain, I am of opinion that the North-West Provinces of India have been fairly represented by photography, and I cannot recommend any expenditure by Government for the purpose beyond the purchase of negatives of the above or of any other buildings not mentioned in this list. This last remark applies more especially to buildings in Rajpootana, which are not easily accessible, and but sparingly represented in the above list.

*Saugor.*

Temple at Pathári.  
Lát at Pathári.  
Ruins of Jain temple at Gyraspore.  
Porch of temple at Pathári.  
Temples at Bhilsa.  
Archway at Gyraspore.

In addition to the above very meagre list, 20 photographs of the Sanchi Tope by Lieutenant Waterhouse are in course of publication, and the same Officer has several others, taken in the same neighbourhood. But, generally speaking, the district, though one of the richest in ancient remains, and one of the most interesting in India, is a blank in so far as photographic or artistic representation of any sort is concerned. Khajuráho, Chandaree, Pattarya, Eerun, Seoni, and many other places, though full of the most interesting remains, are comparatively unknown to us, and the country about Nagpore, and down to Chanda, is equally a blank. It is also in this country that the remains are more likely to be utilized by the railway engineers, and where, therefore, the greatest necessity exists for some efforts for their conservation.

If, therefore, a party should be sent to cast the sculpture at Sanchi, I would earnestly urge that they should be accompanied by an antiquarian and a photographer, and an effort made to illustrate the district. The railroad being open to Jubbulpore, it is very easily accessible, and an officer establishing his head quarters at Saugor, or in some such central locality, could easily command the whole.

## BOMBAY PRESIDENCY.

*Karlee.*

Exterior of cave.  
Cave; interior of great hall.

*Elephanta.*

Entrance to cave.  
The Lions' Cave; exterior.  
Interior of cave; nuptials of Siva and Parbutty.  
Interior of cave.  
Interior of cave; western aisle.  
Cave; interior from entrance.

*Ellora.*

- The two Chendwassas; exterior.  
Dehrwarra; exterior.  
Viswa Karma, Chaitya cave; exterior.  
Viswa Karma; the hall.  
Viswa Karma; sculptures in left gallery.  
Viswa Karma; sculptures in right gallery.  
Teen Tal; interior of great hall.  
Teen Tal; exterior.  
Kailas; exterior.  
Kailas; the great temple.  
Kailas; exterior, obelisk, and muntapa.  
Kailas; porticos and base of great temple.  
Kailas; exterior of Lanka cave.  
Kailas; interior of Lanka cave.  
Kailas; interior of court of nine Durgas.  
Kailas; interior of court of nine Durgas.  
Doomar Lena; the colonnade.  
Doomar Lena; interior.  
Doomar Lena; Siva as Vira Badhra.  
Doomar Lena; Siva and Parbutty.  
Ravana Ka Kaie; interior.  
Ravana Ka Kaie; interior.  
Ramwarra; the entrance.  
Ramwarra; the interior.  
Ramwarra; the Ling Chapel.  
Das Avatar; interior of great hall.  
Pseudo-structural temple in courtyard of Indra Subha.  
Indra Subha; exterior.  
Indra Subha; left gallery.  
Indra Subha; right gallery.  
Indra Subha; interior of grand hall.  
Indra Subha; interior of temple.

*Dharwar.*

- Ruined temple, Hooblee.  
Temple at Gokak.  
Temple at Bunkapoor.  
Porch of a Jain temple, Belgaum.  
Temple at Purudkul.  
Porch of a Sivite temple, Moongoor.  
Temple at Lukhmeshwur.  
Sculptured capital, Kirwuttee.  
Temple at Hurulhully.  
Details in temple at Hurulhully.  
Jain temple, Lukhoondee.  
Temple of Someshwur, Hurulhully.  
Temple at Kirwuttee.  
Temple at Lukhmeshwur.  
Temple at Iwullee.  
Double temple at Hurulhully.  
Temple at Dumbul.  
Temples at Purudkul.  
Temple at Iwullee.  
Temple at Iwullee.  
Temple at Hurpunhully.  
Group of temples at Bunshunkuree.  
Sculptured memorial stone at Hungul.  
The palace, Seerhuttee.



Window of perforated stone, Nursapoor.  
Window of perforated stone, Nursapoor.  
Doorway in temple at Hungul.  
Doorway in temple at Hungul.  
Stone with inscription at Huryhur.  
Sculptured memorial stone, Hungul.

*Purudkul.*

Great Sivite temple.  
Great Sivite temple.  
Great Sivite temple.  
Great Sivite temple.  
Group of temples.  
Group of temples.

*Ahmedabad.*

The Jumma mosque; the centre arch.  
The Shapoor mosque.  
Seedee Busseer's mosque and tomb.  
Seedee Busseer's mosque and tomb.  
Meer Aboo Tooráb's tomb.  
Mulik Alum's mosque.  
The queen's mosque in Mirzapoor.  
Seedee Syeed's mosque; window of perforated marble.  
Hybut Khan's mosque.  
Hybut Khan's mosque; the porch.  
Syud Alum's mosque.  
Mulik Alum's mosque.  
The Jumma mosque; the centre arch.  
Syud Alum's mosque; the centre arch.  
The Jumma mosque.  
The Jumma mosque; part of northern colonnade.  
The Jumma mosque; the centre mehráb.  
The Jumma mosque; pillars in the interior.  
The Jumma mosque.  
Ránee Seepree's mosque and tomb.  
Ránee Seepree's mosque, from south.  
Ránee Seepree; the mosque.  
The queen's mosque in Mirzapoor; base of northern minaret.  
The Jumma mosque; niche between the side arches.  
The queen's mosque in Mirzapoor; niche in base of northern minaret.  
The queen's mosque in Mirzapoor; northern side arch.  
Seedee Syeed's mosque; window of perforated marble.  
Seedee Syeed's mosque; window of perforated marble.  
Ránee Seepree; base of tomb.  
The queen's mosque in Mirzapoor; the adjacent tomb.  
Tomb of the queens of Ahmed Shah I.  
Tomb of Ahmed Shah I.  
Sirkhej; view from south-west corner of the tank.  
Sirkhej; view from south-east.  
Sirkhej; pavilion and tomb of Gunj Buksh.  
Sirkhej; tomb of Gunj Buksh from north-east.  
Sirkhej; waste weir of the tank.  
Howz-i-Kootub; tank.  
Butwa; tombs of Kootub-i-Alum and his son.  
Syud Oosmán's mosque.  
Seedee Busseer's mosque and tomb.  
Mooháfiz Khan's mosque.  
Mea Khan Chishtee's mosque.

Syud Oosmán's mosque ; part of north side.  
 Mooháfiz Khan's mosque ; base of southern minaret.  
 Mooháfiz Khan's mosque ; base of northern minaret.  
 Mooháfiz Khan's mosque.  
 Dustoor Khan's mosque ; the colonnade.  
 Mooháfiz Khan's mosque ; niche in base of minaret.  
 Moonáfiz Khan's mosque ; niche in base of southern minaret.  
 Mooháfiz Khan's mosque ; niche in base of southern minaret.  
 Mooháfiz Khan's mosque ; summit of a minaret.  
 Achoot Beebee's mosque.  
 The queen's mosque in Sárungpoor ; central arch.  
 Dádá Huree's well at Asárwa.  
 Shah Alum ; interior of mosque.  
 Dustoor Khan's mosque ; perforated stone window.  
 Shah Alum ; a small tomb.  
 Shah Alum ; tomb of the saint.  
 Shah Alum ; the mosque.  
 Mosque of Mahomed Ghous.  
 Mosque of Mahomed Ghous, from the south.  
 Mosque of Mahomed Ghous ; the interior.  
 The Shápoor mosque.

*Beejapoor.*

Ancient mosque in the citadel.  
 Ancient Hindoo college in the citadel.  
 Part of the walls of the citadel.  
 Unfinished mausoleum of Ali Adil Shah I.  
 Plans and sections of the Gol Goomuz.  
 The Gol Goomuz ; general view.  
 Plans and sections of the Gol Goomuz.  
 The Sath Khundi, or Palace of Seven Stories.  
 Plans and sections of the Ibrahim Rôza.  
 Mausoleum of the Ibrahim Rôza.  
 Plans and sections of the Ibrahim Rôza.  
 Plans and sections of the Ibrahim Rôza.  
 Plans and sections of the Ibrahim Rôza.  
 Mosque of the Ibrahim Rôza.  
 Plans and sections of the Mehturee Mahal.  
 The Mehturee Mahal ; general view.  
 Plans and sections of the Mehturee Mahal.  
 Plans and sections of the Mehturee Mahal.  
 Plans and sections of the Jumma Musjid.  
 The Jumma mosque, from the courtyard.  
 Plans and sections of the Jumma Musjid.  
 Plans and sections of the Jumma Musjid.  
 Mosque of Yakoot Dabooli.  
 The Jumma mosque, from the north-east.  
 Plans and sections of the Ashar Mobarak.  
 The Ashar Mobarak ; general view.  
 Mausoleum of Begum Sahib.  
 Mausoleum of Kishwur Khan and Huzrut Shah Ahmed.  
 Mosque in the fort.  
 Tomb of saints ; names unknown.

Owing to various series of illustrations of the caves having been published, and the three great works on Dharwar, Beejapore, and Ahmedabad, which were published last year in this country, it may be said that the Bombay Presidency is further advanced in this respect than her sisters. One district, however, has hitherto been entirely overlooked, and, as it happens, it is the most interesting of all. If ever we are to

learn who the immigrants were who came into India across the Lower Indus, or what the arts of the east borrowed from those of the west, it can only be by the study of the antiquities of Gujerat and Cutch that we can hope to ascertain it. Besides this, the country from Sadree and Abu to Palitana and Somnath is full of buildings of the greatest beauty, and some of them of very great antiquity. Practically, nothing has yet been done to illustrate this district. I would, consequently, earnestly urge on the Government of Bombay the desirability of an expedition in that direction. While, on the other hand, so much has been done in the other districts of this Presidency, that I would not recommend any special mission of photographers to them at present; though, of course, it is most desirable that amateurs should be encouraged to delineate unknown examples, and collections should be made of all photographs available.

MADRAS PRESIDENCY.

*Mysore.*

Gateway of temple of Chamoondee.  
 Gateway of a temple.  
 Gateway and car of temple Chamoondee.  
 Colossal bull at Chamoondee.  
 Colossal bull at the French Rocks.  
 The temple of Hullabeed.  
 General view of temple.  
 Temple, west front.  
 Sculptures in west front of temple.  
 West front of northern vimana.  
 North-west front of northern vimana.  
 South-west front of northern vimana.  
 Sculptures in southern vimana.  
 Pavilion in centre of east front.  
 Sculptures in west front.  
 South-west front of northern vimana.  
 Sculptures in west front.  
 Southern door in east front.  
 South door and north-east angle.  
 South-east angle.  
 South-west front of northern vimana.  
 South-west front of southern vimana.  
 Ganesha, the god of wisdom.  
 South-west front of northern vimana.  
 Catharaswara Pagoda from north-west.  
 Temple of Siva.  
 Catharaswara Pagoda from south-west.  
 Temple of Siva from N.N.E.  
 Temple of Siva.  
 Temple of Siva.  
 Southern pavilion.  
 Sanctuary of southern pavilion.  
 Temple at Belloor.  
 Temple at Belloor; detached building in court.  
 Temple at Belloor.  
 Temple at Belloor; detail.

*Beejanuggur.*

Porch of great temple.  
 Porch of great temple.  
 Porch of great temple.  
 Porch of great temple.



Stone car of god, great temple.  
Small temple.  
Sculptured wall.  
Sculptured wall.  
Principal gateway of a temple.  
Lateral gateway of a temple.  
A small temple.  
General view of ruins.  
Gateway of a temple.  
Elephant stables.  
Interior of great bath.  
Pavilion of palace.  
Treasury buildings.  
Tower in walls.  
Walls of Zenana,  
Car of god, Bunshunkuree.  
Car of god, Seringapatam.

