Madras Exhibition of Raw Products, Arts, and Manufactures of Southern India, 1855.

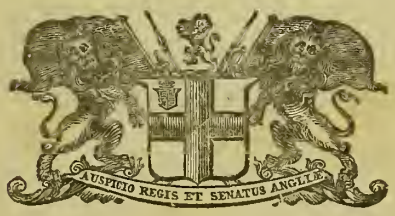
REPORTS

BY

THE JURIES

ON

THE SUBJECTS IN THE THIRTY CLASSES INTO WHICH THE EXHIBITION WAS DIVIDED.



MADRAS:

Printed for the General Committee of the Madras Exhibition
BY MESSRS. PHAROAH AND CO. ATHENÆUM PRESS, MOUNT ROAD.
1856.

The Right Honorable the Governor of Madras in Council, in Extract Minutes of Consultation, dated 14th July 1854, appointed an Exhibition of the Raw Materials, of the Machinery and Manufactures, and of the Sculptures, Models and the Plastic Art, of the Madras Presidency and the neighboring States, to be held in the Banqueting Hall, Madras, in February 1855; and, in order to make generally known the wishes of Government regarding it, and to draw up a scheme of all the minor and subsidiary arrangements for carrying it out, nominated the following Gentlemen to form a Committee.

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JURIES.

Juries will be composed of those Members of the General Committee forming the two Sub-Committees with such other Gentlemen as may hereafter be nominated.

The examination of the Articles exhibited and the decision with respect to the rewards to be given will be confided to the Juries.

The Jurors for the first 11 Classes will be nominated by the Sub Committee for Raw Materials, and for the last 19 Classes by the Sub Committee for Arts and Manufactures.

The General Committee will allot the Jurors amongst the various Classes, and will fix the General Rules which will serve as the basis for their operations.

Rewards will not be granted until after they have been revised by the Executive Committee.

Each Jury will be at liberty to call to its assistance, any persons acquainted with the articles submitted to it for examination. These additional members or associates will only take part in the labours of the Jury, as regards the particular object for which their services are required, they will only be entitled to take part in the discussion and not to vote.

Such Exhibitors as have been appointed Jurors or Associates, will be held ineligible to receive a reward, for the particular class in which they have acted.

REWARDS.

An ample fund has been allotted for money Prizes.

Two Classes of Medals will also be provided, to be awarded in such cases as may appear desirable.

In the department of Raw Materials and produce, prizes will be allotted upon a consideration of the value and importance, in a commercial point of view, of the article, and the superior excellence of the particular specimens exhibited: in the case of prepared materials coming under this head of the Exhibition, the Juries will take into account the novelty and importance of the prepared product and the superior skill and ingenuity manifested in the process of preparation.

In the department of Machinery, the Prizes will have reference to novelty in the invention, superiority in the execution, increased efficiency or increased economy—in the use of the article exhibited.

The importance in a social or other point of view, of the purposes to which the article is to be applied, will also be taken into consideration, as will, also, the amount of difficulties overcome in bringing the invention to perfection.

In the department of Manufactures, only Articles of Native manufactures will be rewarded, and
(*a*,) Those consisting exclusively of native material, in all its stages, will receive the highest rewards.
(*b*.) For those manufactured from imported materials smaller prizes will be given.

Those Articles of Manufacture will be rewarded which fulfil in the highest degree the following conditions viz., increased usefulness, such as permanency in dyes, improved forms and arrangements in articles of utility, &c., superior quality or superior skill in workmanship. New use of known materials, use of new materials, new combinations of materials, as in Metals and Pottery. Beauty of design in form or colour or both, with reference to utility, cheapness relatively to excellence of production.

In the Department of Sculpture, Models and the Plastic Art, the rewards will have reference to the beauty and originality of the specimens exhibited, to improvements in the processes of production, to the applications of Art to Manufactures; and, in the case of Models, to the interest attaching to the subject they present.

It is the intention of the General Committee to reward excellence in whatever form it is presented, and not to give inducements to the distinctions of a merely individual competition.

The two classes of Medals are intended to distinguish the respective characters of subjects and not as first and second in degree for the same class of subjects.

DEPARTMENT OF JURIES.

LIST OF JURORS AND ASSOCIATE JURORS.

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G. B. BRUCE, Esq., Chief Engineer Madras Railway.
EDWARD BALFOUR, Esq., In Charge of the Govt. Central Museum.
Dr. G. J. SHAW, Assay Master, Madras Mint.
Dr. A. J. SCOTT, Assist. Assay Master Madras Mint.
A. HUNTER, Esq., M. D., Director Madras School of Arts.
Joint Reporters.

II.—Chemical and Pharmaceutical Processes and Products generally.

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Dr. A. J. SCOTT, Assist. Assay Master
H. NELSON, Esq.
Dr. A. LORIMER, Secy. Medical Board.
A. HUNTER, Esq., M. D., Director School of Arts.
J. TAWSE, Esq.
Dr. J. G. SHAW, Assay Master.
H. F. C. CLEGHORN, Esq., M. D., Professor of Botany, *Reporter.*

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H. A. MURRAY, Esq.

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H. F. C. CLEGHORN, Esq., M. D., Professor of Botany, *Reporter.*

IV.—Vegetable and Animal Substances, chiefly used in Manufactures, as Implements and for Ornaments.

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Lieut.-Colonel G. BALFOUR, C. B, Member Military and Marine Boards.
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Lieutenant H. P. HAWKES, Deputy Asst. Comy. General.
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C. CUNDAPAH CHETTY.
BALLA CHETTY.
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Mr. J. DESCHAMPS.
Mr. G. WILLIAMS.

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Gums and Resins.

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A. HUNTER, Esq., M. D.
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H. F. C. CLEGHORN, Esq., M. D., *Reporter.*

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Oils and Oil Seeds.

Sub Jury.

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H. F. C. CLEGHORN, Esq., M. D.
A. HUNTER, Esq., M. D.
LIEUT. H. P. HAWKES, *Reporter.*

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Dyes and Colours.

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Associates.

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BALLA CHETTY.

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Fibrous Substances.

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AND

CLASS XVIII.

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Captain HITCHINS.
Captain LAKE.
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A. HUNTER, Esq., M. D.
Captain CUNNINGHAM.
The Honorable Sir W. W. BURTON, Kt.
H. A. MURRAY, Esq.

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NANA THAKOOR.
T. G. CLARKE, Esq.
Captain J. W. HAY.
H. A. MURRAY, Esq.
A. HUNTER, Esq., M. D., *Reporter.*

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Sub Jury.

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Arcot Southern Division.—A. Hall, Esq., and S. N. Ward, Esq.

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Canara.—F. N. Maltby, Esq., and F. Anderson, Esq.

Chingleput.—C. J. Shubrick, Esq., B. Pauncefote, Esq., and Assistant Surgeon J. Ratton.

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Trichinopoly.—J. Bird, Esq., and T. J. P. Harris, Esq.

Vizagapatam.—A. Robertson, Esq., Walter Elliot, Esq., the Zemindar of Vizianagram, and Dr. Blackwell.

COMMITTEE AWARDS.

FOR SERVICES.

SPECIAL MEDALS OF THE FIRST CLASS.

The Right Honorable Lord Harris, *President*, for Originating the Exhibition.—Gold Medal.

Edward Balfour, Esq., for his Services to the Exhibition as Secretary to the General and to the Executive Committee.—Silver Medal.

H. F. C. Cleghorn, Esq., M. D., as Secretary to the Sub Committee for Raw Products.—Silver Medal.

A. Hunter, Esq., M. D., as Director of Arrangements and Secretary to the Sub-Committee for Arts and Manufactures.—Silver Medal.

MEDALS OF THE FIRST CALSS.

The Right Honorable Lord Harris.

The Honorable J. F. Thomas, Esq.

W. A. Morehead, Esq.

W. U. Arbuthnot, Esq.

Lieut. Colonel J. T. Smith.

A. Hunter, Esq., M. D.

Edward Balfour, Esq.

H. F. C. Cleghorn, Esq., M. D.

G. Smith, Esq., M. D.

H. A. Murray, Esq.

Captain J. W. Hay.

Lieut. General J. S. Fraser.

Major J. Maitland.

The Honorable Walter Elliot, Esq.

The Honorable Sir H. C. Montgomery, *Bt.*

Lieut. James Nicholas.

The Zemindar of Callestry.

His Highness the Rajah of Cochin.

Lieut. Genl. W. Cullen, Resident Travancore and Cochin.

His Excellency Viscount DeVilla Nova D'Oorena, Goa.

His Excellency Admiral Verninac, Pondicherry.

His Highness the Nabob of Banaganapillay.

His Highness the Nizam of the Dekhan.

G. A. Bushby, Esq., Resident of Hyderabad.

Nabob Salar Jung Bahadoor, Hyderabad.

His Highness the Maha Rajah of Mysore.

Lieut. General M. Cubbon, Commissioner, Mysore.

His Highness the Nabob of the Carnatic.

The Zemindar of Vizianagram.

His Highness the Maha Rajah of Travancore.

His Excellency Tondiman Rajah Bahadoor Poodoo Cottah.

His Highness the Rajah of Tanjore.

The Zemindar of Shevagunga.

J. Rohde, Esq.

Lieutenant Colonel A. McCally.

Lieutenant H. P. Hawkes.

MEDALS OF THE SECOND CLASS.

P. Shungoonny Menowen Travancore, for his valuable report.

Shungra Warrier, Dewan of Cochin, for the Sircar consignment.

J. D. Bourdillon, Esq.

A. S. Mathison, Esq.

A. Hall, Esq.

S. N. Ward, Esq.

C. Pelly, Esq.

E. Story, Esq.

F. N. Maltby, Esq.

F. Anderson, Esq.

C. J. Shubrick, Esq.

B. Pauncefote, Esq.

Assistant Surgeon J. Ratton.

The Dewan of H. H. the Rajah of Cochin.

J. S. Vernede, Esq.

J. S. Kohlhoff, Esq.

E. B. Thomas, Esq.

T. B. Roupell, Esq.

William Elliot, Esq.

M. Murray, Esq.

T. Prendergast, Esq.

W. Knox, Esq.

Jose Antonio D. Olivera, Esq.

B. W. Xavier, Esq.

E. J. Nune, Esq.

J. Rohde, Esq.

H. Wood, Esq.

Supt. Surgeon J. L. Geddes.

Lieutenant-Colonel Henderson, C. B.

Jervanjee Pestonjee, Esq.

Captain Shelly.

Captain J. L. Barrow.

Ramasawmy Moodeliar.

R. Riddell, Esq.

W. C. Maclean, Esq., M. D.

George Smith, Esq., M. D.

Captain J. G. Russell.

Captain C. Gill.

W. E. Underwood, Esq.

H. Stokes, Esq.

E. Lecot, Esq.

J. Thompson, Esq.

Itimad Ood Dowlah Bahadoor.

N. C. Mooroogasem Moodeliar.

R. D. Parker, Esq.
C. R. Baynes, Esq.
H. V. Conolly, Esq.
G. H. Harris, Esq.
T. D. Lushington, Esq.
J. J. Cotton, Esq.
Captain Miller.
Captain G. Harvey.
Captain Riach.
Dr. Neill.
Revd. Mr. Garrett.
Dr. Kirkpatrick.
Mr. Black.
J. Ratliff, Esq.
F. H. Crozier, Esq.
M. G. Montbrun.
M. Faciolle.
T. Amalric, Esq.
M. E. Mottet.
M. L. Guerre.
M. DeNozeille.
M. Testa.
M. St. Paul.

Saverinasa Pillay.
Appasawmy Pillay.
Arnachella Chetty.
Soobroyah Pillay.
Ponnen Russendra Pillay.
M. C. Dela Silla.
F. Copleston, Esq.
A. Purvis, Esq.
H. A. Brett, Esq.
T. W. Goodwyn, Esq.
H. Forbes, Esq.
G. Ellis, Esq.
C. J. Bird, Esq.
C. H. Woodgate, Esq.
Lieutenant-Colonel Grant.
Dr. Reid.
T. Maduva Row.
J. Bird, Esq.
T. J. P. Harris, Esq.
A. Robertson, Esq.
Walter Elliot, Esq.
The Zemindar of Vizianagram.
Dr. Blackwell.

JURY AWARDS.

CLASS I.

Mining, Quarrying, Metallurgical Operations and Mineral Products.

2ND CLASS MEDALS.

Pro. No.	Catalogue No.	Names of Exhibitors.	Object rewarded.
LXXV	60	Coimbatore Local Committee	Iron Ores and series of Iron.
LXXII	46 to 56	Hyderabad Local Committee	Ores of Steel and Cast Steel.
CCXXI	269	General Cullen	Plumbago or Carburet of Iron.
XXXIII	1 to 39	J. Rohde, Esq	Slates and Marbles.

HONORABLE MENTION.

CLXXVI	107	Captain Elliot	Ores of Iron and Steel.

CLASS II.

Chemical and Pharmaceutical Processes and Products Generally.

1ST CLASS MEDALS.

CXVI	591 to 807	E. Waring, Esq	Collections of Drugs.
CCCXIIV	243 to 483	Dr. Kirkpatrick	Do. do.
CCXXIV	19	Dr. A. J. Scott	Hemidesmine.

2ND CLASS MEDALS.

CCCXXVI	562	Hon'ble Walter Elliot, Esq	Ophelia elegans.
CXCVII	242	W. Hilbers, Esq	Extract of Hyoscyamus.
CCXC	120	Lieutenant E. [illegible] M. Evans	Gamboge.
CCXCIV	10	Government of Goa	Do.
CLXXVII	166	Apothecary Wrightman	Do.
CCXLIV	576-7	Dr. Collas (Pondicherry.)	Blistering Beetles.
CLXIV	12-13	Major Gabbett	Saltpetre.
CLXIII	———	J. Ouchterlony, Esq	Do.
CI	42	Mr. J. R. Campbell	Common Salt.

HONORABLE MENTION.

CCCXLIII	63	1st Dresser C. Appavoo Pillay	Extract and Syrup of Sarsaparilla.
LXVIII	58	H. Forbes, Esq	Common Salt.
		J. Rundall, Esq	Saltpetre.

CLASS III.

Substances used for Food.

2ND CLASS MEDALS.

CC	1 to 52	P. S. Mootoosawmy Moodelliar	Collections of Cereals.
CCLXXI	.....	F. Appavoo	Collections of Pulses.
CLXXVI	.....	F. Green, Esq	Coffee.
CLXXVI	120	T. Cannan, Esq	Do.
.....	.....	J. Ouchterlony, Esq	Do.
LXXXIX	.....	J. Rundall, Esq	Auranta Wine.
CCV	.....	J. S. Vernede, Esq., Cochin	Collections of Spices.
CCXLIX	.....	Aska Sugar Company	Refined Sugar.
CCXVI	.....	Astagram Sugar Company	Loaf and Sugar Candy.

HONORABLE MENTION.

Pro. No.	Catalogue No.	Names of Exhibitors.	Object rewarded.
		W E. Underwood, Esq....	Carolina Rice.
LXVIII	1 to 149	Collector of Tanjore.....	Collections of Cereals.
LXIII	———	Collector of Tinnevelly.....	Do. do.
XX	5	G. F. Fischer, Esq.....	Coffee.
CCXXI	103	General Cullen.....	Cocoa.
LXXXIX	18	G. H. Faulkner, Esq., Rajahmundry..... ..	Sugar.
CCXI	42	Local Committee, Cuddapah.....	Sugar.
XXXVI	1	Commissary General.....	Collections of Commissariat Articles.
		John Rohde, Esq..	Cholum Straw cut with Reaping Machine.

CLASS. IV.

Vegetable and Animal Substances Chiefly used in Manufactures as Implements, and for Ornaments.

SECTION I.

Gums and Resins.

1ST CLASS MEDALS.

CCXC	117 to 129	Lieutenant E. L. M. Evans.....	Collections of Gums.

2ND CLASS MEDALS.

CCXXI	182 to 206	Local Committee, Travancore.....	Collections of Gums.
CCXXI	.....	General Cullen.....	" Pauchonthee" Gum Elastic.
.....	.....	Lieutenant Colonel F. Cotton..	Gum Elastic.
....	.....	T. Ramasawmy, Head writer Engineer's Office, Kamptee....	Lac and Shell Lac.
....	.....	2nd Dresser Pulnyandy.....	India Ruhber.

HONORABLE MENTION.

CCCXVII	.....	Surgeon Lovell.....	Exudation of Amyris Commiphora.
CCVI	.....	Hon'ble Walter Elliot, Esq...	Cuttimundoo Gum.
.....	.....	Major General Clarke....	Euphorbia Tirucalli (Gum.)
.....	.. ..	W. E. Underwood, Esq....	Cryptostegia grandiflora (Caoutchoue.)
CLXII	.....	Narsinga Row, Masulipatam..	Euphorbia Neriifolia (Gum.)

SECTION II.

Oils and Oil Seeds.

2ND CLASS MEDALS.

.....	....	W. E Underwood, Esq	Collections of oils in illustration of the Madras Tariff.
CCXXVII	1	Mr. W. Gay.....	Superior mode of de-colorizing oil.
CIV	.....	Monsieur Godefroy.....	For Castor and Cocoanut oil.
LXV	1	W. D. Kohlhoff, Esq.....	For Castor, Gingeley, Cocoanut, Neem, Pinnacotay, and Mustard oils.

HONORABLE MENTION.

.....	.....	Lieutenant J. D. Heath....	For Camphor wood oil.
.....	.....	Pulnyandy, 2nd Dresser....	For do.
.....	.....	Revd E. Johnston	For oil of the Sarcostigma Kleinü.
CCXC	1	Lieutenant E. L. M. Evans.....	For wood oil.
CCCI	36	Nellore Local Committee....	For various oils.
LXIII	311	Tinnevelly Local Committee....	For Poovana, Gingeley Oils, &c.

SECTION III.

Dyes and Colours.

2ND CLASS MEDALS.

Pro. No.	Catalogue No.	Names of Exhibitors.	Object rewarded.
CCI	53	Messrs. Hart and Simpson	Green leaf Indigo.
CCI	54	M. Jules Lepiné (late of Pondicherry,	Casuarina dye.

HONORABLE MENTION.

		Messrs. Arbuthnot and Co	Green leaf Indigo.
		Mr. G. W. Flynn	Lake prepared from Lac.

SECTION IV.

Tanning Materials.

2ND CLASS MEDAL.

CXLIV	7	Captain Blagrave	Extract of Divi Divi.

SECTION V.

Fibrous Substances.

2ND CLASS MEDALS.

CXXIV	218	Messrs. Fischer and Co., Salem	Bales of Cotton.
CLXXVI	.....	Mr. Meppen	Cottons.
CCCXIV	.....	Bala Chetty	Colored Yarns.
LXIV	.....	Mr. Thorpe, Monegar Choultry	Aloe, yercum and Plantain Fibres.
LXIV	171	Mr. Crampton	Yercum Fibres.
LXXIV	123—126		
	127	Mr. C Horne	Hemp lines and Coir Rope.
CCCXV	236 to 240	H. Forbes, Esq	Rope made at Tanjore.

HONORABLE MENTION.

CCXXL	56—64	Travancore Local Committee	Fishing lines.
CCXXI	265 to 297	Mr. Sheddan of Travancore	Fibrous Substances.
CLXXVI	174 to 205	Dr. Kirkpatrick	For introducing manufacture of Rope in Lunatic Asylum, Bangalore.
LXXXIII	59—114	Madras Local Committee	For Fibres.
LXIV	143 to 179	Mr. A. T. Jaffray	Do. do.

SECTION VII.

Timber and Ornamental Woods.

1ST CLASS MEDAL.

CCXXI	289 to 451	Local Committee, Travancore	Collections of Woods.

2ND CLASS MEDALS.

XIV	7 to 94	Mr. A. T. Jaffrey	Collections of Woods.
CLXXIII	240	Captain Cunningham	Sumpagay Wood.
CXCVII	.....	M. P. Nursing Row, Shemogah	Aguil Wood.

HONORABLE MENTION.

Pro. No.	Catalogue No.	Names of Exhibitors.	Object rewarded.
LXIII	.....	Local Committee Tinnevelly	Collections of Woods.
CLXXX	122 to 188	Captain Miller, Assistant Commissary General.	Collections of Woods.
CLXXIII	233 to 287	Mr. Xavier.....	Collections of Woods.

SECTION VIII.

Animal Substances.

2ND CLASS MEDAL.

CLXXVIII	15 to 18	Mr. R. A. Fitzgibbon.....	Series of Wools.

HONORABLE MENTION.

CLXXVIII	19	Rajagopauloo Bangalore.....	Specimens of prepared Wool.
CXIX	21	Mr. Bowden.....	Do. do.
CCXX	.....	Government Tannery, Hoonsoor.....	Glue of superior kind.
.....	.....	Mr. Brophy.....	Do. do.

CLASS V.

Machines for Direct use including Carriages and Railway and Naval Mechanism.

HONORABLE MENTION.

CCXCII	10	Captain G. Harvey.....	Travelling Coach.

CLASS VI.

Manufacturing Machines and Tools.

2ND CLASS MEDAL.

CCXLIII	44	Monsieur Bulliard.....	Distilling Apparatus.

PECUNIARY AWARD.

LXXXIII	7	Anakapen of Dindigul.....	Rs. 50	Slide rest for turning lathe.

HONORABLE MENTION.

CCXXX	39	Staff Serjeant Gage.....	Model of tanning mill, &c.
CCLIII	45	Gun Carriage Manufactory.....	Model of Oil Press
CCLIII	47	Mr. Curran, Overseer.....	Augur for boring square holes.

CLASS VII.

Civil Engineering, Architectural and Building Contrivances.

2ND CLASS MEDALS.

CCLVIII	2	Mooroogapah Achary.....	Model of Hindoo Dwelling house.
CCLVIII	6	Store Serjeant H. Carr.....	Model of Coffer-dam.
CCXCVI	1	Madras Railway Company.....	Model of the first Railway Terminus.
CCXCVII	8	Mr. G. Williams.....	Model of proposed Madras University.

CLASS VIII.

Naval, Architectural and Military Engineering, Ordnance, Armour & Accoutrements.

2ND CLASS MEDALS.

Pro. No.	Catalogue No.	Names of Exhibitors.	Object rewarded.
LXX	56 to 233	H. H. the Rajah of Tanjore	Arms of Offence and Defence.
CXCI	362 to 440	Hon'ble Walter Elliot, Esq.	Do. do.
CCCXXXIII	486 to 502	His Excellency Lieut. General Anson	Do. do.

HONORABLE MENTION.

CXV	275 to 300	His Highness the Tondaman Rajah	Arms of Offence and Defence.
CCLIII	455	Supt. of Gun Carriage Manufactory	Model of a Mortar.
CCVII	330 to 361	Director of Artillery Depot	Model of Gun Carriage.

CLASS IX.

Agricultural and Horticultural Machines and Implements.

2ND CLASS MEDALS.

CCLVII	52 to 63	Supervisor S. Brooks	Agricultural and Horticultural Implements.
CCLVII	64 & 65	Sub Conductor C. Smart	Agricultural Implements.

HONORABLE MENTION.

CCXX	.....	Captain C. A. Blagrave	Drill for sowing grain.

CLASS X.

Philosophical, Musical and Surgical Instruments.

2ND CLASS MEDAL.

LXVIII	216	Mootoosawmy of Tanjore	An Universal Sun Dial.

HONORABLE MENTION.

LXIII	176	Mr. Cruickshanks	Abacus for the blind.
CCLVIII	2	Mr. Patterson, Overseer	Tourniquet.
CCLXXIV	38	Aurokeum	Cavalry Trumpet.

CLASSES XI. AND XVIII.

Manufactures in Cotton and Woven, Spun, Felted and laid Fabrics, when shown as Specimens of Printing or Dyeing.

1ST CLASS MEDAL.

CIV	446 to 448	Monsieur Godefroy	Damask table linen, &c. &c.

2ND CLASS MEDALS.

Pro. No.	Catalogue No.	Names of Exhibitors.	Object rewarded.
CCLIX	384	Rajahmundry Local Committee	52—Punjum Cloth.
CLXX	98	J. Gooroomoorthy Chetty	Arnee white Muslin.
CXXIX	400 & 401	V. Kristnama Chetty	Cambric Muslin and bleached Isree.
CXXVIII	394 & 395	Butcha Ramalinga Chetty	Jean and watered Cambric.
.....	470	German Mission	Table cloths woven in the Jacquord loom.
.....	.....	Palar Chetty	Table cloths and napkins.
.....	.....	Cassava Doss	Rajahmundry trouser cloths.
LXXVII	330 to 432	Chengulroy Chetty	Gown cloths and towels from South Arcot.
CXLII	455	Masulipatam Local Committee	Short diapers.
.....	.....	Nawab Salar Jung Bahadoor	Hyderabad Muslin.
CLXIX	314	Narasimloo Chetty	Native cloth with gold border.

HONORABLE MENTION.

CXLVIII	1	Ruthnum Moodely	Muslin.
LXIII	151	Coopchund	Nankeen.
CXLII	2 & 3	Pillarysethee Barthasaradee Naidoo	Palampores.
CXXXVI	7 to 21 } 53 to 56 }	Rajahmundry Local Committee	Chintzes of Sorts.
CI	24	Balakiroochna and Parasoorama and Co	Blue cloth from Pondicherry.
CCXCIV	284 to 286	Goa Local Committee	Stamped dimity.
CXLII	234	Paremcottiah Naidoo	Ventapollum neckerchiefs.
CXLII	259	Revd. W. Groney	Damask napkins.
XC	345	Basavalingum	Peuelope canvas for Berlin work.
LXI	290	Kotha Sooba Chetty	Native cloths.
.....	291 to 294	Moosany Lutchmen Chetty	Do.
CCXI	.....	Cuddapah Local Committee	Trouser cloths.
CCLXXXIV	224	Iya Chetty	Cottons of sorts.

PECUNIARY AWARDS.