*Carnatic.*

Tanjore Pagoda.  
Great Bull, Tanjore Pagoda.  
Trivalur Temple.  
Gateway of Seringham temple.  
Village temple and idol cars.  
Trichinopoly rock.  
Base of temple, Trivatore.  
Base of small temple, Tanjore.  
Carved stone pillar in pagoda at Perroor.  
Carved stone pillar in pagoda at Perroor.  
Carved stone pillar in pagoda at Perroor.  
Entrance to the Ulsoor Pagoda, Bangalore.  
Pillars of pagoda, Vellore.  
Pillars of pagoda, Vellore.  
Pagoda at Vellore.  
Side entrance to pagoda at Vellore.

The Madras Presidency was very imperfectly represented in the Paris Exhibition, but since then I have received from Dr. Hunter, Superintendent of the Government Industrial Schools, more than 100 very beautiful photographs of buildings in this Presidency. He has trained some of his pupils to be very expert in the art, and every year sends them out to photograph the most interesting remains. All that is within reach of Madras may safely be left in his charge. As the negatives, I presume, are the property of the Government, they might either be sent home or any number of copies furnished which might be required.

The southern part of the Peninsula is probably beyond his reach, but I have been given to understand that a very fine series of photographs of Tinnevely, Madura, Ramiseram, the Seven pagodas, and Tanjore, have just been completed by Captain Lyon. If the negatives of these, or a sufficient number of copies, could be obtained, what we possess would probably suffice for the present, in so far as the Madras Presidency is concerned.

The great deficiency of the Madras series is, that in no instance are the photographs accompanied by either plans or descriptions, and no dimensions are given. As the great temples of this Presidency generally consist of a vast number of different buildings appropriated to various purposes, and of all shapes and ages, plans and descriptions are indispensable in order to render them intelligible. As Dr. Hunter does not seem to have any one who is competent to undertake this branch of the subject, I hope the attention of the Madras Government may be directed to supply the deficiency.



If the number of examples in the above lists were doubled, they would probably fairly represent the amount of photographic illustration at present available for the study of Indian antiquities; and, with the exceptions mentioned, the proportion to each district may also be assumed to be near the truth.

Under these circumstances, if anything is to be done to supply deficiencies, I would suggest that the Government of India be invited to direct its principal efforts to the Saugor and Nerbudda territories, and the Native States immediately surrounding them. I have no doubt but that a competent person could easily be found to undertake the task.

Lieutenant Waterhouse is returning to India. He is an excellent photographer, and knows the country and its antiquities perfectly. If he could be spared from his duties on the Survey, he would do all that could be required.

The Bombay Government, in like manner, I think, should be requested to devote their energies to Guzerat and the neighbouring districts. Messrs. Lindley and Warren have lately been in that district, and, I have reason to believe, would willingly undertake the task; and Mr. Hope is stationed at Surat, and would, I feel sure, be willing to direct them, and no one is more competent to do so.

Apart from these operations in our own territory, it is even more important that photographic incursions should be made into the Nizam's territory. All our inquiries and all our speculations as to the ethnography and antiquities of India are stopped short by our utter ignorance of the great central plateau, where, if anywhere, the wrecks of the past may be expected to be found. What I would suggest, to remedy this, would be, that a party from Bombay should penetrate *via* Kallian and Kulburga, and a party from Bengal *via* Wyraghur and Chanda.

One other point I should like to mention before concluding is, that the photographs to be taken should not, if possible, be less in size than 8 inches by 10. Stereoscopes and those of less dimensions, though very beautiful, are not suited for scientific purposes. It is hardly ever possible to make out the details of architecture in small photographs with sufficient distinctness to reason upon them in a satisfactory manner.

JAS. FERGUSSON.

20, Langham Place,  
June 1868.



B.—MEMORANDUM by MR. FERGUSSON, regarding Objects in India of which it is desirable Casts should be obtained.\*

---

There are, in the Museum of the Royal Asiatic Society at Calcutta and the Central Museum at Madras, a considerable number of pieces of sculpture, some of great beauty and interest, of which it would be desirable casts should be obtained for museums in this country. There must be parties on the spot who know which are best and most suitable.† I may also remark that it strikes me as extremely desirable that the parties who are to be employed in casting the larger objects *in situ*, should first be employed on these smaller antiquities in the local museums.

In the Lahore Museum there is a considerable collection of sculptures obtained from topes in Afghanistan, principally from the neighbourhood of Peshawur, of the Bactro-Indian period, which are of extreme beauty and interest. I believe there would be no difficulty in procuring the originals for this country, and it is more desirable this should be effected if possible. But if this cannot be done, the next best thing, of course, would be casts of them.

I am not aware what antiquities may be collected in any museum in Bombay, but I fancy there must be a considerable number, some of which at least may be worthy of being so multiplied.

#### BENGAL.

The objects in this Presidency of which, in my opinion, it would be most desirable to obtain casts, are some of the sculptures in the caves at Udyagiri, in Orissa, not far from Cuttack.

\*The two best are the bas-reliefs in the so-called Jodev and Ganesh Gurbha Caves. These are figured in the *Journal of the Asiatic Society of Bengal*, Vol. vii., pls. xlii. and xliv. They are about 3 feet in height, and the one 20, the other, I guess, 30 feet in length. They are placed under cover in verandahs about 7 feet from the ground, and therefore very accessible, and, being in low relief, easily cast.

These two were the only caves accessible when I was there, and they are among the oldest and most interesting objects in India. They probably date before the Christian era.

There are other sculptures in other caves in this locality which may be worthy of being cast, but, so far as I can judge from photographs, they are so much damaged by alterations made to render the caves suitable for residences in modern times, as to be now of little value. This, however, could be easily determined on the spot.

The black pagoda at Kanaruc is not far from these caves, and is one of the best and most elaborately sculptured monuments in India. If a party were in that neighbourhood, and had time, they might find numerous objects in that now ruined temple worthy of being cast. It is impossible without photographs or drawings to specify which; but any person in charge of the party ought to have sufficient knowledge of the subject to fix on the best.

---

\* This memorandum was originally prepared for the India Office by Mr. Fergusson. Since then additions have been made to it by him.

† If any of the sculptures or inscriptions from the Amravati Tope which were deposited in the Calcutta Museum by Colonel Mackenzie are still there, casts of them would be most desirable to complete the collection here.



Near Ratrapore there is a temple some of the sculptures of which are figured J. A. S. B. vii. pl. xxxii., which from their style are well worthy of being cast, and if access can now be obtained to the precincts of the old Great Temple at Bhuvanewar, commonly called Bobaneswar, there must be numerous objects within its walls worthy of being cast.

So far as we now know, the temple of Bhuvanewar, dating from the 7th century, is the oldest *Hindu* temple in India, and consequently any information regarding it must be most valuable.

This part of Orissa is full of antiquarian interest, and a party could easily find any amount of employment. So far as I can judge, their relative interest is in the order in which I have named them.

Next in interest to these Cuttack sculptures are the pillars and remains of the Rail that once surrounded the Bo Tree at Boodh Gya in Behar. Some of these are built into the Courtyard of the Mohunt's House. Others form a sort of porch to the present temple, and some are, I believe, *in situ*. Those which are sculptured are equal in beauty and interest to anything in Bengal.

These pillars are not large, from six to eight feet in height, and could easily be cast so as to be restored as a whole.

There are also numerous fragments of ancient sculpture in the neighbourhood of Boodh Gya which are worthy of being cast, but it would require discrimination to say which. The rail is of surpassing interest. It would suffice for the present to photograph the others. In many instances the sculptures themselves could be brought away for less money than it would require to cast them.

#### *Agra and Delhi.*

I am not aware of any objects of Hindu antiquity near these cities which it would be worth while to cast, unless the fragments of the Bhuddist rail discovered by General Cunningham at Muttra have been collected in some local museum (Agra?). If casts were taken of them, they would be of great interest.

Among the Mahomedan remains, there is little if anything after the death of Akbar (A.D. 1605) which is worthy of attention in this respect. After that period, inlaying became the principal means of ornamenting, and that cannot be expressed by casts. At the Kootub at Delhi, however, and in the old Pathan tombs and mosques, there are carved details of Saracenic ornamentation equal to any found in any part of the world, and the carved geometric ornamentation of Akbar's buildings both at Agra and Futtehpore Sicri are unsurpassed of their class.

The so-called gates of Somnath, in the Arsenal at Agra, could easily be cast. They are fine examples of Saracenic workmanship of the 11th century, and consequently earlier than anything else of their class in India.

The pillar and brackets of Akbar's throne at Futtehpore Sikri are of great beauty, and very appropriate for casting, and so is the marble tombstone of Akbar at Secundra.

Besides these, there must be other single objects known to residents on the spot, but which it is difficult to specify, for want of detailed information, which is not, at present, available in this country.

#### *Sanchi.*

There is no monument in the Central Provinces of which it would be so desirable to obtain casts as of the gateways at Sanchi. Two of these are fallen, and the fragments on the ground are not only easily accessible, but could without difficulty be pieced together so as to make a complete restoration afterwards. If one gateway only were undertaken, probably the southern would be the best. If part being still erect were no objection, the western is probably of greater interest.



There is, however, the gateway of the smaller tope a few yards to the north of the great one, which is about half the size of those of the great tope. Its whole height is only 17 feet, while those of the great tope are 33 feet high; only one trilithon of this is standing, the rest in the ground. If the erect position of a part was no objection, its smaller scale would make this more desirable as an experiment. The sculptures on it are of equal interest to those on the others, and it would cost far less to cast.

### *Bombay.*

Some of the sculptures in the great cave at Elephanta are typical of their class, and of great interest to the study of Indian antiquity. The choice of those to be first operated upon would, in a great degree, depend on their state of preservation, and that can only be settled on the spot.

The double elephant capitals in the great cave at Karlee are objects of great beauty and interest. One or two of the best of them ought to be cast, and also the capitals in front of the cave at Birsa or Beira. (J. B. B. R. A. S., vol. i., p. 439.)

These places are in the immediate neighbourhood of Bombay, and easily accessible by railway, and with smaller details, which would suggest themselves to a party on the spot, might easily fill up a season. If operations could be extended to Bejapore or Ahmedabad, there are infinite varieties of Saracenic details which it might be worth while to reproduce by casting. As most of these have been published in the two volumes of photographs bearing these names, any one may satisfy himself on these heads, and I therefore forbear to enlarge on them.

### *Madras.*

I am very much at a loss to know what to recommend with regard to this Presidency. So far as I know, none of the sculpture of the great temples is of so high a character as to be worthy of study apart from the buildings in which it is found, though very effective while *in situ*.

If a party could be detached to Belloor and Hullabeed (*see* volume of photographs of Dharwar and Mysore) they might find abundance of profitable employment, but this would probably be too much to attempt at first; barring this, the desecrated temple in the fort at Vellore (now the arsenal) affords some of the best and most elaborate pillars of the southern style, and these would be extremely interesting in any collection as a means of comparison.

In conclusion, I beg leave to observe that, unless casts of sculpture *in situ* are accompanied by plans and measured drawings in elevation, they will lose half their value. Indian sculpture is so essentially a part of the architecture with which it is found, that it is impossible to appreciate it properly without being able to realize correctly the position for which it was originally designed.

I may also add, that no party should be despatched on such an expedition unless accompanied by a photographer. A considerable number of negatives may be obtained at the same cost as one cast, and though they cannot in all instances supply its place, the larger field they cover, and the number of incidental details they include, render them invaluable adjuncts, and they also bring home to us an infinity of information regarding the antiquities which no amount of casting can afford, unless undertaken on a larger scale than is at present probable, or perhaps even desirable.

JAS. FERGUSSON.

May 1868.



C.—EXTRACT from Letter by MR. FERGUSSON, referring to Scheme for the Conservation and Representation of Ancient Monuments in India.

I have perused with great interest the papers forwarded to me referring to the Conservation and Representation of ancient monuments in India. I cannot but hope that the most beneficial results may follow from the "Resolution" of the Governor General in Council, but as it is most important that every aspect of such an undertaking should be carefully considered, I trust I may be allowed to offer a few suggestions.

It will be understood, of course, that nothing can be further from my intention than to criticise or in any way disparage a proposal I so highly appreciate, but having thought a good deal on the subject, I rather desire to supplement it from my own experience, and if others could be induced to do the same, my impression is, that the result would be most satisfactory.

In the first place, then, my impression is that the scheme of the Governor General in Council refers too exclusively to "castings." These, though valuable, and most desirable to obtain, are neither the most important or the most pressing objects at the present moment. There are paintings in the western caves, especially at Ajunta and Baug, which are perishing daily, and of which few traces will remain in a few years. There are temples which are being torn to pieces by the vegetation, and sculptures which are being burnt into lime, and especially in the central provinces there are temples and sculptures which are being, it is said, utilized by the railway engineers to a painful extent. It would be most desirable that some record of these should be obtained before it is too late.

I may also add, that we are hardly yet in a position to say what things should be cast in the first instance. However extensive the scale may be on which it is carried on, casting can only represent an infinitesimal portion of the objects of antiquarian interest in India. Plans and descriptions, if accompanied by photographs and drawings, would not only convey far more information, but would enable us to select those things which should be cast, and probably save a great deal of money eventually by preventing comparatively worthless objects from being represented in this cumbrous and expensive manner.

Though this is true, and from its very nature, casting must always be limited in its application, still I am inclined to believe that the Indian Government rather over estimate the expense of casting, and the number of men requisite for the purpose. The recent improvements in paper and composition moulding, obviate many, if not most, of the difficulties hitherto experienced in this matter. At the same time, also, it should not be forgotten that, in many instances, the original of small objects of art may frequently be obtained from ruined and desecrated temples at less expense than it would take to cast them. These are, of course, intrinsically of more value, and, being collected into museums, would be so saved from the destruction which is so imminent when left where they are.

In the next place, I may venture to remark that I do not think the organization proposed in the "Resolution" is quite that which is likely to lead to the most satisfactory results. It is most improbable that the Public Works Department in each of the four Presidencies possesses subordinates who can be detached from their ordinary duties for four months at Rs. 300 per month, and who can be qualified for a task requiring so much special knowledge and skill. I should also feel afraid



that the "Masters of the Schools of Design" are already too much occupied, and the office of "Superintendent of the Public Works Department" of too shifting a nature, and so essentially given for other qualifications, that neither of these officials would be able to give to the task that attention which I believe to be indispensable to success. My impression is, that the first essential is the appointment in each Presidency of an officer who shall devote his whole time and attention to the duties of the office. He ought to have sufficient knowledge of the mythology and archaeology of the country to be able to select those objects which are most interesting, and sufficient taste to discriminate between what is good and what may be of little or no value.

If such a person could be found, and he could draw plans and photograph, he would, with very slight additional assistance, be nearly all that is wanted in the first instance. He would travel about his district during the cold season, and during the hot weather and in the rains work up the materials collected, correspond with the local authorities, and consult with and advise Government as to what should be done next. Without some such permanent organization, I should fear that a great deal of money would be wasted on worthless objects, or in misdirected efforts; while the same money, or at least something very little in excess, might, if this suggestion be adopted, lead to satisfactory results.

My impression is, that such an officer might be found, either in the covenanted or uncovenanted services of the Government, who would undertake the duties at from Rs 500 to Rs. 700 per month. Perhaps even less might suffice, because if he is not sufficient of an enthusiast to throw in something for love of the work, he had better not be employed. With such an officer in each of the four main divisions, and a moderate staff of Native assistants, I cannot but hope that we should, in a very few years, obtain a very complete general knowledge of all the objects that India contains in the way of ancient art, and have ascertained what may be necessary for their conservation.

JAS. FERGUSSON.

20, Langham Place,  
June 1868.

---

D.—MEMORANDUM by GENERAL CUNNINGHAM, on the Archæological Remains of India.

The Archæological Remains of India may be divided into four principal classes, Architecture, Sculpture, Coins, and Inscriptions.

ARCHITECTURE.

Architecture would be chiefly represented by photographs and ground plans; but it would be desirable to have models of some of the more remarkable buildings, and specimens, either original or casts, of the different kinds of pillars and the various styles of ornamentation.

The architecture of India is naturally divided into the two great classes of Hindu and Muhammadan, which are widely distinct from each other.

The Hindu architecture may be sub-divided into three classes, according to the nature and style of the buildings required by the different religious ceremonies of the Buddhist, the Jain, and the Brahman.

*Buddhist.*—The Buddhist architecture consists of caves, topes, monasteries, temples, and pillars. The existing Buddhist buildings are so few, and the interest attached to them as the earliest specimens of Hindu architecture is so great, that all remains of this class ought to be preserved by photographs.

The principal Buddhist caves are at Barâbar, near Gaya, at Dhaolagiri, near Cuttack, at Kanhari, Nasik, Junir, Ellora, and Ajanta, near Bombay, and at Dhamnâr, Kholvi, and Bâgh, in Malwa.

The chief Buddhist topes are at Mânikyâla and Shah Dheri, in the Punjab, at Sârânâth, near Benares, at Giryek, in Bihar, and at Sânci, near Bhilsa.

The existing remains of Buddhist monasteries and temples are generally in too ruinous a state to yield much more than a ground plan. They are always to be found in the vicinity of topes.

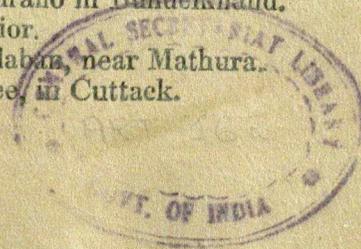
Buddhist pillars exist at several places; but the best specimens are the following :—

1. Base from Shah Dheri, now in the Lahore Museum. This is a Greek work, being an almost exact copy of the true Attic base.
2. Base, at Sanchi, near Bhilsa.
3. Capital, at Sankisa, near Mynpooree.
4. Ditto, at Bakra, in Tirhoot.
5. Ditto, at Lauriya, near Bettiah, in Champâran.
6. Ditto, at Sanchi, near Bhilsa.
7. Ditto, ditto.

*Jain.*—The principal Jain works are in Rajpootana, Gwalior, and Bundelkhand. Though not so numerous as those of the Brahmans, they are equally as important, from their extreme richness and variety. The finest specimens are on Mount Aboo, in the Fort of Gwalior, at Khajuraho, the ancient capital of Bundelkhand, and at Sonâri, near Dutteah.

*Brahman.*—The early Brahmanical structures are very few, but those of later date are so numerous that it is difficult to make a selection of the more important works of each period and style. Unfortunately, the dates of the temples cannot always be ascertained; but there are usually such special differences and varieties of style, peculiar to different periods, that the age of most of them can only be approximately determined. As specimens of different styles and periods, it would be desirable to have photographs and ground plans of all the chief temples at the following places :—

- |                                    |                              |
|------------------------------------|------------------------------|
| 1. Kashmir.                        | 6. Khajuraho in Bundelkhand. |
| 2. Chandravati, near Jhalra Patan. | 7. Gwalior.                  |
| 3. Barolli, on the Chambal river.  | 8. Brindaban, near Mathura.  |
| 4. Eran, near Bhilsa.              | 9. Pooree, in Cuttack.       |
| 5. Pathari, near Bhilsa.           |                              |



*Muhammadan.*—The Muhammadan architecture is divisible by style alone; but the difference between Pathân and Mogul architecture is almost as broadly marked as that between the Hindu and Musalman. The majestic beauty of the Kutb Minar, and the stern grandeur of Tughlakabad, are widely different from the chaste elegance of the tomb of Taj-Mahal, and the graceful lightness of Aurangzib's mosque. But as the Muhammadan architecture is so varied in character that the broad divisions of Pathân and Mogul are not sufficient to mark the diverse styles which prevailed at particular periods, it may be conveniently divided into five classes, as follows—

- |  |                |      |
|--|----------------|------|
|  | A.D.           | A.D. |
| 1. <i>Early Pathan</i> , of the Ghorî and Khiljî dynasties                   | - 1193 to 1321 |      |
| 2. <i>Late Pathan</i> , of the Tughlak and Sayid dynasties                   | - 1321 „ 1451  |      |
| 3. <i>Afghân</i> , of the Lodi and Suri dynasties                            | - 1451 „ 1554  |      |
| 4. <i>Early Mogul</i> , from Humâyun's restoration to Shah Jehan's death     | - 1554 „ 1658  |      |
| 5. <i>Late Mogul</i> , from Shah Jehan's death to the accession of Alam Shah | - 1658 „ 1759  |      |

The number of existing Muhammadan buildings is so great that it is necessary to make a selection of the finest specimens only, or of such as are typical of the prevailing styles of different periods. The following list includes buildings of all descriptions from the time of the Muhammadan conquest in A.D. 1193 down to the battle of Plassey in 1757, and the accession of Shah Alam in 1759, when the empire of the Great Mogul was limited to the Gangetic Doab by the conquests of the English and the Afghans in the East and West, and by the secession of the Nawâbs of Oudh and the Carnatic. The series begins with the Masjid Kutb-ul-Islâm, or Great Mosque of the Kutb, commencing in A.H. 589, or A.D. 1193, and closes with the tomb of Safdar Jang, who died in A.D. 1756.

#### Early Pathân.

Date, A.D.	Building and Name.	Reigning King.	Place.
1303	Fort Siri	Ala-uddin	Delhi.
1193	Gateway, east entrance	Kut-buddin	Delhi, Kutb-mosque.
1310	Ditto, south entrance	Ditto	Ditto, ditto.
1303	Palace, Hazâr Situn	Ala-uddin	Ditto.
1193	Masjid, Kutb-ul-Islam	Kut-buddin	Ditto.
	Ditto	Altamish	Ajmeer.
1235	Tomb of Altamish		Delhi.
1239	Ditto of Raziah		Ditto.
1265	Ditto of Sultân Gâri	Naser-uddin	Ditto.
1316	Ditto of Ala-uddin		Ditto.
1200	Pillar, Kutb Minar	Kutb-uddin	Ditto.
1254	Ditto, Minar	Naser-uddin	Koel.

#### Late Pathân.

Date, A.D.	Building and Name.	Reigning King.	Place.
1321	Fort Tughlakabad	Tughlak Shah	Delhi.
1330	Ditto Adilabad	Muhammad	Ditto.
1330	Ditto Jahân Panâh	Ditto	Ditto.
1321	Gateway, Tughlakabad	Tughlak Shah	Ditto.
1354	Ditto, Kotila	Firuz Shah	Ditto.
	Ditto, Katti Ghâti	Muhammad	Chânderi.
1310	Tomb of Ruknuddin	Tughlak	Multân.
1325	Ditto of Tughlak Shah	Muhammad	Delhi.
1400	Ditto of Shekh Kamâl	Mahmud	Khara.
1432	Ditto of Hushang Shah		Hushangabad.
1433	Ditto, ditto		Mândû.
1354	Palace, Firuzabad	Firuz Shah	Delhi.
1360	Masjid, Jâmai	Ditto	Depâlpur.
1387	Ditto, Kâla	Ditto	Delhi.
1420	Ditto, Jâmai	Hushang Shah	Mândû.
1360	Pillar	Firuz Shah	Fort of Hisâr.
1360	Ditto	Ditto	Fort of Jonpur.