			Amount.	
CXLII	176 to 179	Ajee Mandee Saib	Rs. 50	46 Chintzes of sorts.
CXLII CCCXXXV	27 } 57 }	Aga Ismail Saib	„ 50	36 Chintzes of sorts and a Gold flowered Palampore.
.....	.....	Conjetty Arjapa Chetty	„ 50	Unbleached Isree.

CLASS XII.

Woollen and Worsted Manufacture.

2ND CLASS MEDALS.

CCXXX	12 to 16	Captain J. Loudon	Blankets.
XLIV	1	Captain Gill	Black Cumbly.

HONORABLE MENTION.

CLXXIII	10	Captain R. S. Dobbs	Check Cumbly.

CLASS XIII.

Silk and Velvet.

2ND CLASS MEDALS.

CCLXXXVIII	178	Mrs. James Fraser, Ganjam	Silk Scarfs.
CCLVII	87	Hyderabad	Figured Satin.

HONORABLE MENTION.

Pro. No.	Catalogue No.	Names of Exhibitors.	Object rewarded.
LXVII	5—6	Madras Tariff	Tanjore Silks.
CXCVIII	38 to 42	Trichinopoly	Kincobs.
LXI	3	Botha Sooba Chetty, Salem	Nafermanee Silk handkerchief.
CXV	81	Poodoocottah	White Doovettie.
CXXXI	7 to 21	Hyderabad	Satins Nos. 47, 59, 84, and 86.
CCLXXII	171	Soobo Pillay	Benares laced Kincob.
CXLV	.....	Soojan Mul Lalah	Do do.

CLASS XIV.

Manufactures from Flax and Hemp.

1ST CLASS MEDAL.

CCCXLV	97 to 100	W. E. Underwood, Esq.	Manufacture from the fibres of the Agave Americana.

2ND CLASS MEDALS.

CCCIX	83 to 86	Dr. R. Riddell	Plain and Penelope canvas, colored cloth, brushes, white & colored Ladies' shoes,&c.
.....	.....	Captain Meadows Taylor	Prepared fibres of the Ootrum or Damia Extensa and six other plants.

HONORABLE MENTION.

CCCXV	235	W. D. Kohlhoff, Esq., Tanjore	Koorinja fibre or Tylophora Asthmatica.

CLASS XV.

Mixed Fabrices including Shawls, but exclusive of Worsted Goods.

1ST CLASS MEDALS.

CXLIII	58	Girdar Doss Valaba Doss	Cashmere Shawl.
LXVII	.....	His Highness the Rajah of Tanjore	Richly laced fabrics.

2ND CLASS MEDALS.

CCXX	120	H. Balamoocoonda Doss	Red Cashmere Shawl.
CLXXIV	153	Moonshee Nunjapah	Silk Shawl.
CLXIX	251	Narsimloo Chetty	Crimson and Gold fabric.

HONORABLE MENTION.

CXLV	68	Soojamul Lallah	Scarf.

CLASS XVI.

Leather, including Saddlery and Harness, Skins, Fur, Feathers, and Hair.

2ND CLASS MEDALS.

CLXXVIII	149 to 162	Colonel Sherriff and Lieut. Grant	Leather of Sorts.
CLXXVIII	163	Peerajee	Saddle and Bridle.
CCLXXIII	197 to 236	Mr. Bowden	Leather of sorts.
CCXXX	227 to 262	Captain J. Loudon	Do. do.

HONORABLE MENTION.

Pro. No.	Catalogue No.	Names of Exhibitors.	Object rewarded.
XCIV	84 & 85	H. H. the Rajah Tondaman Bahadoor	Native Saddlery.
LXV	21 & 22	W. D. Kohlhoff, Esq	Sheep and Goat skins.
XXIII	6	Rajah of Kalastry	Collections of skins.
LXIII	10 to 20	Meeranjee Meeah	Skins.
CXXXI	25 to 31	Nawab Salar Jung Bahadoor	Skins Raw and Tanned.
LXXXV	43 to 50	J. Ratliff, Esq	Skins Raw and Dressed.
CCV	117 to 126	H. H. the Maha Rajah of Cochin	Skins Raw and Tanned.
CXCI	127 to 134	Hon'ble Walter Elliot, Esq	Skins.
	146	Captain Miller	Sambre, Deer and Cheeta skins.
CCXXI	165 to 196	Travancore Local Committee	Skins of sorts.
CCXXXII	192	H. V. Conolly, Esq	Variegated Panther skins.
CXX	194 to 196	J. Rohde, Esq	Skins.
CCXI	125 to 142	Cuddapah Local Committee	Skins, &c.

CLASS XVII.

Paper and Stationery, Printing and Book-Binding.

2ND CLASS MEDALS.

CXI	584 to 594	Wesleyan Mission Press of Bangalore	Book binding in Morocco and Calf skin.
XLIII		C. V. Cunniah Chettyar	Paper.

PECUNIARY AWARD.

CXX	744	Guntoor Local Committee for the Manufacturer	Rs. 30	Sealing Wax.

HONORABLE MENTION.

CXXIII	366 to 487	Christian Knowledge Society	Book binding.
CCIX	782 to 797	American Mission Press	Do. do.
		Messrs. Pharoah and Co	Do. do.
XI	34 to 98	Revd. C. Aroolapen	Do. do.
CCXI	798	Cuddapah Local Committee	Sealing Wax.
CCCXXXIX		W. E. Underwood, Esq	Paper from the fibre of the screw Pine pandanus Odoratissimus.

CLASS XIX.

Tapestry, including Carpets and Floor Cloths, Lace and Embroidery, Fancy and Industrial Works.

1ST CLASS MEDALS.

LXVII	29	His Highness the Rajah of Tanjore	Silk Carpet for presentation to H. M. Queen Victoria.
		Linga Rajoo	Embroidered Rug.

2ND CLASS MEDALS.

CXXX	239	Mahomed Hoossain	Wurrungul Carpets.
CXXX	230	Peer Mahomed	Do do.
CXLII	246	S. Nummiah Naidoo	Ellore Carpets.
CCV	115 & 116	Cochin Local Committee	Grass mats
CXLIV		Oodagheer Mahomed Saib	Embroidery.
		Boojah Row	Do.
LXXXVIII	11 to 22	Edeyengoody Mission School	Lace.
CCLIV	160	Nagercoil Mission School	Do.
CCLXXIV	186	Munjoo Shaw Shaca Row Chenanjee Row Ausagee Row	Embroidered Shamianah.

HONORABLE MENTION.

Pro. No.	Catalogue No.	Names of Exhibitors.	Object rewarded.
LXVIII	227	H. Forbes, Esq	Tanjore Rugs.
CXXXVII	41	Miss Walton	Crochet Stockings.
CCLXXIX	188 to 194	Madras Local Committee	Gold Lace, &c.
...	...	Hyderabad Local Committee	Cloth of Silver (Cl. xv.)

PECUNIARY AWARDS.

			Rs.	
...	18	Mangalore German Mission	35	Crochet Work.
XLVII	1	Miss Addis	20	Crochet Counterpane.
...	...	Mr. Haller	20	Coir Matting.
			20	Do.

CLASS XXI.

Cutlery and Edge Tools.

1ST CLASS MEDAL.

LIX	1 to 11	S. Arnachellum of Salem	Cutlery.

2ND CLASS MEDAL.

CXCVIII	16 to 19	Austin, of Trichinopoly	Cutlery.

CLASS XXII.

Iron and General Hardware.

2ND CLASS MEDALS.

CXX	67	J. Rohde, Esq	For wall Shade Bracket.
XCII	44	M. DeClosets	For cast iron railings.
CII	18 to 53	M. Bulliard	Iron Cots, &c.

HONORABLE MENTION.

CCV	80	H. H. the Maha Rajah of Cochin	Metallic Mirrors.
CCXXI	117	Travancore Local Committee	Do.
CCLVIII	126	Overseer W. Patterson	Hand Cuffs.
CCLXXIV	132	Captain Haines, Supt. Bangalore Division	Wire Steel.

CLASS XXIII.

Working in Precious Metals, Jewelry and Articles of Virtu and Luxury, not included in other Classes.

1ST CLASS MEDALS.

CCLXIX	155 to 199	A. Arathoon, Esq	Precious Stones.

2ND CLASS MEDALS.

Pro. No.	Catalogue No.	Names of Exhibitors.	Object rewarded.
....	.....	Mr. P. Orr.....	Silver vase.
CCXXI	99 to 125	Travancore.....	Silver filigree work.
CCXXXVII	127	Jugganad Butten.....	Chased jewelry and bangles.
CCLXIX	.....	Mrs. Taylor.....	Precious Stones.
CCLXX	.....	Bala Mooconda Doss.....	A pair of enamelled bracelets.
.....	.....	Lieut. General Fraser..	A large vase of Beder ware.
CXLVI	597 to 599	Kasava Doss.....	Drawings and etchings (Class XXX.)
XLVII	.....	Edward Balfour, Esq....	Lithograph books in arabesque.
.....	.....	Churdriah of Nellore.....	Iron and Steel.

HONORABLE MENTION.

CLXXII	80	Messrs. Scriven and Co.....	3 Vases and Silver filigree work from Cuttack.
CCXXI	99 to 125	Travancore and Goa Local Committees	Chased jewelry and bangles.
.....	.....	Mr. Just Gantz.....	Water color drawings.
.....	.....	T Chengulroy	Drawings of arms and ancient pottery.
.....	.....	W. E. Underwood, Esq.	Photographs.

CLASS XXIV.

Glass.

PECUNIARY AWARDS.

LXXXIII	103	Madura Local Committee.....	Prize Rs. 10	Bangles.
LXXXV	9 to 13	Nellore Local Committee....	Do. 10	Bangles and Glass Cups.
CXXXI	14	Hyderabad	Do. 25	White glass bottles.

CLASS XXV.

Ceramic Manufactures, China Porcelain, Earthenware, &c.

2ND CLASS MEDALS.

XCVII	10	Ange de Babick of Pondicherry.....	Medici vases.
CCCXII	....	Arcot Local Committee.....	White and colored pottery.

PECUNIARY AWARDS.

LXXII	3	Hyderabad Local Committee for Raichore Manufactory.....	Rs. 50	Varnished, glazed and colored pottery.

HONORABLE MENTION.

CLXXVII	12	Bangalore Local Committee	White earthenware.

CLASS XXVI.

Decorative Furniture and Upholstery, including Lacquered Goods.

1ST CLASS MEDAL.

CCXIV	... .	Mr. J. Deschamps.....	Carved furniture generally.

CLASS XXVII.

Manufactures in Mineral Substances used for Building or Decoration as in Marble, Slate, Porphyries, Cement, Artificial Stones, &c.

2ND CLASS MEDALS.

Pro. No.	Catalogue No.	Names of Exhibitors.	Object rewarded.
... .	.....	Mooroogasen Moodelly.....	Goglets and a Jar made of Naggery Potstone.
.....	.....	Mr. M. Chesterfield....	Improved Building and Roofing Materials.
.....	.....	Gunner T. Barton	Building Bricks.

HONORABLE MENTION.

.....	.....	Appavoo....	Ink stand and Butter cup of Soap stone.
.....	.....	Monsieur Carriol of Pondicherry....	Artificial Hydraulic cement.

CLASS XXVIII.

Manufactures from Animal and Vegetable Substances, not being Woven or Felted, or included in other Sections.

2ND CLASS MEDAL.

CCXXI	16 to 64	H. H. the Rajah of Travancore.....	Series of Carvings in Ivory.

CLASS XXIX.

Miscellaneous Manufactures and Small Wares.

2ND CLASS MEDALS.

CCV	87	H. H. the Maha Rajah of Cochin....	Wax candles and Peacocks feather fans.
CXV	50	H. Excellency the Tondiman Bahadoor..... ..	Walking stick.
.....	.....	Mr. W. Gay.....	Perfumery.
CCXIX	114 to 116	Lutchmiah Rajoo.....	Gilding.
.....	86 to 87	Dr. G. W. Flynn.....	Soap (Class II.)

PECUNIARY AWARD.

Madras Tariff..... ..	Seelar Sahib.....	Rs. 50	Attars, &c., &c.

HONORABLE MENTION.

CXXXI	27 to 40	Hyderabad Local Committee....	Lac ware.
CXLVII	99 to 106	Munnul Cody Ummal.....	Bead ware.
CCXXXIV	117 to 123	Miss Locker.....	Do.
.....	.....	Rajahmundry Local Committee.....	Fans.
LXIII	19 to 23	Tinnevelly Local Committee.....	Do.
CXLII	68 to 69	Masulipatam Local Committee.....	Condapillay toys.

CLASS XXX.

Fine Arts, including also Coins, Books, &c.

1st CLASS MEDALS.

Pro. No.	Catalogue No.	Names of Exhibitors.	Object rewarded.
CCXCVIII	621	Captain Tripe	Photographic views of the temples of Hullabede and Belloor.
CLIX	529	W. E. Cochrane, Esq	Collection of Photographic portraits.

2nd CLASS MEDALS.

LVII	27	Mrs. Wilkieson	Carved Sandal wood Box.
CLXXII	549	Captain G. Harvey	Carvings in stone.
CCXLVIII	622	Dr. Neill	Landscape and Architectural views.
CCCIII	.....	Captain Greenlaw	Groups of figures.
CCCIII	.....	Mrs. Monckton	Chess Table painted on wood.
CXLVI	598	Casava Doss	Etchings on walking stick & bamboo boxes.

CLASS I.

REPORT ON MINING, QUARRYING, METALLURGICAL OPERATIONS AND MINERAL PRODUCTS.

Jury.

Major Maitland, *Chairman, Superintendent Gun Carriage Manufactory.*
G. B. Bruce, Esq., *Engineer, Madras Railway.*
Edward Balfour, Esq., *In charge of the Government Central Museum.*
G. J. Shaw, Esq., m. d., *Assay Master, Madras Mint.*
A. J. Scott, Esq., m. d., *Assistant Assay Master, Madras Mint.* } *Joint Reporters.*
Alex. Hunter, Esq., m. d., *Director Madras School of Arts.* }

The Collection of Specimens exhibited in this Class is very meagre and cannot by any means be considered as a fair representation of the mineral resources of this Presidency. An exception must be made however in favor of the ores of iron and steel of which there are several series from different localities of much value and possessing considerable interest. The following species have been exhibited.

Native iron.	Clay iron stone.
Do. magnetic.	Bog iron ore.
Do. iron sand.	Pitchy hydrate.
Steely iron sand.	Silicate of iron,
Iron sand with manganese.	Silico calcareous ore or
Iron pyrites.	Yenite.
Octohedral sesquioxide.	Red and purple Haematite.
Cubical do.	Yellow do. or hydrate of
Radiated pyrites.	iron.
Arsenical do.	Antimonial ore.
Yellow sulphuret.	Brown ochrey ironstone.
Specular ore or glance.	Yellow do.
Red iron stone.	Pisiform ore.
Brown do.	Micaceous iron ore.
Umber.	Carburet of iron or plum-
Black iron stone.	bago.
Sparry iron stone.	

With the exception of 4 or 5 species this includes nearly all the ores of iron with which we are acquainted, and of these, two more are known to have been met with in this Presidency, but samples of them have not been forwarded, viz., titaniferous iron of the Neilgherries, and meteoric or nickeliferous iron which has been picked up in Southern India. Of the above ores the magnetic iron, iron sand, bog ore (or cellular iron) the haematites and the silicates are the species most frequently employed by the Natives. There are two or three forms in which the silicates occur in India which are deserving of attention, as these ores are much esteemed by the Natives on account of the quality of iron and steel which they yield, and the facility with which the metal is obtained from them. One is a sparry red or brown sandstone trongly impregnated with iron and particularly liable to disintegrate or crumble on exposure to the air. This sandstone when examined with a lens is found to consist of minute particles of iron and quartz, there is often a little manganese with the iron, and the rock on decaying yields the iron sand of different colors of brown, red, grey and black which are so plentiful in Southern India. The steel grey varieties contain the greatest quantity of manganese, in the form of a silicated sesquioxide, and it is to the presence of a little of this metal that a good deal of the steel of Southern India owes its hardness and the working properties which adapt it so well for cutlery and stone masons' tools.

Another variety of silicate is a hard close-grained sandstone which accompanies the beds of lime, magnesian clay, and fire clay in the Chingleput, Nellore, and Masulipatam Districts. This sandstone is dark red, brown, and black in proportion to the quantity of iron which it contains, and its relative geognostic position.

At the Red Hills where it occurs along with conglomerate laterite and broken fragments of granite, on low undulating mounds, it is of a dark purple color strongly resembling the old red sandstone. Near Rajah's Choultry on the same tract of country about 30 miles distant, this sandstone again appears accompanied with black bands of Iron and fibrous lime. At Streepermatoor, 17 miles from the Red Hills, the sandstones are of considerable thickness, nearly white, and the iron in thin seams between the strata. These beds of iron, lime, sandstone and fire clay appear to extend for 250 miles or more both up and down the Coast with little interruption, and at depths varying from 2 to 80 feet from the surface. They are covered in many places with alluvial soil, marls, gypsum, the sand formations and the debris from the distant hills. In many parts of this tract the iron ores, iron sands and haematites appear to have been extensively worked in former times, as large mounds of iron ore and scoriæ from furnaces with portions of burnt clay nozzles are frequently met with. In the Chingleput District the manufacture of iron is almost abandoned; but in Nellore

In Guntoor and Hyderabad a good deal of iron and steel are still manufactured.

and Masulipatam it is still carried on in a small way.

The third form in which the silicate occurs is as band iron ore alternating with layers of sandstone, and frequently accompanied by manganese. These ores yield very fine qualities of iron and steel. They occur in Salem, Guntoor, Masulipatam and Mysore. A fine series of these ores is exhibited by Captain Elliot from Shemoga in Mysore. The Jury consider this series deserving of honorable mention, but they regret that the celebrated steel wire, or iron and steel manufactures of the district are not exhibited.

The iron ores and series of iron in different stages of preparation exhibited by the Coimbatore Local Committee is most complete, and if taken in connection with the models of iron implements used in agriculture and the different trades, this forms an interesting and instructive series, the Jury award a 2d Class Medal for this contribution.

The best series of ores of steel and of steel made from them, is exhibited by the Hyderabad Local Committee from Kurkool. A 2d Class Medal is awarded for this collection.

Major Dobbs exhibits a good series of iron ores from Chittledroog in the Mysore territory. The wrought steel from Tinnevelly and Travancore both appear to be of good quality. Mr. Rohde exhibits a large and interesting series of iron ores from Guntoor. The Masulipatam Local Committee also exhibit a variety of ores chiefly hæmatites, iron glance, and sandstones containing iron.

As regards the manufacture of iron there are two or three points in which the native process differs from the European. First in the selection of ores; the native manufacturer employs only those which are rich in metal, never mixing those of different qualities, and seldom using fluxes to suit particular ores. The clay iron stone sand calcareous iron ores from which much of the iron of Europe is made, are almost totally neglected in India. The furnaces in which the ores are smelted are too small for manufacturing Iron on a large scale, being seldom more than 5 feet in height by $2\frac{1}{2}$ in diameter—their walls are not of sufficient solidity to keep in the heat; they are built of a red ferruginous marl worked up in a soft sloppy pulp instead of being constructed of burnt fire bricks carefully and closely cemented; the walls are consequently filled with minute fissures which though not perceptible to the eye allow a good deal of heat to escape. The common native bellows made of cow skins inflated, do not keep up a sufficiently powerful and steady blast, and the metal does not flow freely enough to be separated from the scoriæ. In the subsequent stages there are other imperfect appliances which tend to deteriorate the quality of the wrought iron and to render it unfit for large manufactures. The blast heat not being sufficiently powerful, the blooms require a long exposure in the fire to render them malleable. They frequently get burnt on the surface and the whole mass is beaten up impurities and all. The Native ironsmith works his iron at a low temperature and with too light a sledge hammer for heavy work. See an interesting account of the manufacture of iron in the printed Reports from the Guntoor District drawn up by Mr. Rohde. The process of manufacturing iron as followed by the Natives may be regarded as one for refining and not for smelting the ores; the silicious particles are got rid of, and the iron is agglutinated into a lump which descends to the bottom and is taken out in a state fit for working up, by this mode the subsequent heating and puddling which are required in the English process for cast iron are avoided. It is doubtful whether the two processes are likely to be assimilated with benefit. The Indian process is economical for manufactures of a small kind, the cast iron of England for large manufactures and machinery.

Steel.

The manufacture of steel is a branch of Industry for which India has long been celebrated. This substance can be made of good quality in small quantities and at a comparatively trifling cost; the process is more carefully conducted than that of making iron and the results are on the whole more satisfactory. Some defects however are found in the cast steel of India which interfere materially with its sale in the European market. These are the hardness of the external surface of the melted lumps, and their inequality, few being alike. The hardness is caused by the lumps cooling too rapidly on the surface from the small size and thinness of the crucibles. This branch of manufacture is susceptible of improvement in India, and there is a great abundance of rich ores, fluxes, and refractory clay in most of the districts of this Presidency. The great desideratum however is a bed of good coal that would convert into coke. Some of the black sandstones and band irons exhibited in this class with their accompanying strata of lime, fireclay, white pipe-clay and thick beds of yellow and red sandstone are very similar to those found in the coal bearing strata of Bengal and other countries.

Plumbago or Carburet of Iron.

Next in importance to the ores of iron, are the samples of plumbago from several localities; the finest and most varied series both as regards size and quality are those exhibited by General Cullen from Trevandrum. One large block occurs along with laterite and contains some pieces the size of a walnut, nearly equal to the fine kinds of Cumberland black lead. Other large blocks nearly a foot in cubic measurement appear of a softer and coarser quality. They have been sawed through, but are not so compact as the brightest portions of the first named block. This plumbago or graphite is well suited for the manufacture of ordinary pencils or for making crucibles.

A 2nd Class Medal is awarded to General Cullen for the series.

Mr. Caldecot exhibits some very fair samples from the same locality; the Zemindar of Vizianagrum also exhibits some fair specimens. It is to be regretted that the pencils which have been made from this black lead are not exhibited. Lieut. Evans, 51st Regiment M. N. I., exhibits plumbago of good quality from Ceylon, and of indifferent quality from beds of shale that accompany iron ore at Malacca.

Some indifferent specimens of plumbago are also exhibited along with iron ore and slaty shales from Cuddapah.

Galena.

Among the metallic ores holding the promise of being marketable, are a rich ore of galena or sulphuret of lead from the vicinity of Cuddapah. This ore is rich in silver, and is worked by the Natives on this account, but all the lead is wasted and the silver is obtained by a tedious, clumsy, and expensive process. Mr. H. L. Pattinson's new process for separating the metals by careful, slow-cooling and crystalization, is applicable to this ore.

Another interesting ore of lead is a galena or sulphuret free from silver. It was brought to notice by Captain J. G. Russell and Dr. A. J. Scott, and occurs in large quantities and in blocks of great size in the vicinity of Kurnool. This substance was carefully analysed a few years ago by Dr. Scott, and was found to contain about 60 per cent. of lead without the least trace of silver. Its history is interesting. It was discovered accidentally by the late ex-Nawaub of Kurnool, in digging a well. He was at the time making warlike preparations and considering the discovery of much importance he surrounded the excavation with a wall for the purpose of concealing it and placed a guard over the entrance of the enclosure. The pit has now however been choked up as since the Kurnool territory has fallen into the hands of our Government, no outlay has been sanctioned to ascertain the extent of the lode and whether it would be worth while working it. The galena has been used in large quantities in the School of Arts for glazing common pottery and has been found of excellent quality.

Manganese Ores.

A very rich ore of manganese is exhibited from Vizianagrum, and another from Bimlipatam, amongst the minerals from the Madras School of Arts.

They occur in huge veins from 3 to 5 feet in thickness amongst primitive granites, and were forwarded by the Zemindar of Vizianagrum. Some of the blocks weighed from 3 to 4 cwt. They have been very accurately described and carefully analysed by Dr. Scott as follows. The minerals under consideration present a highly metallic lustre of a bluish black color, interspersed here and there with dull greyish spots, which latter possess the external character of Psilomelan; both specimens possess the same external characters. The sample from Vizianagrum breaks with difficulty and when split with a chisel presents an imperfect rombohedral cleavage, its sp. gr. is 4·50. When powdered it assumes a dark brownish black color, it dissolves readily in Hydrochloric acid with the evolution of Chlorine gas, and on evaporation forms a gelatinous mass of a deep yellow color. After a careful analysis the quantitative constitution was found to be as follows.

Silicic acid	8·300
Peroxide of iron	12·910
Magnesia	2·339
Water and loss	0·801
Red oxide of manganese	73·786
Oxygen	1·864

The quantity of metallic manganese in the above analysis amounts to 53·428 per cent. and the total quantity of oxygen combined therewith to 22·219; it corresponds very closely to the constitution of sesquioxide or of a mixture of protoxide and peroxide. It is protected from oxidation by being a silicate. It agrees most nearly with a manganese ore called marcellin from mount Marcel in Piedmont investigated by Damour. The sample of ore from Bimlipatam was also subjected to a careful quantitative analysis, and was found to differ in containing lime, its composition was as follows:

Silicic acid	9·090
Peroxide of iron	11·720
Lime	1·244
Magnesia	0·668
Red oxide of manganese	76·177
Oxygen	0·655
Water	0·432
Loss	0·014

It therefore contains metallic manganese 54·929 oxygen 22-558. To constitute a true sesquioxide 23·904 of oxygen would be required. It would thus appear that the metal is in a lower state of oxidation than in the Vizianagrum specimen. These ores are of little or no commercial value, but they have been found of use in producing strong black, purple, and brown glazes for the pottery exhibited in another Class.

Copper Ores.

These are exhibited of good quality from Guntoor, Nellore and Cuddapah; the samples however are small and not so rich in the metal as those collected for the London Exhibition of 1851. Copper is known to occur in 17 or 18 different localities in the forms of green carbonate and grey and liver colored ores, but the metal has never been traced to good veins or nests.

Antimony Ores.

It is to be regretted that only one or two small specimens of sulphuret of Antimony and Antimonial Iron are exhibited. It is known that the former metal occurs abundantly in the Northern Circars.