## Afghan.

Date, A.D.	Building and Name.	Reigning King.	Place.
1440	Masjid, Atâla	- - -	Jonpur.
to	Ditto, Lal Darwaza	- - -	Ditto.
1482	Ditto, Zanziri	- - -	Ditto.
---	Ditto, Jâmai	- - -	Ditto.
1450	Ditto, Makhdûm	- - -	Kansj.
1539	Gateway, Lal Darwaza	Shir Shah	Delhi.
1450	Tomb, Lila Gumbaz	- - -	Ditto.
1450	Ditto of Sayid Amir	Miran	Sirhind.
1450	Ditto of Sayid Jalâl	- - -	Kansj.
1488	Ditto of Bahlol Shah	Lodi	Delhi.
1500	Ditto of Shamsi Tabrez	- - -	Multan.
1545	Ditto of Shir Shah	Sur	Sassaram.
1495	Palace, Bâradari	Sikandar Lodi	Agra.
1539	Ditto, Shir Mandir	Shir Shah	Delhi.
1553	Ditto	Bâz Bahadar	Mându.
1539	Fort	Shir Shah	Rohtâs.
1539	Ditto, Kilah Shir Shah	Ditto	Delhi.
1545	Ditto, Salingarh	Salim Shah	Ditto.
1500	Bridge	- - -	Chaparghatta.
1540	Pillar, Kos Minar	Shir Shah	Delhi.

## Early Mogul.

Date, A.D.	Building and Name.	Reigning King.	Place.
1533	Fort, Dinpanâh	Humâyun	Delhi.
1570	Ditto, Akbarabad	Akbar	Agra.
1630	Ditto, Shahjahanabad	Shah Jahan	Delhi.
1571	Gateway	Akbar	Fatehpur, Sikri.
---	Ditto, Tomb of Akbar	Jahângir	Sikandra.
---	Ditto, Nurmahal	Ditto	Nurmahal Punjâb.
1630	Ditto, Taj Mahal	Shah Jahan	Agra.
1571	Palace	Akbar	Fatehpur, Sikri.
---	Ditto	Jahangir	Agra Fort.
---	Ditto	Shah Jahan	Agra.
1630	Ditto	Ditto	Delhi.
1571	Masjid	Akbar	Fatehpur Sikri.
---	Ditto	Ditto	Koel.
1630	Ditto, Jâmai	Shah Jahan	Delhi.
---	Ditto, Moti	Ditto	Agra.
1530	Tomb of Bâber	Humâyun	Kabul.
1556	Ditto, of Humâyun	Akbar	Delhi.
---	Ditto, of Adam Khan	Ditto	Ditto.
---	Ditto, of Muhammed Ghaus	Ditto	Gwalior.
---	Ditto, of Tansen	Ditto	Ditto.
---	Ditto, of Salim Chishti	Ditto	Fatehpur, Sikri.
1605	Ditto, of Akbar	Jahangir	Sikandra.
1620	Ditto, of Bâla Pir's father	Ditto	Chunâr.
1621	Ditto, of Itimâd-ud-Dowlah	Ditto	Agra.
1628	Ditto, of Jahângir	Shah Jahan	Lahor.
1630	Ditto, of Mumtaz Zaman	Ditto	Agra.
1641	Ditto, of Bâla Pir	Ditto	Kanoj.
1646	Ditto, of Nur Jahan	Ditto	Lahor.
---	Bridge	Akbar	Jonpur.
1612	Ditto, Salingurh	Jahângir	Delhi.
---	Ditto, Bara Pul	Ditto	Ditto.
1580	Pillar, Kos Minar	Akbar	Ditto.
1630	Ditto, ditto	Shah Jahan	Sirhind.

## Late Mogul.

Date, A.D.	Building and Name.	Reigning King.	Place.
1756	Gateway, Safdar Jang's Tomb	Ahmed Shah	Delhi.
1671	Palace, Marble Barakdari	Aurangzib	Lahor.
1671	Masjid, Jamai	Ditto	Ditto.
—	Ditto, Nabi	Ditto	Mathura.
—	Ditto, Jamai	Ditto	Ditto.
—	Ditto, Zinat-un-Nissa	Ditto	Delhi.
—	Ditto, Seneri	Ahmed Shah	Lahor.
—	Ditto, Roshan-ud-Dowlah	(?)	Delhi.
1676	Tomb of Jehânâra Begum	Aurangzib	Roza.
1677	Ditto of Aurangzib	Ditto	Ditto.
1756	Ditto of Safdar Jang	Ahmed Shah	Delhi.
—	Bridge, Narwar	Aurangzib	Narwar.
—	Ditto, Nûrabad	Ditto	Nurabad.
—	Ditto, Sultanpur	Ditto	Sultanpur.
—	Ditto, Dakhani Sarai	Ditto	Dakhani Sarai.

## SCULPTURE.

The sculpture of India is almost necessarily limited to the Hindus, as the Muhammadan religion forbids the representation of anything living, either man or animal. The sculptures are naturally divided into the three distinct classes of Buddhist, Jain, and Brahmanical, according to the three distinct religious beliefs which prevailed in ancient India.

The Buddhist sculptures consist of bas-reliefs and detached statues.

The former are specially valuable, as illustrating the dress and occupations of the people, as well as their buildings and religious ceremonies. The sculptures are also highly important from their unconstrained style and superior finish, which are, in all probability, due to the influence of Greek art. As early specimens are very rare, they should all be preserved either in original or in casts, or by photographs. But the late Buddhist sculptures are much more numerous, and, as they are chiefly confined to religious subjects, a selection might be made from them, as noted in the latter part of the following list:—

## EARLY BUDDHIST SCULPTURES.

- B.C. 250. {
1. Pillar capital of four lions at Sânci.
  2. Ditto of one human figure at Sânci.
  3. Ditto of four human figures at Firuzpur, near Sânci.
  4. Ditto of one elephant at Sankissa, near Mynpooree.

These four capitals are now lying on the ground uncared for, and might be secured in original.

- B.C. 250. {
5. Pillar capital of one lion at Bakra and Tirhut.
  6. Ditto, ditto, at Lauriya, near Bettiah.

These capitals might be secured either in casts or in large photographs.

7. Colossal figure of Mâyâ Devi and the infant Buddha lying on a couch, at Pathâri, to the north of Bhilso.

This grand specimen of Indian sculpture is noticed in Sir W. Sleeman's "Rambles of an Indian Official." It is now in a dark chamber, and can only be photographed with the aid of the magnesium light. A cast should be obtained, if possible, as I consider this statue to be the most important specimen of Indian sculpture that I have seen.

8. Bas-reliefs of Sânci Topes.
9. Ditto of Buddha Gaya pillars.

These may be secured by photographs.

### 10. Sculptures and bas-reliefs from ruined towns near Peshawar.

Many fine specimens of these sculptures may be obtained in original, and the remainder may be photographed. There are many originals in the local museums of Peshawar and Lahore.

### B.C. 50.—11. Sculptures and bas-reliefs from Mathura.

Most of these are now preserved in the grounds of the City Dispensary at Agra. Several of them are inscribed and dated. These dated specimens should be secured in original, and casts or photographs obtained of the others.

### LATER BUDDHIST SCULPTURES.

The following are the principal subjects of the later Buddhist sculptures, from which it will be sufficient to make a selection of good and well preserved specimens. There are numbers of these statues now lying about the districts of Bihar and Gaya, quite uncared for by the people, from which it would be easy to make a selection of fine specimens of every variety of Buddhist sculpture. The Museum of the Asiatic Society in Calcutta, and the local museums of Peshawar and Lahore, also possess many duplicates, all of which would be available. Many specimens would, no doubt, be presented by private persons in England; and any desiderata, especially in the smaller figures of metal, might readily be supplied by occasional purchases from dealers.

### BUDDHIST TRIAD.

1. Statue of Buddha.
2. Ditto of Dharma (female).
3. Ditto of Sangha

### *Pancha Dhyāni Buddhas.*

- |                   |   |   |   |  |
|-------------------|---|---|---|--|
| 1. Vairochana     | - | - | - | } In different positions and with different symbols. |
| 2. Akshobhya      | - | - | - |  |
| 3. Ratna Sambhava | - | - | - |  |
| 4. Amitābha       | - | - | - |  |
| 5. Amogha Siddha  | - | - | - |  |

### *Pancha Dhyāni Boḥhisatvas.*

- |                   |   |   |   |  |
|-------------------|---|---|---|--|
| 1. Samanta Bhadra | - | - | - | } In different positions and with different symbols. |
| 2. Vajra Pāni     | - | - | - |  |
| 3. Ratna Pāni     | - | - | - |  |
| 4. Padma Pāni     | - | - | - |  |
| 5. Viswa Pāni     | - | - | - |  |

### *Pancha Dhyāni Buddha Saktis.*

- |                     |   |   |   |  |
|---------------------|---|---|---|--|
| 1. Vajra Dhateswari | - | - | - | } These female figures are all in different attitudes, and have different symbols. |
| 2. Lochanā          | - | - | - |  |
| 3. Māmuki           | - | - | - |  |
| 4. Pandarā          | - | - | - |  |
| 5. Tārā             | - | - | - |  |

### *Four principal Scenes in Sakya's Life.*

1. Birth.—Māyā Devi standing under a Sāl tree.
2. Asceticism.—Buddha seated under a Pipal tree.
3. Teaching.—Buddha either seated or standing.
4. Death.—Buddha lying at full length.

*Four Predictive Signs.*

1. Sakya in a chariot meets an *old* man.
2. Ditto ditto ditto a *sick* man.
3. Ditto ditto ditto a *dead* man.
4. Ditto ditto ditto a *monk*.

The same figures, but differently treated, may be obtained in metal from Tibet. But there are numerous specimens, now in the hands of dealers, which might readily be obtained at a small cost.

JAIN.

The Jain sculptures are almost restricted to a representation of their twenty-four hierarchs, whose names and distinctive symbols are given in the following list. Many fine specimens of Jain sculpture may be obtained in different parts of India, especially in Rajputana, and at Gwalior, Benares, Mahoba, and Khajuraha in Bundelkhand.

Large statues might be photographed, but smaller figures, both in stone and metal, might be obtained in original. The colossal figures at Gwalior are all Jain.

*Twenty-four Jain Hierarchs.*

Names.	Symbols.
1. Adinâtha -	Bull.
2. Ajitanâtha -	Elephant.
3. Sambhunâtha -	Horse.
4. Abhainandanâtha -	Monkey.
5. Sumatinâtha -	Chakwa (Red Goose.)
6. Supadmanâtha -	Lotus.
7. Supârswanâtha -	Swastika.
8. Chandraprabha -	Crescent.
9. Pushpadanta -	Crocodile.
10. Sitalanâtha -	Tree, or Flower.
11. Sri Ansanâtha -	Rhinoceros.
12. Vasupadya -	Buffalo.
13. Vimalanâtha -	Boar.
14. Anantanâtha -	Porcupine.
15. Dharmanâtha -	Thunderbolt.
16. Santanâtha -	Antelope
17. Kunthanâtha -	Goat.
18. Aranâtha -	Fish.
19. Mallinâtha -	Pinnacle.
20. Munisuvratha -	Tortoise.
21. Naminâta -	Lotus.
22. Neminâtha -	Shell.
23. Parswanâtha -	Snake.
24. Vardhamâna, or Mahavira	Lion.

The Brahmanical sculptures are almost countless, and it will be necessary to make a selection of the finest specimens of each kind, as noted in the following list, so as to form a very complete collection of the representations of the Brahmanical divinities. Many other subjects will, of course, be met with, and more especially the figures of the larger animals, as the lion, elephant, bull, horse, and boar, of all of which it would be advisable to secure specimens, to exhibit the amount of knowledge which the Hindu sculptors had attained in the treatment of animals.



BRAHMANICAL SCULPTURES.

*Triad.*

1. Statue of Brahma.
2. Ditto of Vishnu.
3. Ditto of Siva.

	<i>Brahma.</i>	<i>Vishnu.</i>	<i>Siva.</i>
Wives - - -	Saraswati - - -	Lakshmi - - -	Pârvati.
Vehicles - - -	Hansa (goose) - - -	Garuda (eagle) - - -	Nandi (bull).
Sons - - -	Viswakarma - - -	- - -	Skanda.
	Bhrigu - - -	- - -	Bhairava.
	Nareda - - -	- - -	Virabhadra.
			Ganesa.
Incarnations - - -	Daksha - - -	1. Matsya - - -	11. Rudras.
	10 Brahmadikas - - -	2. Kurmma.	
	7 Rishis - - -	3. Varaha.	
		4. Narasinha.	
		5. Vâmana.	
		6. Parasu Rama.	
		7. Rama Chandra.	
		8. Krishna.	
		9. Buddha.	
		10. Kalkiavatâr.	