Chromate of Iron.

A very fine sample of chrome ore weighing about 5

cwt. is exhibited by Mr. Fischer of Salem; the Jury would have awarded a 2d Class Medal for this specimen. The ore having been so largely exported to England as to have lowered the commercial value of the mineral.

Alloys, Brasses and Bell Metals.

A good series of these is exhibited by the Travancore Local Committee, and they are considered deserving of honorable mention, but it is regretted that no particulars are furnished regarding the proportions of the different metals employed.

Coal.

There are three samples of Coal, one from Labuan and two from Malacca, but they are known to be of inferior quality, being from very superficial beds. The latter was said to be very sulphureous and liable to spontaneous combustion.

A specimen of bituminous fossil-wood is exhibited from Perambore. This resembles the Bovey coal of Wales found on the outskirts of the coal formations. The sample was dug from a bed of marl, containing gypsum formations and fossil shells, it has been frequently found at the depth of 14 or 18 feet from the surface in sinking wells in this vicinity.

Materials for Pottery.

Will be noticed in detail in Class XXV, along with the articles manufactured from them.

Granite, Laterite and Building Stones.

A few granites and laterites are exhibited by the Travancore Local Committee and from Pondicherry, but they do not require special mention.

Mr. Rohde exhibits a very interesting series of granites, green stones, slates, lithographic marbles and limestones from Guntoor; the Jury consider them worthy of a 2d Class Medal, which is awarded.

Emery and Corundums.

These are exhibited from a great variety of places. The best samples are contributed by Mr. Rohde from Guntoor, the Hyderabad Local Committee, Dr. Kirkpatrick from Mysore, Mr. Meppen from Cuddoor, and Mr. Fischer from Salem. The Madras School of Arts exhibits two complete series of all the varieties of emery and corundum with their accompanying rocks, adulterations and the substances mistaken for them. These minerals are in great request for grinding and polishing machinery, steam engines, plate glass and pebbles, but they are never selected with sufficient care for exportation.

Oil Stones, Hone Stones, Soapstone, and Lac Grindstones.

It is to be regretted that the display in this class is very meagre, as this Presidency is known to be very rich in grinding and polishing stones. The best samples exhibited are from Mysore, Cuddapah, Nellore and Guntoor, but finer qualities are known to occur in the Ceded Districts and several other localities.

ORES OF IRON AND STEEL AND SAMPLES OF THE METALS PREPARED FROM THEM.

Names of Articles.	Uses.	Localities where procured.
Bog Ore or Spongy Iron Ore.	Used in the Manufacture of Iron.	Coimbatore.
Coarse Iron Sand	Used as an Ore of Iron	Royasamoothrum Coimbatore.
Red Haematite	A rich Ore of Iron	Do.
Iron Ore	Rich in the Metal	Oorpachoor—Coimbatore.
Iron Bloom	Ready for hammering	Coimbatore.
Iron Blooms	In the first state of preparation	Do.
Iron Blooms	In the second stage of preparation	Do.
Iron Bloom	Cut & ready for a second hammering.	Do.
Wrought Iron	In its first stage	Do.
Wrought Iron	In second stage hammered and welded	Do.
Wrought Steel		Do.
Iron Ore	Broken for smelting, this Ore is rich in the Metal	Chittledroog Division, Mysore.
Iron Ore—No. 100 of list	Rich in the Metal	Do.
Iron Ore—No. 15 of list.		Bigganhully in Chinnagherry Talook, Bangalore.
Ochrey Iron Ore—No. 72 of list	Rich in the Metal	Mysore.
Alternate layers of Iron Ore and Quartz	Used as an Ore of Iron	Do.
Stratified Quartz and Iron—No. 100 of list	Do.	Chittledroog Division, Mysore.
Iron Sand—No. 73 of list	Used as an Ore of Iron	Chittledroog Division, Mysore.
Iron Smelted—No. 74 do	Being the first preparation of Iron	Do. do.
Wrought Iron	Used for making tools	Do. do.
Iron Bloom	First stage of preparation	From Satteemuttum.
Wrought Iron—No. 76 of list	Second do.	Chittledroog Division, Mysore.
Cast Steel—No. 77 of list	Used for sharp edged tools	Do. do.
Brown Haematite—No. 15 of list	Rich Ore of Iron	Binganhully Chinnagherry Talook, Bangalore.

Names of Articles.	Uses.	Localities where procured.
Series of Ores of Iron & Manganese...	Used in the Manufacture of Iron, Steel and Wire...	From Shemogah, Chinnapatam and Mysore, exhibited by Dr. Hunter.
Iron glance....	A rich Ore of Iron....	Soondoor Hill Bellary, exhibited by Dr. Hunter.
Red Haematite with Iron glance ..	A rich Ore of Iron	Red Hills, exhibited by Dr. Hunter.
Magnetic Iron Ore	Rich in the Metal..... ...	Chingleput, exhibited by Dr. Hunter.
Coarse Granite, containing Iron.. ...	Used as an Ore of Iron.....	Do. do.
Iron glance—No. 19 of list	A rich Ore of Iron....	Roodrah, Coilgoontla Talook, Cuddapah.
Stratified Iron Ore—No. 21 of list ..	Rich in the Metal....	Yalacatand, Cuddapah.
Iron Ore—No. 30 of list	Rich in the Metal....	Cuddapah.
Purple Haematite—No. 18 of list..	A rich Ore of Iron.....	Roodrah, Coilgoontla Talook, Cuddapah.
Iron glance.....	Used for making Cast Iron.	Vicinity of Pondicherry.
A pig of Cast Iron	Used in casting rails, machinery, &c.	Pondicherry made by M. A. De Closets.
Red Haematite.	Used as an Ore of Iron..... ..	Teroor, Masulipatam.
Brown Sparry Iron Ore or Carbonate of Iron.....	Do.	From Teroor, Masulipatam.
Iron glance	Used in the Manufacture of Iron. ..	Masulipatam.
Iron glance	Used for making Iron and Steel.....	Bezwarah, Masulipatam.
Wrought Steel.....	Used for edge tools....	Teroor, Masulipatam.
1 Piece Melted Ore No. 2 of list.. .	Used for tools.....	Rajahmundry, Exhibited by Gungathadooroo.
Purple Haematite No. 1 of do.	A rich Ore of Iron	Do. do.
Iron Sand, poor in the metal.	Used as an Ore of Iron....	Poodoocottah.
Pisiform Iron Ore	Used instead of shot for shooting Birds	Do.
Iron Sand No. 324 of list....	Used in coloring Bangles....	Madura.
Coarse Iron Sand	Used as an Ore of Iron.....	Tricanalore.
Iron Ore.....	Rich in the metal....	Do.
Iron Sand	Apparently containing Manganese...	Do.
Iron Sand.....	Containing Manganese....	Do.
Iron Sand.....	Rich in the metal.....	Do.
Rusty Iron Sand.....	Used as an Ore of Iron....	Do.
Iron Sand.....	Used as an Ore of Iron...	Do.
Common Iron Sand.....	Do.	Cochin.
Coarse Iron Sand.....	Do.	Do.
Coarse Iron Sand.....	Do.	Do.
Fine Iron Sand.....	Containing Manganese..	Do.
Cast Steel and Bar Steel..	Used for edge tools....	Travancore.
Cast Steel No. 2. of list..	Do.	Do.
Bars or Oolies of wrought Steel No. 87 of list..... ...	Do.	Tinnevelly District.
Wrought Iron.....	Do.	Nellore local Committee.
Iron Sand No. 72 of list....	Used as an Ore of Iron....	Tinnevelly District.
Iron glance No. 29 of list.	A very rich Ore of Iron..	Tinnevelly.
Octohedral Crystals of Iron Ore	Yields Iron Ore of good quality.....	Salem.
Iron Ore and Wrought Iron.	Used for tools.....	Do.
Iron bloom No. 25 of list....	Do.	Hyderabad.
Do. No. 26 of do.....	Do.	Kurkool, Hyderabad.
Iron Ores No. 34 of do...	Do.	Hyderabad.
Steel Ores No. 29 of do.....	Do.	Do.
Steel from No. 30 of do....	Do.	Do.
Steel Ores No. 32 of list....	Do.	Do.
Cast Steel No. 24 of do.....	Do.	Kurkool, Hyderabad.
Cast Steel.	Do.	Hyderabad.
Iron Bloom.....	Do.	Teroor, Masulipatam
Wrought Iron.....	Used for making tools....	Do. do.
Melted Iron or Iron Bloom No. 2 of list	Do.	Poodoocottah.
Samples of wrought Iron and Steel...	....	Mangalore.
Iron Glance	Very rich in the Metal.....	Do.
Iron Sand.	Do.	Sattemuttum.
Iron Sand	Used as an Ore of Iron	Pattooloor.
Iron Glance	A rich Ore of Iron.....	Do.
Iron Sand....	Rich in the Metal used as an Ore of Iron	Guntoor.
Yellow Ochrey Iron Ore.. ..	Rich in the Metal	Do.
Cubical Iron Ore.....	....	Goorzal, Guntoor.
Iron Ore D. of list..	.....	Jampad, Guntoor.
Brown Haematite..	A rich Ore of Iron..... ...	From Margampad and Kananky Guntoor.
Brown Ochrey Iron Stone No. B. 2 of list.....	Used as an Ore of Iron....	Goondlapilly, Guntoor.

Names of Articles.	Uses.	Localities where procured.
Silicious Iron Ore	Used Do.	Guntoor.
Red and Black Haematite No. 1 of list.	Used as an Ore of Iron	Do.
Iron Ore.	Rich in the Metal.	Toomaragod Guntoor.
Iron Glance	Used as an Ore of Iron	Cunchemalay
Iron Ore	Do.	Gooticondah, Guntoor.
Iron Slag	Used in Making Crucibles	Goondlapilly, Guntoor.
CHROME ORES.		
Chromate of Iron or Chrome Ore.		Exhibited by Mr. Fischer, Salem.
Chromate of Iron.		Bangalore Local Committee.
Chromate of Iron, Madras School of Arts	Used as a Coloring Substance.	Vizianagrum.
PLUMBAGO SERIES.		
Plumbago—Graphite or Carburet of Iron No. 8 of list		14 Miles N. E. of Trivandrum found in Lateritc and at a depth of 4 or 5 feet. It is not worked. Exhibited by General Cullen, Trevandrum.
Plumbago—Graphitc or Carburet of Iron No. 9 of list		14 miles N. E. of Trivandrum found in laterite and at a depth of 4 or 5 feet—It is not worked. Exhibited by Genl. Cullen, Trivandrum.
Plumbago No. 10 of list		Do. do.
Plumbago No. 11 of list		Do. do.
Plumbago—Graphite or Carburet of Iron		Exhibited by Mr. Caldecott Travancore.
Plumbago—Black lead or Graphite	Used for making pencils and crucibles	By His Highness the Rajah of Vizianagrum.
Plumbago No. 20 of list		Contributed by Lieut. E. L. M. Evans 51st Regt. M. N. I. from Ceylon.
Plumbago No. 19 of do		Found in a Village about 12 miles from the town of Malacca, contributed by do.
Plumbago—Madras School of Arts		Cuddapah.
Iron Ore containing Plumbago or Black lead No. 31 of list		Paulcondah Hill Chennoor Talook Cuddapah.
Iron Ore containing Plumbago No. 97 of list		Chittledroog Division Mysore.
ORES OF MANGANESE.		
Manganese Ore, Sesquioxide of Manganese with Silica and a little Iron	Used in coloring and glazing Pottery.	Vizianagrum.
Brown Wad or Oxide of Manganese and Iron	Used in coloring Pottery	Red Hills.
Sesquioxide and Peroxide of Manganese	Do.	Vizianagrum.
Purple Clay Iron stone, containing a vein of Manganese		Red Hills near Madras.
Iron Ore and Manganese in alternate strata, Madras School of Arts		Bangalore.
Sesquioxide of Manganese containing 74 per cent of the Metal, analysed by Dr. A. Scott	Used for coloring Pottery	Vizianagrum.
Iron Ore, containing Plumbago No. 11 of list		Roodrar, Coilgoontla Talook, Cuddapah.
Peroxide of Manganese, Madras School of Arts		
Brown Wad or Oxide of Manganese and Iron, Madras School of Arts.	Used in Chemical Manufactures	Soondoor Hill, Bellary.
Sesquioxide of Manganese, Madras School of Arts	Used for coloring glass and Pottery.	Shemogah Mysore.
Galena or Sulphuret of Lead	Used for glasses and glazing Pottery.	Kurnool.
Iron Sand, No. 3 of list	Said to contain gold	Conjeemallay Hills Salem, District.
Arsenical Pyrites or Cube Ore, Madras School of Arts	Roasted as an Ore of Arsenic	Salem.