In the north-west of India, where stone is expensive, most of the ancient mounds yield terra-cotta figures, which are generally in excellent preservation. There are many specimens of these figures in the local Museums of Peshawar, Lahore, and Delhi. They are frequently inscribed, and as they are usually of small size, it would be desirable to secure some specimens of these curious and interesting figures.

MUHAMMADAN SCULPTURES.

The only specimens of Muhammadan sculpture that have come to my knowledge are the two statues described by Bernier, which originally stood outside the city gate of Delhi. They were taken down by Aurangzib, and were lost sight of until disinterred after the mutiny. The elephant, of life-size, was constructed of separate pieces of black stone, with housings in white and yellow marble. The two human figures were of red sandstone. As these important statues are the only known specimens of Muhammadan sculpture, I would strongly advise their immediate removal to England, where they could be set up and preserved from further injury.

COINS.

The coins now in the East India Office are very valuable as the nucleus of an Oriental Collection. They consist chiefly of the collection of Bactrian, Indo-Scythian, Sassanian, and Muhammadan coins made by Masson at Kabul, and of the smaller collection made by Sir H. Willock in Persia. For the history of India these coins are invaluable; but each of the different series is at present incomplete. For an Indian Museum the collection should be confined to Oriental coins alone, in which I would include the Syrian, Parthian, and Sassanian series in ancient times, and the Muhammadan coinages of Ghazni and Persia in modern times. All of these are intimately connected with the coinages of India, many of which are simple copies of the money of their Western neighbours. It is necessary, therefore, for the full illustration of Indian history that the collection should be an Oriental one.

Such a collection as I have here sketched would not be expensive; and as its completion would necessarily be gradual, its cost would be spread over a number of years. Its completion would no doubt be very much accelerated by the gifts of Indian Officers, many of whom now return home with valuable coins, some of

which are annually melted and lost while, others fall into the hands of dealers and are dispersed.

The formation of a good Oriental collection of coins would also be facilitated by the exchange of duplicates with other Museums, as the collection at present contains many duplicates of several valuable coins.

### INSCRIPTIONS.

With regard to Inscriptions, it would be sufficient to have a few specimens of different ages, illustrative of the various styles of writing that have prevailed in India. Copper-plate grants might be obtained in original; but it would be desirable to have casts in papier-maché or plaster of Paris of the more remarkable records on stone, while paper impressions of the greater number would be sufficient for all the purposes of reference.

The inscriptions may be divided into several distinct classes, as follows:—

1. *Early Buddhist*, in Indian Pali, from B.C. 250 to 50, on pillars, rocks, and caves. Casts should be obtained of the Bhabra inscription now in the Calcutta Museum, of the Delhi pillar inscription, and of the rock inscription at Khalsi.

2. *Later Buddhist*, in Indian Pali, from A.D. 0 to A.D. 400, on Junagarh rock in Gujerat, at Jasdan in Guzerat, in caves in Western India, and on the Sanchi and Amaravati topes.

3. *Indo Scythian*, in Arian Pali, from B.C. 100 to A.D. 100, on stone slabs, copper plates, and seals; stone slab of Kanishka in the Peshawar Museum. Two stone slabs from the Yusafzai district; copper plates from Wardak and Taxila; inscription on rock at Kangra; inscription on stone slab in Paris Museum.

4. *Early Brahmanical*, in Sanskrit, from A.D. 100 to 600. On rock at Junagarh in Gujerat; on pillars at Allahabad, Bihar, Kubaon, and Bhitari; on boar and pillar at Eran; and on copper plates of the Balabhi and Chalukya Rajas.

5. *Mediæval Brahmanical*, in Sanskrit, from A.D. 600 to 1193. On copper plates of the Chalukya Rajas; also stone and copper records of the Rajas of Kanoj, Delhi, Mahoba, and Gwalior.

6. *Later Brahmanical*, in Sanskrit, from A.D. 1193 to 1750. Inscriptions of Rajas of Rajputana, Mahoba, and Gwalior.

7. *Early Muhammadan*, in Kufic and Arabic, from A.D. 1193 to 1451. On masjids of Delhi and Ajmer, Kutb Minar at Delhi.

8. *Later Muhammadan*, in Persian, from A.D. 1451 to 1750, on masjids and tombs of the Mogul Emperors.

### ARCHITECTURAL ORNAMENT.

There are two kinds of architectural decoration which are peculiar to Muhammadan buildings, namely, the use of glazed tiles of various colours, and of inlaid marbles or mosaics.

The glazed tiles were most probably introduced from China, as the buildings covered with them are generally known by the name of Chini. In the early buildings of the Pathan kings, the different colours are usually found on separate tiles, and, where geometrical or other patterns are attempted, they are formed of small pieces joined together like mosaics. But in the later buildings of the Mogul Emperors, several colours are found on the same tile, and the flowered patterns of many colours are made on large square tiles, and afterwards joined together like a common pavement. The art of glazing tiles is now confined to Sindh and Multan, but the present manufacturers have lost some of the knowledge of their predecessors, as the specimens that I have seen of modern Sindh tiles are inferior in design, and deficient in variety of colour to those of the buildings of the Mogul Emperors at Lahore, Delhi, Agra, Mathura, Gour, and other places. These glazed tiles are worthy of examination, as they have stood the sun and rain of India for many centuries. The plantain leaves of green tiles on the palace at Gwalior are as fresh and as good as when they were first put up, nearly 400 years ago. The tiles are somewhat similar to Dutch tiles, and they would, I believe, form a valuable exterior to public buildings in London, where they would defy the smoke and dirt of our coal fires.

The mosaics of India are of two kinds, which may be called the black ground and the white ground, according to the colours of the material in which the mosaic



pattern is worked. The first is found only at Delhi, where the throne chamber of the Diwân-i-am, or public hall of audience, was decorated with pictures of birds and flowers in coloured marbles on a black ground. These are similar to the Florentine mosaics; and I incline to adopt the opinion of Sir W. Sleeman, that they were introduced by Austin, of Bordeaux, a jeweller who was much employed by Shah Jehan.

The mosaics on a white ground are found in various buildings at Lahore, Delhi, and Agra; but they are most numerous at the last place, where the finest specimens are found in the Taj Mahal and in the palace of Shah Jehan in the Fort.

The white ground mosaics are well known from numerous specimens of trays and tables, which have already found their way to England. But the Indian black ground mosaics are almost unknown in Europe, and, as they are fast disappearing from the Delhi palace, it is very desirable that some specimens should be secured before it is too late. All the larger mosaics have already gone, but many of the smaller ones are now concealed under sanitary whitewash, and some of them might be rescued from oblivion, and brought to London, to adorn the museum of the India Office.

March 1869.

(Signed) A. CUNNINGHAM,  
Major-General.

In continuation of the above Memorandum on the Archæological Remains of India, I beg to add a few practical suggestions, which I think may be of use in securing the objects which the Government has in view.

In the first place, it seems to me very desirable that the officers employed on these archæological duties should be furnished with some precise instructions, not only as to what they should select, but also as to what they should discard, either because it has already been done, or because it is not worth doing. If all the existing remains were sufficiently well known, there would be little difficulty in giving the necessary instructions; but where so much still remains unknown, much must still be left to the judgment and taste of the individual officer employed. But such work as has already been done need not be done over again.

An officer selected for these duties should possess several qualifications which are not often found combined in the same person. A knowledge of photography I consider of but little importance, as better photographs can generally be obtained from professionals than from amateurs. But the faculty of discriminating what is valuable in the traditions of the people, and of judging what inscriptions may be worth preserving, requires a competent knowledge of the language and history of the country, as well as some acquaintance with its ancient alphabets, which few officers can be expected to possess. Without these qualifications, however, it will be impossible for them to acquire the necessary information regarding the buildings which they may measure, and the localities which they may visit. All places are more or less interesting, according to the associations connected with them. If, therefore, a sufficient number of properly qualified officers cannot be found, it would be better to employ a staff of ordinary draughtsmen and photographers, under the guidance of one or two experienced superintendents, who would direct their proceedings, and give them detailed instructions of what to do and to observe at each separate place.

To ensure the acquisition of certain points of information, I would recommend that some uniform system of report should be adopted by all the officers employed on this duty. I would suggest that the drawings and photographs of every building should be accompanied by a description, which should give some account of its history and purpose, some notice of its mode of construction and of the nature and colour of its materials, and a brief statement of any traditions which the people may have regarding it. All inscriptions should be copied; and, in the absence of any formal record in a conspicuous situation, the short records of visitors, and even the masons' marks on the stones, will be of value for determining its age.

Coins also should not be neglected, as they are the only *continuous* historical records which India possesses of its early history. At every large place all the old Hindu coins should be assiduously collected, as they give the names of the kings who have formerly ruled in that part of the country. By comparing all these collections together, we shall be able to determine, with some precision, the



extreme limits of the Greek and Indo-Scythian conquests, and to define the boundaries of the different kingdoms of ancient India. All the *early* coins, that is, all the Greek, Indo-Scythian, and Hindu coins that present any traces by which they can be recognized, should, therefore, be collected at each place. But Muhammadan coins are not required, as we possess a very fair history of India during the Muhammadan period. The early coins are so few in number that their cost would be a mere trifle, probably not more than 2*l.* or 3*l.* at each large place.

In my Memorandum on the Archaeological Remains of India, I have given a detailed list of the principal Muhammadan buildings in Northern India of which I think it desirable that we should possess photographs and detailed measurements. Photographs of many of the principal buildings may be obtained by purchase from the existing stock of professional photographers, but, as they would be of no use for reproduction, it will be necessary in all cases that the negatives should be secured for the purpose of publication. Some of these negatives may, perhaps, be obtained from the professional photographers, especially those of the more famous Muhammadan buildings at Agra, Delhi, and other cities. But as for most places it will be necessary that a photographer should be employed, it should be specially stipulated with him that the negatives should become the property of Government.

Of Hindu remains I have given no details, as I think it desirable that all the *earlier* buildings should be photographed and measured. Of the later Hindu buildings, it will be sufficient to make a selection of all the larger and more important structures that may be considered worthy of preservation. In my memorandum I have omitted the name of Ranode, near Seepree, where there is a two-storied stone building of much interest, as it is roofed with enormous slabs, eleven feet square, and one foot thick, and is perhaps the only existing specimen of an ancient palace or dwelling house in Northern India.

But the officers employed on these duties should not be content with visiting the places which have been enumerated; they should also make inquiries as they proceed, and should leave no places of promise unseen. It was in this way that I first became acquainted with the sites of several of the most celebrated cities of ancient India.

I would also recommend that photographs should be obtained of all the most famous fortresses; such as Rohtas and Multan, in the Punjab; Agra, Gwalior, Kalinjar, and Ajaygarh, in North-West India; Chitor, Ranthambhor, and Kumbhomer, in Rajputana; Asirgarh, on the Tapti, and Rohtas in Bengal. Plans and sections of all or most of these can be obtained from the office of the Quartermaster-General. I myself possess those of Multan, Agra, and Gwalior.

Of the earliest, or prehistoric class of man's works, the only remains that I am aware of in Northern India consist of earthen mounds and cromlechs.

The earthen mounds are of all sizes, from three feet to seventy feet in height, either standing singly, as at Benares, Ajudhya, and Sâhet, and many other places in Oudh, Gorakhpur, and Champaran, or in large groups, as at Lauriya, to the north of Bettiah, and at Kasiya, to the east of Gorakhpur. My impression is, that these are sepulchral monuments or barrows of the early inhabitants of the country.