NAMES OF ARTICLES.	USES.	LOCALITIES WHERE PROCURED.
Octohedral Iron Ore a Sesquioxide of Iron, Madras School of Arts	Sometimes used for making Steel.....	Guntoor.
Sulphuret of Iron or Iron Pyrites, Madras School of Arts ...	Embedded in secondary clay Slate..	Nundial Cuddapah.
Galena or Sulphuret of Lead No. 25 of list	Used for glass and glazing Pottery.	Cuddapah.
Orpiment, Yellow Sulphuret of Arsenic, No. 48 of list	Used as a medicine	M. P. Nursingarow Shemoga.
Copper Ore, containing Malachite or Green Carbonate of Copper No. 60 of list	Used as a ring stone	Garemenapenta in Daumoor Division Nellore, Local Committee.
Copper Ore No. 60 of do.		Do. do.
Copper Ore, Green Carbonate of Copper	Rich in the Metal .... Used for coloring glass	Ventanoor, Cuddapah.
Samples of Brass, Pewter and Bell Metal	.....	Travancore.
Coal, Madras School of Arts		
Coal, Madras School of Arts	Used as a fuel	From Labuan.
Coal from the Mine No. 9 of list, Madras School of Arts	..... Do.	From Mergui. At Tanjong-Kubong, Labuan. Exhibited by P. S. Mootoosawmy, Moodelliar.
Coal. No. 21 a small specimen of, reported to be found at Malacca, contributed by Lieut. E. L. M. Evans, 51st Regt. M. N. I...	.....	Malacca.

AWARDS.

HONORABLE MENTION.

		Captain Elliot.	Ores of Iron & Steel.

2ND CLASS MEDALS.

Pro. No.	Catal No.	Name of Exhibitor.	Object Rewarded.
		CoimbatoreLocal Committee ..	Iron Ores and series of Iron.
cxxxix	37to47	HyderabadLocal Committee...	Ores of Steel.
cccxxi	8 to 11	General Cullen ...	Plumbago.
xxxiii	1 to 39	J. Rohde, Esq. ...	Slates and Marbles.

CLASS II.

REPORT ON CHEMICAL AND PHARMACEUTICAL PROCESSES AND PRODUCTS GENERALLY.

Jury.

Dr. Mayer, *Professor of Chemistry, Chairman.*
Dr. A. J. Scott, *Asst. Assay Master.*
H. Nelson, Esq.
Dr. A. Lorimer, *Secy. Medical Board.*
Dr. A. Hunter, *Director Madras School of Arts.*
J. Tawse, Esq.
Dr. G. J. Shaw, *Assay Master.*
Dr. H. Cleghorn, *Professor of Botany, Reporter.*

Although chemistry and pharmacy afford little scope for competition at the present time in India, yet there is no part of the Exhibition, which presents so many objects of a novel character as Class II, which contains a very large number of raw materials used in medicine, and a smaller number of the products of chemical manufacture.

The Arabs have the credit of having given origin to chemistry, but it is probable that the early Hindoos were acquainted with the same substances and preparations, as we find them enumerated under similar names in the earliest works on Hindoo medicine. (Royle). The crude soda and mineral acids are still prepared here by the same simple methods and rude apparatus as in the most ancient times.

It would be impossible for the Jury to enlarge upon the individual articles of the Materia Medica, but they would draw attention to the numerous and interesting medicinal agents sent from the various districts of the Presidency. The specimens themselves and the facts detailed by the Exhibitors, especially Dr. Kirkpatrick and Mr. Waring, prove that Southern India is abundantly supplied with simple, energetic, and appropriate remedies, well adapted for the treatment of tropical diseases; the Jury are of opinion that many other indigenous drugs besides the "country medicines" now known, might be brought into use, and improved by the operations of the Pharmaceutical Laboratory, and they urge the Medical Department to co-operate with the Drug Committee, now in existence, in the further prosecution of enquiries which may be greatly extended, and which will prove of general benefit by pointing out the Pharmaceutical resources of the country, and effecting a considerable saving to the coffers of the state.

The number of Exhibitors, whose contributions have been submitted to the consideration of the Jury appear to be about 50. Many other medicinal substances, or which may be used as such, are noticed among the *spices* and intoxicating drugs, (class III) or amongst the gums, resins and oils (class IV).

Of the larger collections of Drugs, the chief were from Dr. Waring, Dr. Kirkpatrick, Captain Miller, H. E. the Rajah Tondiman Bahadoor, the Canara and Madura Committees; and in addition to the above, there is an instructive series of Bazaar Drugs included in the Commissariat collection, and in the Madras Tariff.

The following products were each shown by but one Exhibitor—alum, muriate of ammonia, barilla, petroleum, borneo camphor, borax, nitric and muriatic acids and blistering beetles.

The crystallized sulphur (Mediterrancan) and nitre (Salem) from their size ($2\frac{1}{4}$ feet high) and beauty appropriately illustrate the great manufactures of the mother country—they have been obtained during the slow cooling of large quantities of solution. The crystals are well defined and of unusual dimensions.

Canara.

A very extensive collection of medicinal substances, illustrating the Native Pharmacopœia of Western India, has been forwarded by the Local Committee of Canara. This collection is not limited to indigenous products—it contains not a few articles imported from Arabia and elsewhere—these are often interesting, and their commercial routes are difficult to be traced, but with the majority of them we are already acquainted. The products being of a perishable nature, did not all arrive in a state fit for examination, and considerable obscurity involves the history of some of them, but as a whole, the collection exhibits well the condition of the Drug Bazaars in that province, and the nature of the traffic carried on with the Persian Gulf.

Amongst the drugs, we observe *gamboge, catechu, dikkamully* gum, *cubebs, colocynth, assafœtida, wood oil,* (dipterocarpus) *cocculus cordifolius, sphœranthus ?, plumbago zeylanica, acorus calamus, guilandina bonduc, argemone mexicana, cannabis indica, cyperus ?, fish oil, cocum-butter,* and *sago.*

The Canara committee have evidently taken much trouble in preparing the above collection, and the Jury consider it worthy of honorable mention.

Travancore, Mr. Waring.

The most valuable of the drug collections in regard to extent, variety, and careful method in which they have been put up, is forwarded by E. Waring, Esq., Residency Surgeon, Travancore, consisting of 241 specimens, accompanied with a descriptive catalogue of the drugs, and well dried specimens of the plants—the numbers being attached, corresponding with the vegetable products. This collection contains *Star Aniseed*, some remarkable *Galls*, *Wood Aloes*, *Butea Kino*, *True Kino*, *Mutty Pal*, &c., also the root of a *Smilax*, which is reported to be a good substitute for Jamaica sarsaparilla, *Cocculus Indicus*, *Nux Vomica*, *Zedoaria*, &c. *Croton Tiglion*, *Aristolochia Indica*, *Curcuma Montana*. The series is admirably arranged, and has been a source of much attraction during the Exhibition. The Jury award to Mr. Waring a 1st Class Medal.

Mysore, Dr. Kirkpatrick.

The collection of medicines forwarded by Dr. Kirkpatrick as part of the Mysore contribution, is very large and interesting. "In forming this collection" (243 specimens, accompanied with drawings of some of the plants,) Dr. Kirkpatrick writes "care has been taken to include only such articles as there was every reason to suppose were natural products of the Mysore Territories. Different preparations of several medicines, and a long list of medicinal substances procurable in the bazaars, have been excluded because they were not products of Mysore." Amongst this collection, there are preparations of *Bael*, *Tylophora Asthmatica*, *Wrightia Antidysenterica*, *Celastrus Nutans*, *Guilandina Bonduc*, *Cucumis Colocynthis*, *&c.* with practical comments upon their therapeutical value. For the reasons given in speaking of Mr. Waring's collection, and also on account of Dr. Kirkpatrick having submitted many of the substances to the test of actual hospital practice, the jury award a 1st Class Medal.

Madura.

A collection consisting of 66 specimens was forwarded by the Local Committee of Madura, containing same interesting drugs from the Pulney hills.

Poodoocottah.

A small collection of drugs (43 specimens,) was forwarded by H. E. the Rajah Tondiman Bahadoor. Many of the samples were unfortunately spoiled, being found covered with mould, when the bags were opened.

The following articles of Indian materia medica deserve special notice.

1. Oil of Lemon grass or Citronelle, the produce of "*Andropogan Citratum*" is exhibited from Travancore, and also from Ceylon by Mrs. Goodsir.

2. Roussa grass oil, the produce of "*Andropogon Calamus aromaticus*" is exhibited from the Nizam's territories by Dr. Riddell, : this is found to be a good substitute for the more expensive Cajeput oil, and is a useful rubefacient.

3. *Cardole*, a thick black oily substance, obtained from the pericarp of ("Anacardium occidentale") the cashew nut, is exhibited from Tanjore (Local Committee) and by Lieutenant Hawkes. It is a powerful vesicating agent.

4. *Borneo Camphor*, the produce of "Dryobalanops camphora," a small quantity was brought over from Labuan, as a curiosity by 2d Dresser Pulnyandy.

5. *Country Sarsaparilla.* The roots of "*Hemidesmus Indicus*" have been sent from almost every district, but they vary considerably in aroma, the bundle from Trichinopoly being the best.

Syrup and extract from the indigenous plant, growing at the foot of Courtallum hills by 1st Dresser C. Appavoo Pillay, Tinnevelly.

Dr. A. J. Scott has forwarded a crystallized principle called "Hemidesmine," which is found on examination to be an entirely new substance, exhibiting a remarkable indifference both to acids and alkalies, crystallizing in a peculiar manner in hexagonal plates, which are subject to rapid efflorescence. The only ascertained solvents are alcohol and æther ; it is perfectly insoluble in water, both cold and hot. These facts show that it is a substance of a very peculiar nature. The jury recommend that this preparation be fully tested in hospital practice, along with the extract and syrup prepared from the same plant, and forwarded by 1st Dresser C. Appavoo Pillay. In consideration of Hemidesmine being a new product, the jury award a 1st class medal to Dr. Scott, and to C. Appavoo Pillay, Honorable Mention.

The late *Mr. Gay's* specimens of various pharmaceutical preparations including *Omum Water*, *crystallized sugar of Omum*, *Wine of Sarsaparilla*, *Essence of Sarsaparilla*, and *Croton oil*, are considered creditable, and deserving of notice.

6. *Ophelia elegans.* Two bundles of a vegetable drug in considerable demand to the Northward, where it is used as a bitter and febrifuge, are exhibited by the Honorable W. Elliot, Esq. The plant when carefully examined, proves to be "Ophelia elegans," (vide Wight Icon. t. 1331.) closely allied to, and greatly resembling (chiretta)—the native name is *Salaras* or *Salajit*, the stalks are sold bound together in bundles about one foot long, and a little thicker than a man's arm. The drug is exceedingly cheap, and the amount exported is considerable : to what extent it is employed, is difficult to ascertain, as it is confounded in the bazaar with "chiretta." For the interesting fact of a new Gentian being thus brought into notice, and for the specimens sent,

the jury are indebted to the Honorable W. Elliot Esq., and award to him a 2d class medal.

7. *Gunta baringa*, the root of a plant growing in the hills about Lamsingi to the W. of Vizagapatam. It is mentioned by Ainslie p. 112. (1st Ed. 4to,) under its tamil name "chirudekku." (Honorable Mr. Elliot). The same drug is contained in the Canara and Travancore collections, the plant yielding these roots is unknown.

8. *Senna*. A fine specimen of "Tinnevelly senna" cultivated near Cape Comorin may be noticed as of a superior quality. It is satisfactory to remark, that senna grown in the Southern provinces of the presidency is highly esteemed in Britain, and preferred by many to all other sorts, as being both cheaper and purer.

9. *Catechu*. (kuth or terra japonica,) of this astringent, there are many samples, which may be reduced to three varieties, these are as follows.

1. Circular flat Cakes from Travancore, covered on both sides with paddy husks.

2. Large flat Cakes from the Northern Division, varying in colour from Brick dust to dull yellow.

3. Round balls of a dark brown colour, the size of a small Orange from Mangalore, where a large manufacture takes place. These two sorts appear identical or nearly so, varying only in shape. There is likewise a piece of the wood of "Acacia Catechu."

10. *Gambir*, from Rangoon, in cubical cakes covered with a malvaceous leaf.

11. *Kino*, the natural exudation of Pterocarpus marsupium, is an article of export from the Malabar Coast. Several specimens exhibited are quite identical with the kino of commerce.

12. *Extract of Hyoscyamus*. A large fresh specimen has been forwarded from Hoonsoor, prepared by Asst. Surgeon Hilbers, the quality of the extract has been thoroughly tested in the different Civil Dispensaries, and it has been pronounced equally useful as the European article, considering that this valuable medicine has been prepared for the first time in the Presidency, the Jury award a 2d Class Medal.

13. *Gamboge*—has been forwarded from Goa, Mysore, Canara, Malacca and Labuan. The specimen from Malacca exhibited by Lieut. Evans 51st N. I., is the finest pipe variety, all the others are in the form of lumps or tears. The series is very instructive, showing how much the commercial character of this product may be altered by trivial circumstances, the exudation being yellow, reddish, or brown, and of different degrees of solidity, according to the season of the year, and the method of manipulation. It has been shown that the peninsular Gamboge is a useful pigment, and an effective purgative. It has been lately added to the list of country medicines, and it appears that the tree is so abundant along the crest of the ghauts, that the product may be obtained in very considerable quantities in the forests of Mysore, Malabar and Canara. The Jury award a second Class Medal to Lieut Evans, also a 2d Class Medal to the Government of Goa, and another to Apothecary Wrightman, who has collected this product with much care, in homogeneous masses without air vessels, and free of woody fibres or other impurities.