Cromlechs and other stone remains were found in Malwa, to the north of the Nerbada river, by Lieutenant Burgess, the Revenue Surveyor; but his untimely death during the mutiny prevented the publication of this interesting discovery.

I possess ground plans and measurements of all the principal Muhammadan buildings at Delhi, Mathura, Agra, Gwalior, Benares, and Jonpur, and of the principal Hindu buildings at Gwalior, Khajurâho, and Gaya. I possess also detailed measurements of the Buddhist caves at Dhamnar, Kholvi, and Barâbar near Gaya; and of most of the Buddhist remains in the Bhilsa district. It is unnecessary, therefore, that any time should be spent in making these measurements over again, but photographs should be taken of all the more important caves and sculptures.

In conclusion, I would strongly urge the advisability of employing a larger staff for a few years, in preference to a smaller staff for many years, in order that the whole work may be done before the interest in the subject which now exists has died away, and while the objects themselves are still standing, as several important monuments have disappeared altogether during my career in India.

A. CUNNINGHAM.



E.—MEMORANDUM by Colonel MEADOWS TAYLOR on the Pre-historic Archæology of India.

The subject of the Pre-historic Archæology of India seems to me to claim a high rank for consideration in connexion with what may be termed its Mediæval Archæology.

The existence of large numbers of—

Cromlechs and Dolmen,  
Kistvaens,  
Cairns and Barrows,  
Tumuli,  
Groups of placed Rocks,  
Rock Temples, or places of sacrifice,

possessing, both in construction and contents, the strongest marks of identity with those of Great Britain and Europe generally, has been proved by the discoveries of Mr. Babington in Malabar, Captains Harkness and Congreve in the Neilgherry Hills, by myself in the province of Soorapoor in the Deccan, and, in connexion with my observations, by General J. S. Fraser, the late Dr. Lankester Bell, Colonel A. Doria, Sir George Yule, K.S.I., and others, near Hyderabad, in the Deccan, and in the south-eastern provinces of the Nizam's dominions, particularly on the road from Hyderabad to Masulipatam, and, more recently, near Nagpoor.

In Malabar, these remains are known to Natives under the names of—

Pandoo Kooles.  
Topi Kulls.  
Kodey Kulls.

In Bellary and Shorapoor, as "Mohiric Munni, or Dwarfs' Houses;" but the groups of cairns and barrows, as also of placed rocks, have no distinguishing appellations, and are not so well known, and their localities would require special means of ascertainment.

As far as investigation has proceeded at present, what is on record is necessarily of an unconnected character; but the existence of these pre-historic remains have, nevertheless, been traced from the south of India as far as a line drawn between Bellary and Nagpoor, in both of which provinces they are numerous. In the Collectorate of Bellary, for instance, by an official return forwarded to me by Mr. Pelly the Collector in 1851, there are no less than 2,129 cromlechs, kistvaens, &c. of all sizes, and recent investigations have proved the existence of great numbers of cairns and barrows in Nagpoor.

The pre-historic race or races to which these remains belong were, it is supposed, Turanian or Aryan; they were not aboriginal Indians. It is of much importance, therefore, to ascertain as far as possible, the line by which they advanced into India, and the area of that country over which they spread themselves. The line of discovery of remains, appears as yet to confine them to Southern and part of Central India; but there is no reason to suppose that the area of occupation may not be found to embrace other localities; and that from the Punjab, Sindh, the passes into Affghanistan, Guzerat, Kutch, Rajpootana, &c., traces of the line or lines of advance may not be found, which might eventually connect the migrations eastward to India and westward to Europe, of the same people.

Until, therefore, a general investigation of the whole of India has been made, the subject must necessarily remain incomplete for scientific, ethnological, or archæological purposes.

Local inquiry, might possibly require time, as it certainly would patient perseverance, to make it complete, and this remark applies more especially to localities in which no discoveries have been made than to others. From the line I have mentioned, however, to the extreme south of India, there would, I consider, be no difficulty whatever; and the information required, as in the case of Bellary could be furnished by Collectors and Magistrates and their assistants, European and Native, in concert with the patells or headmen of villages.

As some particulars of the pre-historic remains enumerated in para. 1 may be necessary for identification, I beg to add the following:—

*Cromlechs or Dolmen.*—These consist of square or oblong erections of various sizes, composed of three or more large slabs of stone, set upon their edges, and covered by a dolmen or table-stone, which is supported by them. The cromlechs are closed or partially closed on three sides, and have one side entirely open. They contain no remains.

*Kistvaens* are constructed similarly to cromlechs, but have four sides, closed together, and, when perfect, have a slab as cover. Some of these remains are as large as cromlechs, some smaller, and have been used as depositories of the ashes of human beings after cremation. They contain these ashes, mixed with partly calcined human bones and pieces of broken pottery of a red or black colour. Some kistvaens have a round hole in one of the end slabs, from six to nine inches in diameter; and it is desirable this should be observed and recorded where it occurs, as it forms one of the strongest marks of identification with similar remains in Europe, Southern Russia, Circassia, &c.

*Cairns and Barrows.*—These are found in large or small groups. They are very numerous in Soorapoor, on the Neilgherries, in Nagpoor, and in the south-east portion of the Nizam's dominions. They consist of low tumuli, surrounded by single, double, and treble circles of large stones and rocks. The upper part of the tumulus contains nothing; but on digging deeper, cists formed of limestone slabs, containing skeletons, are met with; and around them urns of black and red pottery, with arms, arrow and spear heads, iron tripods, &c., are found. In some instances, wrought copper and cast bronze bells have been discovered, with necklaces made of beads, portions of shells, and the like. It is remarkable, also, that an earth *not belonging to the locality*, red, sandy, or grey, has been used to fill up the cairns. The cists lie at a depth of from eight to eighteen feet from the surface, and in some cases, the space between the surface and the cists is found to contain evidences of human sacrifices, in skeletons thrown in irregularly, skulls separate from the skeletons, and the like.

Another class of cairns or barrows which, in outer appearance and construction precisely resemble those above described, contain, buried at greater or less depth, urns, large and small, containing human ashes, with pieces of bone and charcoal. I have found no remains of arms or iron utensils in these cairns.

*Tumuli.*—These are said to exist in Southern India, in Guntoor, Kurnool, and the Ceded Districts; but I have no personal acquaintance with their details, either as to construction or their contents. It is very advisable, however, that they should be examined whenever found.

*Groups of placed Rocks.*—Some remarkable instances of these groups, which are similar in design to those of Avebury in Wiltshire, Rowldrich in Oxfordshire, and Carnac in Brittany, occur in Soorapoor. In one place, 56 rocks, larger than those of Carnac, have been set round a



tumulus. They form a parallelogram. The tumulus has been formed by successive cremations, grey earth having been deposited on the ashes of each body. In another instance, 22 large rocks formed each side of a square of 484 rocks, each four of which enclosed an area of 18 feet. They are thus placed in lines with singular exactness.

*Rock Temples.*—These occur in the Shorapoor district, and possibly elsewhere. They consist of tors and loggan stones, surrounded by double and single rings of rocks. In one instance, a large solitary rock was surrounded by a double circle of large stones, with two rocks on the south side, to form an entrance.

*Kodey Kulls, Pandoo Koolies, Topie Kulls.*—The foregoing details are applicable to all the pre-historic remains of which I have personal knowledge, and those of the Kodey Kulls, &c., do not differ from them in any remarkable degree; they are large stones placed over cells, in which urns, containing human ashes, have been buried with arms, pottery, &c., the urns being deposited in an earth *foreign to that of the locality*.

I trust, by these general descriptions of pre-historic remains, that they will be readily discoverable; but there may be others, in different parts of India, which may not agree with them in every respect, and the details of each, if discovered, will be extremely valuable.

MEADOWS TAYLOR.

London, March 1869.

---

F.—DESCRIPTION by Dr. FORBES WATSON of two Processes for taking  
Moulds from Sculptures in Bas-relief, &c., in India.\*

I. *Process for making Moulds in Paper.*

The following articles are required:—

Several brushes, scissors, knives, &c., as per figures in the accompanying illustration.

A saucepan for making paste, with a large and a medium sized sponge.

Wheat flour; alum; glue; resin,† finely pounded; linseed oil; cut fibre;‡ waste paper; steatite or soapstone,§ finely ground or pounded; India-rubber; asphaltum; coal tar; naphtha; and, lastly, paper for moulding, as per samples appended.

The whole of the materials above named are easily procurable in India, all of them, with the exception of the naphtha, being products of the country.

Some of the native-made papers are admirably adapted for moulding. The sample No. 1 from Patna, which is recommended (see sheet of specimens appended), has been selected from a number of specimens in the India Museum Collection, and is superior to the paper commonly employed in this country for moulding purposes.

*Preliminary operations.*—Before commencing to mould from exposed sculptures, it will be necessary to screen them from the rays of the sun and from gusts of wind. This, in the case of a large erection, like one of the gateways to the Sanchi Tope, will require the collection on the spot of a considerable amount of scaffolding, which will have to be set up, for the double purpose of allowing the work to be got at, and of forming the support for whatever may be used as a screen. For this latter, tent canvas, made up in some convenient form, would probably answer best; but, whatever may be the material employed, it should be so arranged as to be readily removable, in order to allow the sun to act upon the mould in proportion as it is completed, so as to ensure its being rapidly, as well as thoroughly, dried before its removal from the sculpture.

Commencing at the top, the work to be operated on has to be washed, or otherwise completely cleansed from dust and all foreign matters.

Before commencing the actual operation of moulding, the following materials have to be got ready.

1. *Paste.*—A good formula is as follows:—

Thoroughly mix 4 lbs. of flour, 2 oz. of alum, and  $\frac{1}{4}$  lb. of finely pounded resin in four quarts of cold water. Boil  $\frac{1}{4}$  lb. of glue in four quarts of water, in a large saucepan, and while boiling add the mixture of flour, &c., as above, and keep it well stirred till the whole begins to boil. When cold it is ready for use.

\* The processes here described have been practically carried out by Mr. W. Griggs in connexion with the preparation at the India Museum of the *relief-maps* of India, now in course of construction for the Government of India and for that of Madras and Bombay.

† The Gunda-berozza of the bazaar, from the *Pinus longifolia* and other conifers.

‡ Jute or other soft fibre, cut into from  $\frac{1}{2}$  to  $\frac{3}{4}$  inch lengths.

§ This, under the Native and trade name of Sunkjeeroo, is common in India, and is superior to the *whitening* (washed chalk or carbonate of lime) generally used in this country for the same purpose.

2. *Composition, Carton-pierre.*—This substance, which is a kind of *carton-pierre*, is required, as the work proceeds, to fill up or *back* hollows of moderate depth in the paper mould, as also to carry out the process next to be described. It is prepared as follows; the quantities indicated being such as would be required only in cases in which a considerable surface of work was expected to be completed by the paper process within a short time of its commencement. But in the process, to be afterwards described, where the composition itself is used for making almost the entire mould, the quantities here given will be found to be only sufficient for one working, should the sculpture to be operated upon be of any considerable extent.

To 9 lbs. of pounded resin add one quart of linseed oil. Boil in kettle and retain till required.

Take of flour 6 lbs., mix with 10 quarts of cold water, add 1 lb. of alum, and boil the whole until a proper consistency has been obtained. Then add to the above paste,—which should be kept boiling in a copper or other large vessel,—paper pulp, which has been previously prepared by soaking from 10 to 12 lbs. of waste paper in water for several hours.

The pulp, from which the water has been squeezed out, should then be added in successive quantities to the boiling paste, along with the resin and oil mixture, and the whole should be kept boiling until it has assumed a proper consistency.

To the mass thus formed, and still kept boiling, add, in successive quantities, 1 lb. of jute or other soft fibre, cut into quite short pieces, taking care to mix the whole thoroughly.\*

Next add about 12 lbs. of finely pounded steatite, boiling the whole for about ten minutes, and taking care to keep the mixture constantly stirred, a precaution which has to be taken throughout.

When cold, roll up with enough of the steatite to make it workable like ordinary putty. If not required for immediate use, the batch must be kept rolled up in a macintosh or oil-skin cloth to prevent its drying.

When quick setting is desired, equal parts of steatite and plaster of Paris should be used for rolling up with the mass just before it is required to lay on the work.

3. *Moulding Papers.*—These should also be got ready, in order that the operation of moulding may be proceeded with.

The first layer of paper, or that which forms the surface of the mould, and comes into immediate contact with the casts, is the one which chiefly requires care, as well to secure the continuity of the surface, as to ensure complete contact with every portion of the work.

To this end, a convenient number of sheets similar to the No. 1 paper are well pasted on one side only, and then either doubled or placed one on the other with the pasted surfaces together, and rolled up in a damp cloth, with an outside cover of macintosh or oil-skin, to prevent evaporation. They should thus be kept for several hours before being used. The sheets as used in this country are not previously soaked in water, as it is found that the paste, when carefully applied as above directed, has sufficiently softened the paper; but it is possible that when working in India at a high temperature, causing rapid evaporation, it may be requisite to start with the sheets in a moister condition; although, even in that case, it will probably be found expedient to trust to the freer application of a thin paste than to adopt the plan of soaking the sheets in water. In all cases, great care must be taken to keep one surface of the paper used for the first layer free from paste.

The papers for the succeeding layers are similarly prepared, except that in their case the paste is applied freely to both sides;

\* It is found in practice that it is better to add the fibre at this stage, on account of its tendency to form knots if added at an earlier period.

and they are then rolled up and kept for some hours in a damp cloth covered with an oil-skin, as in the former case.

Having now got ready a convenient stock of materials, the operation of moulding may be commenced.

The first step to be taken is thoroughly to wet the portion of the sculpture to be operated on, this being essential to the perfect contact of the paper with the work. This, under the influence of the rapid evaporation which occurs in India, will involve the frequent application of water by means either of a sponge or a whitewasher's brush, and it is for this reason essential that the work should be commenced at the top and carried downwards, as otherwise the water would be apt to get between the paper and the stone, and thus prevent the contact necessary for the production of a faithful impression.

The whole being now ready, the No. 1 paper, which has been prepared as already directed, is taken, and, as required, torn up into small irregular patches and applied to the surface of the work, care being taken to keep the side next to it entirely free from paste.

When the carving is slight, the pieces of paper employed may be of some size, but when it is bold and prominent they must, in order to avoid creases, be small, and the edge of each must overlap the other as slightly as possible. In order to prevent the joinings from being perceptible the paper must be torn up, not cut; besides, torn edges join not only more evenly, but also more strongly, than cut ones.

The first layer having now been laid on, and, to a certain extent, pressed with the fingers into the interstices of the work, the paper for the next layer is then torn up, and applied over it; and as soon as this has been done, the operation of sending the layers *quite home* to the surface of the sculpture is commenced.

This is effected by using pressure with the fingers, with brushes or modelling tools, &c., as may be best suited for getting every marking of the stone impressed on the paper. Upon the care with which this is effected depends, of course, the truthfulness of the mould and of the cast afterwards taken from it.

A continuous surface of paper, over a convenient working space, having now been obtained, the next operation consists in filling up any hollows of moderate depth\* with the *carton-pierre* composition, which is to be kept at hand ready for the purpose.

When this has been done, all that is required, is simply to continue the application of the coarser pasted papers, layer after layer, until eight additional thicknesses, making ten in all, have been obtained. As an aid in ensuring the application of the required number of layers over the back of the mould, it is advisable to employ two papers of different colours, one a dark one, as by this means the operator will more easily know when he has completely finished the covering of the work.

In order to keep the mould in full contact with the work until it has become thoroughly dry *in situ*, it is necessary to use a little paste on the surface along the edges.

The next operation has for its object the prevention of alteration in the shape of the paper mould whether from "buckling" or other causes, after its removal from the work. This can best be effected by the free use of laths of some stiff wood, such as half sections of Bamboo canes perfectly seasoned, and not in themselves liable to warp.† Short lengths of these should be pasted down across the back with one or more layers of paper, or of canvas, or of coarse calico, in the manner best calculated to accomplish the object in view. The laths should be used freely, it being most important that the mould should retain its true shape.

\* When the hollows are deep, it is inexpedient to fill them up with the *carton-pierre* composition. In such cases, the paper should be used in successive layers, until the proper number has been applied.

† It may, in the case of large moulds, be found requisite to use flat iron rods for this purpose.

In addition to the laths, as here recommended, it is also expedient to devise a method by which it can be readily ascertained if the mould has in any way deviated from its original condition in point of evenness, and at the same time of allowing it, if necessary, to be brought straight again. This can be accomplished by fastening on the back of the mould several blocks of wood which have in the first instance been carefully levelled when on the work. These, in addition to being glued on, might, for security, be pasted down under portions of paper, in the same way as the laths. In effecting this last operation it would be necessary either to leave spaces between the laths for the blocks, or to fasten these on first,—this last course being probably the more convenient one.

In cases in which the *under-cutting* is but slight, the paper mould, when dry, will draw freely enough from off the work, and this is one of the advantages which this process possesses over the use of plaster, either by itself or together with canvas.

When, however, the under-cutting exists to any great extent, it will be essential to take piece-moulds in the usual way, using paper as before, and filling up, when the depth is not too great, with *carton-pierre* composition to the proper level. In cases, however, where the depth is considerable, it is advisable to *bridge over* the hollows with card board. In every instance, care must be taken either to make a depression into the surface, or to insert one or more projections in the form of plugs, so as to determine the exact position in the cast of the piece-moulds thus formed.

The piece-moulds so formed should be allowed to remain *in situ* till dry; they must then be removed, treated with a solution of a marine glue, consisting of India-rubber and asphaltum in coal-tar naphtha, and, when again dry, they must be oiled and replaced before proceeding to complete the mould in the usual way.

In the gateways to the Sanchi Tope there is a great deal of sculpture which would have to be treated in this manner, and to which attention would have to be directed at starting, as the instances in question are to be found either at or towards the top, where, as already indicated, it is expedient to commence operations, with the object of working downwards.

When the sculpture presents two or more contiguous sides, like the pillars at Sanchi, it is recommended, in taking the mould of the side first operated on, to allow the paper to catch over the angles, and to be there slightly pasted, to make it adhere. This section, when thoroughly dry, may be removed, and the superfluous edges trimmed away. It is then to be treated with the marine glue solution, and, as in the case of the piece-moulds, replaced before the adjoining side or sides are moulded.

The paper employed in operating upon them is then worked on to, and made to overlap, the cut edge of the mould already taken, which will have to be kept in its place by *spurs* reaching from the ground, or such other means as circumstances may allow.

In cases presenting four sides, like portions of the pillars of the Sanchi gateways, moulds of the opposite sides may be first taken, and their edges being trimmed away, they may then be treated with the marine glue solution and replaced, previously to commencing operations on the remaining sides.

In the majority of instances, however, it will be found convenient to saw off the superfluous edge from the mould first taken, to replace it at the angle of the face to be next operated on, and then to mould carefully over its uncut edge.

In this way it would itself form the edge section of the new mould.

Such are a few suggestions as to the methods to be adopted in dealing with angles, where it is of such importance to secure accuracy.

The junctions of the different sections of the mould, wherever they may occur, have, however, to be effected in the same manner, *i. e.*, it is necessary, in every instance, to work the edges of the new mould on to those of the one previously taken.

In carrying this out, the plan already suggested of using a fine saw to cut off the last portions of the old moulds, in order that they may become incorporated, so to speak, with the next one, will usually be found in practice the most advantageous.\*

Should a large superficial area, suitable for moulding at once, present itself, it may be taken in one piece, which, when quite dry and hard, may, for convenience of packing, &c., be sawn into sections, each joint being marked with duplicate numbers, and care being taken, in all instances, to write inside what the subject is.

It is necessary to repeat, that the *registration*, or numbering and marking of the different pieces, must be very carefully attended to.

As each section of the mould is completed, the operation of drying will be materially hastened by allowing the sun to have access to it, and this, as already stated, may be done by removing the canvas or other material employed as a screen. This, therefore, should be so arranged as to facilitate the plan.

## II. Process for making Composition Moulds.

As already indicated, this process consists in using the *carton-pierre* composition itself for the purpose of taking the entire mould, and it is one which will, in practice, be frequently found to answer better than that in which paper is the material chiefly employed.

It allows of moulds being more rapidly taken, and the tendency to "buckle" is very much diminished, whilst, with care in pressing it *home* to the work, the sharpness of the mould is superior to that obtained by the paper process.

In preparing the composition for application to the bas-relief or other object to be cast, it is rolled out upon a table or flat board,—which has been previously sprinkled with a little powdered steatite—until it has acquired the thickness of from one eighth to occasionally even one fourth of an inch.

The sheet of material so formed is then applied to the surface of the work, which also has been previously well powdered with the steatite.

As in the former instance, the composition has then to be very carefully pressed, by means of the fingers or tools, up to the work. When this has been done, two layers of pasted paper, prepared as already described, have then to be applied over the back of the composition, and, as a precaution against "buckling," the strips of bamboo, &c., before alluded to, will, in certain instances, have likewise to be used.

In order to effect good *joins* between different sections of the same mould, it is desirable that the margins of the composition sheet should each be bevelled off and joined together with paste.

It now remains to describe, a little more in detail, the treatment of the moulds, with the view of rendering them impermeable to the action of moisture, and, consequently, capable of retaining their surface form, and thus of allowing a number of casts to be taken from the same mould. As already indicated, this is effected by coating each section of the mould, when thoroughly dry, with a thin solution of a marine glue, prepared by dissolving india-rubber and asphaltum in coal-tar naphtha.†

\* In cases where the system here recommended is adopted, the marginal pieces, for incorporation in the mould to be next made, should be sawn off before the marine glue solution has been applied. In order to keep the pieces in question *in situ* at starting, as well as afterwards to aid in keeping the mould of which they are to form a part up to the work, it will be necessary to paste paper over the cut margin, so as to take a hold of a portion of the adjoining work, or that last moulded.

† Shell-lac is usually employed in the manufacture of marine glue, but it is not equal to asphaltum for the present purpose. Benzole may be used, but it is not regarded as equal to coal naphtha in solvent power.



One part of india-rubber is first dissolved in ten parts of naphtha, and then two parts of asphaltum, finely powdered, are added. To the solution thus obtained, about thirty parts of naphtha have to be added, in order to render it sufficiently thin to be applied to the mould. It is necessary that the varnish should be thin, both that it may enter the more deeply into the substance of the mould, and also avoid clogging up the finer markings which may exist upon certain kinds of work.

When the carving, however, does not present these, there is less care necessary in this respect, and two coats of the varnish may be applied with advantage.

The moulds should be rendered hot by exposure to the sun, and the varnish solution also heated, must be carefully applied to their surface by means of a soft brush. The whole of the other parts of the mould should then be freely coated with the solution.

Instead of at once treating the moulds with the marine glue solution as described, it has been found advantageous to coat them, in the first instance, with boiled linseed oil and litharge; or sesamum or Indian til oil, to which a little naphtha has been added, may be employed, as recommended by M. de Laval, in the description of his method which follows. In all cases, care must be taken to make the mould hot before either operation is effected.

It will, of course, in India, require every attention to prevent the access of white ants, or other destructive insects, to the moulds. Unless it should, on experiment, be found that the coating of marine glue acts as a sufficient protection, it will be expedient to try some other means of treating the mould so as to prevent their attacks. To this end, a solution of corrosive sublimate in the proportion of 40 grains to the quart of water might be used, or one of arsenic might be employed, but if any solution is employed after the mould is removed from the work, and before it has been made, so to speak, waterproof, it would have to be applied with care, on account of the tendency to "buckle," which would arise were the wet in any quantity to enter into the substance of the mould. Under any circumstances, however, it is important that the moulds retained for work in India should, when not required for use, be very carefully preserved, and it is desirable that valuable moulds, from which casts have already been taken, should be re-varnished before being stored away.