14. *Medicinal—Seer Liver—Shark Liver* and other Fish oils (used in cases of Rheumatism, Atrophy, Phthisis, Glandular swellings and all diseases of a strumous nature) are exhibited, of fine quality, from Mangalore, Tellicherry, Masulipatam and Pondicherry* The Oil is obtained from different fishes. Drawings of these would be interesting.

15. Specimens of the Indian Blistering Beetles, *Mylabris pustulata*, and *punctum* are exhibited by Monsieur Le Docteur Collas of Pondicherry. These are accompanied with a full and interesting report on their blistering properties printed in the "*Moniteur Officiel*" of 2d March 1855. The larger species is *Mylabris pustulata*, and the smaller is *Mylabris punctum*—Both insects are found in large quantities at certain seasons all over Southern India. On account of Dr. Collas' careful researches into the natural History of these Beetles, as well as his interesting report, and successful experiments with this therapeutic agent, the Jury award a 2d Class Medal.

The following chemical substances were exhibited by C. Bauloo Moodelly of Madras, they have been carefully examined by the Professor of Chemistry, who reports as follows.

1. Ammonia Solution—S. G. 0·968, (pharmacopœia strength 0.960) about 10 per cent of real Ammonia.

2. Hydrochloric Acid—S. G. 1·148 (pharmacopœia strength 1.16) contains no Sulphuric Acid, nor any free chlorine.

Half fluid ounce evaporated to dryness left no appreciable residue.

3. Nitric Acid—S. G. 1·359 contains no Sulphuric Acid, half fluid ounce evaporated to dryness left 0·1 gr. of fixed residue which consisted of Iron.

4. Bleaching Powder—Contains 9·24 per cent. of Chlorine has potent bleaching properties emits a strong odour of Chlorine.

The powder is very moist and somewhat rusty, which good bleaching powder should not be; with this exception, which diminishes the percentage of chlorine, owing to the weight of moisture it contains, it is a fair sample. Bleaching powder that is moist, is apt to suffer speedy decomposition. The samples of Dhobies earth and Carbonate of Soda manufactured therefrom exhibited by Bauloo Moodelly and W. Hilbers, Esq. of Hoonsoor, on examination are found to be of inferior quality. The sample of the carbonate exhibited by the

* There is an active demand for this article at all the Sea ports of the Western Coast, and the product has become of great importance as the Export Return shows, vide Appendix A)

former contains only 34 per cent. of Alkali, and is much adulterated with chlorides and sulphates. That exhibited by Mr. Hilbers contains 39 per cent. of Alkali, and although it only exhibits a trace of chlorine, contains much sulphuric acid. The earth sent by Mr. Hilbers marked No. 1, only contains 4 per cent. of alkali.

Seven other specimens of native Carbonate of Soda, have been sent to the Exhibition. The richest in alkali is from the Territories of the Nizam, the Jury do not offer any remark, as a full account with a report of its chemical examination by Mr. R. Reynolds is contained in the Pharmaceutical Journal 1853, Vol. XII p. 517, the quantity of anhydrous sesquicarbonate being 67 per cent.

Samples of *Armenian Bole*, and of soft Magnesian earths from Mysore, Bellary and other localities are worthy of notice, as being articles of the Indian Materia Medica in general estimation; they are also employed in Native painting and gilding. The *Petroleum* or mud oil from Borneo, appears to be a good specimen of this article, but not of sufficient importance to deserve further mention.

The varieties of *Asbestus* and *Amianthus* from Salem and Mysore are deserving of notice, as this mineral is coming into use for various chemical purposes in Europe.

The *Sulphur* from Canara and Nellore is of fair quality, and in pure though small crystals. This substance is found in several districts of this Presidency as Salem, Masulipatam, Guntoor, Cuddapah and Trichinopoly; it occurs along with Gypsum in marl and clay beds, and also very largely in the form of metallic sulphurets. The natives are acquainted with the modes of subliming sulphur, and they prepare it of indifferent quality for the manufacture of gunpowder, which is used for Engineering purposes, &c.

In regard to *Saltpetre*, eight good samples of which are exhibited, the jury have to remark that, in the absence of all information regarding them, as to whether they are brought into market in the same state in which they are exhibited, and as to the number of times each specimen has been refined, they have some difficulty in pronouncing an opinion—they can only judge of the quality of the specimens as laid before them. The beautiful crystallization of this salt, exhibited by Major Gabbett, Superintendent of the Gun Powder Manufactory is entitled to a 2d Class Medal. Of the remaining specimens, the jury consider that exhibited by Mr. Ouchterlony to be the best, and award to him a 2d Class Medal—the next and almost equally good, being that of Mr. J. Rundall, Razole, Rajahmundry—to whom the jury award Honorable Mention.

Fourteen specimens of common *Salt* are exhibited, and the same remark is applicable to them as to the saltpetre. The jury being without information as to the history of their manufacture, can only judge of the quality of the samples before them. They award a 2d Class Medal to Mr. Campbell, and Honorable Mention to Mr. Forbes, the collector of Tanjore.

Captain Blagrave contributes a specimen of Barilla, or crude subcarbonate of Soda, prepared from the ashes of "Salicornia Indica." Capt. Blagrave not having furnished any data as to the mode of preparation, or cost involved, the jury are precluded from giving even an approximative value of the article. The jury remark that this is a source, from which large quantities of alkali might be procured, as these saline plants grow abundantly in the salt marshes and back waters of this Presidency. It is doubtful, however, whether even taking into consideration the cheapness of labour, the manufacture could come into competition with the more economical processes for procuring this substance from dhobee's earth (native carbonate of soda), or from sea salt.

Appendix A.

Statement shewing the articles exported from the Madras Territories by Sea for the year 1854.

		Quantity.	Rupees.
Catechu	Cwts.	1,369	6,984
Kino	„	66	1,031
Gamboge	„	None.	
Country Sarsaparilla	„	269	1,699
Senna	„	404	2,917
Fish oil	Gs.	7,21,095	2,06,863
Lemon Grass oil		None.	

JURY AWARDS.

Class II.

1st Class Medals.

Progressive No.	Catalogue No.	Names of Exhibitors.	Object Rewarded.
		E. Waring, Esq.	Collection of Drugs
		Dr. Kirkpatrick.	Do.
		Dr. A. J. Scott.	Hemidesmine.

2nd Class Medals.

		Hon'ble W. Elliot, Esq.	Ophelia elegans.
		W. Hilbers, Esq.	Ext. of Hyoscyamus.
		Lieut. Evans.	Gamboge.
		Government of Goa.	Do.
		Apothecary Wrightman.	Do.
		Dr. Collas (Pondicherry.)	Blistering Beetles.
		Major Gabbett.	Saltpetre.
		J. Ouchterlony, Esq.	Do.
		Mr.—— Campbell.	Common Salt.

Honorable Mention.

		Mr. J. Rundall.	Saltpetre.
		Mr. H. Forbes.	Common Salt.
		C. Appavoo Pillay (1st Dresser.)	Extract and Syrup of Sarsaparilla.

CLASS III.

REPORT ON SUBSTANCES USED FOR FOOD.

Jury.

Lieut.-Colonel A. McCally, *Commissary General, Chairman.*
W. U. Arbuthnot, Esq.
Colonel F. A. Reid, C. B. *Quarter Master General.*
R. O. Campbell, Esq., *President of the Chamber of Commerce.*
H. A. Murray, Esq.,

Associates.

Dr. Evans, *Professor of Medicine.*
Dr. Cleghorn, *Professor of Botany, Reporter.*

Of the Cerealia commonly cultivated in Southern India, viz. Rice, Cholum, Maize and the Millets (together with the European grains, more sparingly met with, Wheat, Barley, &c.) the Jury inspected about 500 samples, many of great excellence, but more are dirty, broken weevil-eaten and unequal, characteristic of the slovenly state of Indian bazaars. Some are ears on spikes for scientific illustration, others were exhibited in bags or trays with tickets affixed bearing the name of each article. The land produce of each district was exhibited altogether. The rice from Canara and Travancore is packed in its own straw, but when intended for export is covered with rush mat and tied round with coir cord—in shape the *moodah* resembles an orange—the rice by this mode of packing keeps better, and is more secure from insects than in gunny bags.

The grains and pulses are very unequally distributed in the Peninsula, and the accompanying table affords interesting information as to the relations in this respect between the Collectorates and their produce.

Tinnevelly District....	55	Varieties	of Paddy.
	16	Do.	of dry Grains.
	9	Do.	of Pulses.
Tanjore District	77	Do.	of Paddy.
	14	Do.	of dry Grains.
	12	Do.	of Pulses.
Nellore District	13	Do.	of Paddy.
	5	Do.	of dry Grains.
	9	Do.	of Pulses.
Trichinopoly..	7	Do.	of dry Grains.
	9	Do.	of Pulses.
Cuddapah	4	Do.	of Paddy.
	10	Do.	of dry Grains.
	8	Do.	of Pulses.
Madras.....	36	Do.	of Paddy.
	16	Do.	of dry Grains.
	24	Do.	of Pulses.
Masulipatam	19	Varieties	of Paddy.
	9	Do.	of dry Grains.
	11	Do.	of Pulses.
	4	Do.	of Paddy.
	14	Do.	of dry Grains.
	9	Do.	of Pulses.
Madura....	11	Do.	of Paddy.
	16	Do.	of dry Grains.
	10	Do.	of Pulses.
Chittledroog..	12	Varieties	of Paddy.
	17	Do.	of dry Grains.
	6	Do.	of Pulses.
Canara	15	Do.	of Rice.
	3	Do.	of dry Grains.
	6	Do.	of Pulses.
Travancore	11	Do.	of Paddy.
	4	Do.	of dry Grains.
	6	Do.	of Pulses.
Hingolec	1	Sort	of Gundarce Rice.
	1	Do.	of Triticum Aestivum
	1	Do.	of Cajanus Indicus.
Bangalore.	1	Do.	of Coarse Paddy.
Major Haines' collection.	5	Varieties	of dry Grains.
	8	Do.	of Pulses.
Major Miller's collection.	35	Do.	of Paddy.
	25	Do.	of dry Grains.
	28	Do.	of Pulses.
Poodoocottah.....	5	Do.	of Paddy.
	10	Do.	of dry Grains.
W. Elliot, Esq.	1	Chittamootyaloo, or seed Pearl Rice.	
Rajahmundry	12	Varieties	of Paddy.
	11	Do.	of dry Grains.
	8	Do.	of Pulses.

Ennore (Mr. Underwood) Carolina Rice.

Thus from Tanjore, the most richly irrigated province there are 77 varieties of rice, whilst from the districts of Cuddapah and Guntoor there are only four.

In size, colour and fineness, none was equal to the Carolina rice, of which a beautiful sheaf was exhibited by W. E. Underwood, Esq., grown at Ennore from imported seed—the straw of this is large and strong. There have been several importations of this grain, but the seeds did not previously vegetate—80 bags were imported of which about 3 measures were received by Mr. Underwood, the rest being sent to the northward, and never* reached their destination, the seed produced 5 per cent. more grains and ripened a month earlier than the surrounding paddy—there is a sufficient quantity for distribution, and as the value of Carolina rice is greater than that of Madras rice, the propagation of the new variety is very desirable. Several samples of the Hill rice grown without irrigation are curious.

There are samples of a variety of millets, which are of great importance in many parts of the country, the samples with difficulty have been carefully named; they are found to be as below, and hold a rank second to Rice alone. In Mysore, perhaps, they surpass all other crops in importance. Ragee forms a principal article of diet along the Western Ghauts, &c.

The attention of the Jury has been directed to a sample of Cholum cut by Ransom's patent reaping machine: this is forwarded by J. Rohde, Esq., and is considered worthy of favorable notice.

LIST OF MILLETS.

Botanical Names.	English.	Hindoostanee.	Tamil.
Setaria italica	Italian millet	Kala kangnee. / Kora kang	Tenney.
Setaria germanica	German millet		
Panicum miliaceum.	Little millet	Samee cheena / Warree	Varagoo.
Pencillaria spicata	Spiked millet	Bajree	Cumboo.
Sorghum vulgare.	Great millet,	Jowaree	Cholum.
Eleusine coracana	Raggy	Ragee	Kavaroo.

The Indian corn or maize *(Zea mays)* is for the most part indifferent, and deteriorated, it does not show the usual tint of the West Indies. One good sample, however, of the large white variety is exhibited by Mr. Western, Veterinary Surgeon, the produce of American seeds, grown in his garden at Bangalore. "The product is about 500 fold. One head containing 534 seeds and the other 509. Five hundred and thirty four seeds weighed a few grains less than a pound. The soil in which it grew was the common red soil of the compound, well dug but without any manure, and the plants were watered only occasionally *i. e.* once in four or five days." The red American variety is also exhibited from Tinnevelly.

Of 13 samples of Wheat, raised chiefly on the table land of the Peninsula, the best is forwarded by Captain Meadows Taylor, Hingolee.

There is only one sample of Barley, viz. from the Pulney Hills.