It has likewise to be noted that it may become necessary to repeat the application of the marine glue solution during the progress of casting, should the surface of the mould show signs of suffering either because an unusual number of impressions have been taken from it, or because of some original imperfection in the mould itself.

J. FORBES WATSON.

The India Museum,  
India Office, March 1869.

G.—DESCRIPTION of M. LOTTIN DE LAVAL'S Process for making Moulds in Paper from Bas-reliefs, Inscriptions, &c.\* Translated by Lieutenant WATERHOUSE, R. A.

I. To make a Cast from a Bas-relief or from an Inscription in marble, wood, stone, plaster, &c.

If the object to be reproduced is exposed to the air and sun, and especially in hot climates, before commencing operations it must be well damped with a sponge, in order that the most perfect adherence may ensue at once.

Bas-reliefs in wood should first be rubbed over with a thin coat of linseed oil, in case there should be any gluey matter on them which would prevent the removal of the cast.

Then take five or six sheets of the whitey-brown paper and lay them one over the other in the tray of water. Generally this paper has some size in it, which is all the better, if many copies are required from the cast. If the paper is very stiff, and consequently of better quality, it should be wetted and worked well with the hands, and then dipped in the water again, when it will become as soft as blotting paper. The quality of the paper is of great importance, and very good paper for the purpose is obtainable throughout the East. The paper is allowed to steep in the water for half a minute or so, then the lowest sheet is taken out and applied to the most prominent part of the bas-relief; it should be well stretched out and have as few creases as possible, and must be gently dabbed all over with a stout whitewasher's brush. If a large surface has to be covered, as in copying extensive inscriptions, the work should always be commenced from the top, otherwise the water will cause the lower sheets to come off; the operation is repeated till the whole surface is covered, taking care to place the leaves of paper one over the other, so that each sheet covers only two-thirds of the sheet underneath it.

When the bas-relief is covered with at least two coats of the slightly sized whitey-brown paper it should be again dabbed with the whitewasher's brush. The paper will tear, particularly if there are large figures in strong relief, and if there are what they call in statuary "hollows" or "dark parts" (*des noirs*), that is to say, deep open parts, one need not be alarmed at it, as it is of no importance. Each tear should be covered with paper folded two or three times—practice will soon show how much is necessary,—then take some paper pulp and tear it in strips or squares of a convenient size, as may be required, plunge them doubled into your vessel of water, apply them quickly over the whole surface of your bas-relief, and beat them well with the large hog's hair brush (the bristles should be as soft as possible). The paper pulp then becomes liquid and soft, and can be spread more easily and better than modelling clay, more quickly too, and is not so thick after it is dry.

If the brush uncovers the most prominent parts of the bas-relief, which often happens, cover them again with damp paper and dab them more softly. If there are under cuttings and deep hollows, apply the pulp freely to them, and push it into the hollows with the modelling tools or with the handle of the whitewasher's brush, shaped for the pur-

\* From the "Manuel Complet de Lottino-plastique," par M. Lottin de Laval. Paris. Dusacq, 15, Rue St. Benoit, 1857.

pose ; then knead it well into the forms with the fingers. When this preparatory work is finished, and the marble, stone, wood, or bronze, &c., are entirely covered, well sprinkle the whole surface of the bas-relief with a large sponge, always taking care to avoid letting the water enter from above between the bas-relief and the pulp, which would cause it to peel off. Then coat the whole bas-relief with a paste composed of well-cooked flour paste, diluted after its preparation with water slightly saturated with alum, using a large cod's tail brush ; then on the top of it apply a layer of slightly sized paper without troubling about creases, and with the hog's hair tool dab it well in order that the paste may be incorporated with the moistened paper pulp.

A very important thing when copying objects exposed to the air, or on mountains, is to be able to protect such slight casts from violent gusts of wind, otherwise, as soon as the sun dries them, the wind carries them off. When I commenced working, I frequently saw my work fall to the ground when quite completed, and become the sport of the whirlwinds which drove it off into space. After groping about fruitlessly for some time, necessity at last suggested the following remedy. Whenever I wanted to take a cast of a monument of any importance, I dipped a flat brush into water containing a *very little* paste, and covered the edges of the bas-reliefs or inscriptions with this. The paper stuck immediately to the stone, and when it was dry this paste, although weakened by the operation of modelling, was sufficient to hold my very slight casts, and was enough to protect them from the wind. Without this precaution it would have been impossible for me to have taken casts of the colossal pillars (stiles) of Sarabit el Kadem, in the peninsula of Sinai, perched as they are on a mountain peak continually swept by frightful storms of wind.

The second operation completed, cover your bas-relief (always using the "cods' tail brush," *queue de morue*\*) with a thin coating of sheeps'-foot gelatine (kids' feet or antelope feet will also answer) quite hot, when it is most liquid, and a small quantity is required. If the strong glue called "givèt" could be got, it should be used. Then dab and knead the stuff, taking care not to leave any part of the bas-relief uncovered. If the inscriptions or bas-reliefs are only an inch or two long, there is no need for such care, two or three thicknesses of soft paper, like that of Cairo, doubled, will suffice. In the deserts of Asia I made my gelatine with the feet of the sheep or other animals which served me and my people for food. It seems a very simple thing, yet it was necessary for me to consider and find out how to do it.

Sometimes I quickly covered this coat of gelatine with a sheet of damped paper, at other times, when I was in difficult or dangerous places or mounted on rickety ladders, I dispensed with it, but in general I should strongly advise its use, especially when working on strongly marked sculptures. That done, you should look again at the cast, to make sure that it sticks well all round to the marble or stone, otherwise you must go over its edges again with the brush and thin flour paste as described above, in order that if any part dries more quickly than the rest the wind may not lift the cast. This finishes the operation of modelling.

## II. Mode of preserving the Casts from wet.

When the moulds are dry they are taken down with care. In Persia and Arabia, after a few hours, they used to become as rigid as wood, and in taking them off *from the bottom* they yielded to the hand at once. If they should still be moist in the thick parts, they must be dried in the shade. With regard to this point, I *strongly* recommend that the casts should be left to dry completely on the work. Then melt some tallow, or in default of this some fat from the tails of sheep (tallow is the best).

\* See fig. No. 9 in photograph of specimen obtained from Paris, and which turned out to be an ordinary whitewasher's brush.

I refer here to operations which the traveller must perform in the desert, but if he finds himself near a town he may procure the oil of sesamum. It answers perfectly, and dries well, especially if a little naphtha is added to it. It is to be found in Persia, Russian Asia, India, Arabia, Syria, and Egypt. The moulds are coated lightly with these substances, and are then exposed to the fire or to the heat of the sun, which will cause the fatty matters to sink well in, and so prevent the rain or damp from acting on them, which is essential for such fragile, and to all appearance, permeable articles. In France and throughout Europe boiled oil may be obtained, or instead of it some bees wax may be melted in linseed oil and the moulds coated with this.

### III. *To render Moulds of large Bas-reliefs portable.*

It would be impossible to carry the moulds of large bas-reliefs entire with safety through wild countries, as the rapacity of its poorer inhabitants would be excited by the sight of so much baggage, besides which, the packages themselves would be very awkward and expensive to carry about; some means must, therefore, be devised for rendering them more portable, and capable of being packed into boxes of about 5 feet long, 2 feet wide, and 18 inches deep. When the subject admits of it (such as an inscription) the cast should be cut into strips between the lines with strong scissors. The strips should be cut to about the breadth of the box, or any other convenient width, according to the nature of the subject. Such strip should be numbered and marked with register points with a lead pencil, using one or several strokes as may be necessary. When it is required to cast them in plaster, they must be brought together in the mould, the marks of the joins will be visible, but it is very easy to remove them while the plaster is fresh, either with the nail or with a moistened ear of the doghound fish, which is used by all moulders. As regards large bas-reliefs or colossal figures, the principle is the same, discretion being used as to whether to cut along the relief or through the ground; the deep parts will join well in the modelling. Casts of very large inscriptions in shallow characters will only require three or four sheets of paper, and may be folded up, taking care that the longitudinal folds may come upon nearly vertical letters, if possible. Another precaution, which should be taken by all travellers, is to write inside each mould, as soon as it is taken down, where it came from, and the character of the work, otherwise it will be found impossible to recognize the numerous subjects which may have been collected together.

### IV. *Baking the Moulds.*

This is an operation as delicate as it is important, since it might entail the destruction of precious moulds which it would be difficult to replace. It need not be done while travelling, but it is better to do it at once.

The moulds are placed in front of a large fire-place, in which a very hot fire is burning. They should be supported in a vertical position by means of chairs, &c., in order that they may be placed as close to the fire as possible. When the mould is scorching take it away, and coat the inside with the following mixture:—

Thick boiled oil	-	-	500 parts.
Beeswax	-	-	50 „
Turpentine	-	-	50 „

These materials should be mixed in an iron pot, and applied while quite hot with a broad brush. One coat is sufficient. The moulds are then placed in an oven heated to 180° or 212° F. They are left there for half an hour. In default of an oven they may be placed in front of the fire as before, but a free current of air must be maintained in order to



drive off the unwholesome fumes which will arise and are liable to cause colic and inflammation of the throat. These operations being completed, you may proceed to cast in plaster.

A remark may here be made, that the older the moulds are the better they get.

#### V. *Impermeability of the Moulds.*

The moulds may be made perfectly watertight by coating them outside with the same composition. This is done after all the other processes, and the inside is again exposed to the fire.

#### VI. *Repairing the Moulds.*

It constantly happens that the moulds blister or strip in places. The first leaf of paper applied at the beginning of the operation rises up with a thickness varying from  $\frac{1}{2}$  in. to 2 in., and that even before being used. There is no necessity to trouble oneself about it at first, and especial care should be taken not to apply any paste to it, because, when it is baked, the part newly pasted will wrinkle or form ridges. No repairs should be made till all the preceding operations have been gone through, and you are about to cast in plaster from the moulds. You then proceed as follows. The mould must be laid on the modelling table, and is coated *all over* with a thin coat of linseed oil to which has been added one-sixth of boiled oil, after which dip a flat brush, about  $\frac{3}{4}$  in. wide, in flour paste, and pass it gently under the raised leaves working it with the fingers till it sticks, then run on the plaster, without waiting for the paste to dry.

Sometimes, when casts of objects in slight relief, or very shallow inscriptions, are made in desert places, under a burning sun, the outer part getting dry very quickly causes cracks or ridges; this usually happens when the moulds are made of one or two sheets of paper. Nevertheless, these moulds should undergo all the operations above described; only, before running on the plaster, take a wet sponge, and dab the inside of the mould with it gently; after a few minutes the mould will regain its proper shape. Then coat it with a mixture of raw and boiled oil, let it dry, and all the ridges will have entirely disappeared.

#### *Casting in Plaster.*

Such light moulds being unable to support the weight of the large masses of plaster required to make casts from them in the ordinary way, especially if the relief is strong, some other device is necessary.

When the bas-relief is to be cast in plaster from a deep mould, spread on the modelling table a layer of plaster equal in height to the greatest depth of the mould; on this bed place the mould, outside downwards, and allow it to settle down in the plaster. Then with a little board, or the scraping triangle of masons or modellers, work the plaster up, and press it well all round the mould, until it is as high as the ground; then surround the bas-relief with long wide rods, placed so that they may be easily removed when the plaster is set. They must be supported at intervals either with bricks, stones, or pieces of wood, in order that, when the liquid plaster is poured in, it may not knock them down. The thickness to which the plaster should be poured on varies according to the nature of the work, which practice will soon teach.

The casts may also be made in Roman cement, or any of the materials used for modelling.

They may also be bronzed and coloured according to taste, but should first be coated with the mixture of boiled oil and turpentine described in IV., applied after the casts have been warmed.