Of the general collections from the different Collectorates, those from Tanjore and Tinnevelly, are the most complete and generally interesting.

There are two collections, which appear prominently interesting in this class, and which deserve particular notice.

Mootoosawmy Moodelliar. This collection is of considerable merit, illustrating the Agriculture around Madras; it consists of 52 varieties of Cerealia in bottles, the samples are clean and good. As a collection, it has attracted much attention, and the Jury recommend a second class Medal.

* A considerable portion of it did, and it has been cultivated with some success.

LIST OF CEREAL GRAINS USED AS FOOD IN THE MADRAS PRESIDENCY, CONTRIBUTED TO THE MADRAS EXHIBITION—BY. P. S. MOOTOOSAWMY MOODEELIAR, MADRAS MEDICAL COLLEGE.

Number.	Botanical Names. Order.	Species.	Variety.	English Names.	Tamil in English Character.	Whence Received.	Price.	Remarks.
							14 Marcals	
1		Oriza Sativa.....	1	Paddy.....	Mosana Car Nelloo....	Procurable at Alaypaulcum, near Vundalore.	per Pagoda.	
2		,,		,,	Sumba do.		12 ,, ,,	
3		,,		,,	Caroopoo Manacata do.		15 ,, ,,	
4		,,		,,	Vellay lear do.		14 ,, ,,	
5		,,		,,	Aroonjothee do.		14 ,, ,,	
6		,,		,,	Coondun Sumba do.		not known.	
7		,,		,,	Erungoo Motan do.			
8		,,		,,	Esara Cova do.			
9		,,		,,	Sembalay do.			
10		,,		,,	Valanosana do.			
11		,,		,,	Kykelavan Sumba do.			
12		,,		,,	Chinnasumba do.			
13		,,		,,	Cada Caloothan do.			
14		,,		,,	Poompada do.			
15		,,		,,	Vaday Sumba do.			
16		,,		,,	Seroomane do.			
17		,,		Rice prepared or	Mullega Sumba.....		3½ ,, ,,	
18		,,		Putcharisy.....	Sunna Sumba.....		4 ,, ,,	
19		,,		,,	Elooppapoo Sumba		4 ,, ,,	
20		,,		,,	Pall Sumba.....		3½ ,, ,,	
21		,,		,,	Yeerka Sumba.....		not known.	Received from
22		,,		,,	Sada Sumba.....		5 ,, ,,	Bengal.
23		,,		,,	Mosana Car		5⅓ ,, ,,	
24		,,		,,	Kooroon Sumba..		5⅓ ,, ,,	
25		,,		,,	Moolagoo Sumba.....		4 ,, ,,	
26		,,		,,	Seeraga Sumba.....		4 ,, ,,	
27		,,		,,	Monakatay Car.....		6 ,, ,,	
28		,,		,,	Vaday Sumba		6 ,, ,,	
29		,,		,,	Peroovellay Sumba....		5¼ ,, ,,	
30		,,		Rice prepared by	Paroom Sumba.....		6 ,, ,,	
31		,,		Steaming or	Vaday Sumba.		6 ,, ,,	
32		,,		Pooloongal arisy	Kodun Sumba		6 ,, ,,	
33		,,		,,	Koonda Sumba.....		5 ,, ,,	
34		,,		,,	Aune Car.		7 ,, ,,	
35		,,		,,	Sunna Sumba.....		3⅓ ,, ,,	
36		,,		,,	Seroomoney Sumba....		3⅓ ,, ,,	
37		Triticum Aestivum....		Wheat	Godoombay		3⅓ ,, ,,	
38		Zea Mays.....		Indian Corn....	Mukacholum	Procurable at Madras.	not known.	
39		Sorghum Vulgare.....		Great Millet....	Munja Cholum.....			
40		Do. do.		Great Millet....	Moothoo Cholum.....			
40a		Do. do.		Great Millet....	Seeapoo Cholum.....			
41		Pencillaria Spicata....		,,	Cumboo			
42		Eleusine Coracana		Raggy	Cavaroo.....		8 ,, ,,	
43		Eleusine.....		,,	Muthunga Pil Arisy....		not known.	Prepared used
44		Panicum Italicum.....		,,	Tenny			in famine.
45		Do. do.		,,	Tenny Arisy			
46		Do. Miliaceum		Little Millet....	Varoogoo			
47		Do. do.		,,	Varagoo Arisy.....			
48		Do. do.		,,	Samay			
49		Do. do.		,,	Samay Arisy			
50		Bambusa Arundinacea..		Bamboo Grain..	Moongull Arisy.....			Used in famine
51		Panicum.....		Little Millet....	Vursnom Pil Arisy.....			Do.

F. Appavoo. This collection is likewise an interesting series, consisting of 24 varieties of Indian Pulses neatly arranged on a stand. The importance of these in tropical countries is very great, and the variety of the smaller Lentils is copious, as seen in the annexed list. This contribution is also considered worthy of a second class Medal.

List of Pulses forwarded by Second Dresser F. Appavoo for the Madras Exhibition. 1855.

No.	Botanical Names.	English Names.	Tamil Names.	Teloogoo Names.	Hindoostanee Names.	Prices. Per	R.	A.	P.	For what purpose used	Remarks
1	Lablab Vulgaris	.....	Segapoo mochay.....	Anoomooloo.	Saim ka puttee.....	Measure.	0	1	3	Article of food	
2	Do. variety ...	....	Vella mochay	Thella anoomooloo.....	Suffaid saim ka puttee.....	do.	0	2	2	do.	
3	Ervum lens	Lentil.....	Mussoor paroopoo.....	Musroor pupoo.	Mussoor.	do.	0	4	0	do.	
4	Trigonella Fœnum Græcum.	Fenugreek.	Vendium	Menthiloo.	Maitee.....	do.	0	2	6	do.	
5	Cajanus indicus	Dholl.	Thovaray.	Cunthaloo.	Thour.....	do.	0	1	0	do.	
6	Do. variety	Do.	Segapoo thovaray	Yerray cunthooloo... ..	Lal thour.....	do.	0	1	0	do.	
7	Do. do.	Do.	Mala thovaray.	Conday cunthooloo.....	Paud ka thour...	do.	0	1	7	do.	
8	Dolichos cultratus ...	Red gram..	Karamanee	Karamoodloo	Bullar	do.	0	1	7	do.	
9	Do. variety	White gram.....	Chaday Karamance.	Do.	Suffaid bullar....	do.	0	1	7	do.	
10	Dolichos uniflorus	Horse gram.....	Kolloo	Woolavaloo.	Cooltee.	do.	0	1	7	do.	
11	Do. varicty	Black gram.....	Karoopoo kolloo.....	Nulla woolavaloo.	Kalle Cooltee	do.	1	8	0	As medicine.	
12	Arachis hypogea	Ground nut or Manilla nut..	Vair or nelay cadalay.....	Vair sanegaloo.	Vailatheemoong ka puttee	do.	0	2	0	Article of food	
13	Agati grandiflora	Large flowered Agati.....	Agathee veray.	Agathee or anisay	Agathee ka beenj.	do.	0	8	0	do.	
14	Phaseolus mungo	Mash..	Oolandoo	Woothooloo.....	Mash	do.	0	2	0	do.	
15	Phaseolus vulgaris	French bean	French beansoo	French beansooloo	Bakla	do.	2	0	0	do.	
16	Phaseolus radiatus.....	Green gram.....	Putchay pyroo	Putchay pasaloo	Hureea moong..... ..	do.	0	1	7	do.	
17	Do. variety	Black gram.....	Karoopoo pyroo	Nulla pasaloo.	Kalee moong	do.	0	1	7	do.	
18	Phaseolus—— ?		Pytheay varay.			do.	0	8	0	do.	
19	Cicer arietinum	Bengal gram	Kadalay	Sanegaloo.	Chenna.	do.	0	1	7	do.	
20	Mucuna prurita.	Cowhage seeds.....	Poonakalee varay	Conjooree vathooloo	Kiwach	do.	1	0	0	do.	
21	Canavalia gladiata.	Sword bean	Segapoo thumbetten	Yerray thumbetten kaya..	Lal Kudsumbal	do.	2	0	0	do.	
22	Do. variety..	Do.	Veella thumbetten	Thellay do. do...	Suffaid do.	do.	2	0	0	do.	
23	Pisum sativum.	Common peas	Vella puttanee.	Puttaneloo	Buttanee..	do.	0	1	7	do.	
24	Cyamopsis psoraloides.. ..	.....	Kothoo averay.	Kothoo averay kayaloo...	Mutkeepully	do.	0	3	0	do.	

The only specimen of Job's Tears (Coix Lachryma) is forwarded by Assistant Apothecary Wood from Singapore.

Dried Fruits.

Tamarinds are sent from Goa and Canara. The Sub acid pulp is highly esteemed for its cooling properties, and it forms a large export, being packed in tin with or without syrup. It is chiefly employed for making medicinal drinks, and enters into curries.

The Durian, Litchi, Mangosteen, the Citron, Rose-apple, &c. are exhibited in bottles as curiosities, but none have been preserved for commercial purposes.

Betel nuts and *Cashew nuts* are exhibited in great variety; a series of the former from Travancore is interesting, the nuts being boiled and unboiled and coated with layers of catechu of different thickness. The native gentlemen appear to give the preference to the Nuggur betel nuts.

Chaurapuppoo. The kernel of the Buchanania latifoli is much used in native confectionary brought to Madras from Cuddapah, &c. The oily kernel is roasted and eaten by the Brahmins with milk, and is considered a great delicacy.

Substances used as Drinks.

Coffee.—Many good samples of coffee are exhibited from various districts, and some of very superior quality from the virgin forest land of the Western ghauts—the cultivation of this staple is now extending greatly, and becoming of much importance. It has been pursued with great success by private individuals.

Mr. Green of Munzeerabad exhibits a beautiful series of very fine and well picked coffees, including the pearl or pea berry, but the aroma is defective, as the samples have absorbed an effluvia from the oily wood of the boxes in which they are enclosed. The jury award a second class Medal.

Mr. Cannan's coffee from Annoor in Mysore, Mr. Ouchterlony's from the Western slopes of the Neilgherry range below Naidoobettah, and Mr. Fischer's of the Shevaroy Hills in Salem district, are all of the best quality, and in the best condition.

Mr. Fischer's sample tho' deficient in color, is exceedingly carefully cured and prepared, and the beans being close and well formed, it is deemed worthy of Honorable Mention.

Mr. Ouchterlony's sample is also very carefully prepared, and well cured; the bean is large, and remarkably well shaped, in this respect and in color this sample surpasses Mr. Fischer's.

Mr. Cannan's coffee, however, excels both in color and aroma, being in these respects unexceptionable; the bean is large, but more irregular in shape and size, than either of the other two. These two last are considered the best and worthy of second class Medals.

Cocoa.—The Cocoa seeds sent by General Cullen from his gardens near Oodagherry, 1,800 feet above sea, are the only samples; they are of good quality, the beans being plump, ripe and clean, but small, not well cured and without colour. The jury consider this deserving of Honorable Mention. Considering how much of this article is employed daily in private life, it is of great consequence to get good Cocoa grown in the country. The Committee would draw attention to the cultivation of the tree, from which this valuable nut is produced, and for which the climate and soil of the Western coast would appear peculiarly favorable. It may be remarked—the Cocoa flourishes best in the alluvial soil of mountain vallies, though it will grow well at some elevation on mountain sides. Great care should be taken in the selection of plants, as the varieties are numerous, some producing very superior fruit to the others; judgment on this point must chiefly be acquired by experience.

Considerable diversity of opinion exists as to the distance, at which the plants should be placed, some authorities considering that from 12 to 16 feet apart is sufficient, others maintaining that 30 feet is not too much. It is clear that a free ventilation of air should be insured to the tree, after it has come to its full growth, and this cannot well be attained with a smaller space than 30 feet.. The Cocoa plant requires large forest trees of favourable sorts to be scattered amongst them, to protect them—the tree used for this purpose in the West-Indies and South America is one of the Bombaceæ. The average return of Cocoa per tree, when the trees are planted close together, is from 1 to 3 lbs. there being two crops in the year, but as much as from 9 to 16lbs may be procured by proper planting and cultivation. The plants begin to bear at from 5 to 7 years of age, during this period, the interspaces between the rows of trees can be rendered productive by planting Yams and Vegetables in them. Great care is required in curing the Cocoa, after it is separated from the pod, and on the method of fermenting and drying, depends very much the production of a good or bad article.

Fermented Liquors.

An Orange wine *(Auranta)* prepared by Mr. Rundall, Razole, Rajahmundry District, is quite a novelty, and is an agreeable beverage. On being tasted, it was found sound and good, although of a somewhat peculiar flavour, resembling Malmsey or Muscat. It is recommended for flavouring jellies. The jury consider that the manufacturer is deserving of a second class Medal.

Paddy Liquor *(Arrack)* has been forwarded from Coorg, but this specimen is not remarkable.

Tobacco.

Cheroots are sent from Trichinopoly and a large supply of lunka segars of the *Nicotiana rustica* grown on

the islets of the Godavery, where the cultivation is rapidly increasing; these latter are a superior article, and the whole stock amounting to 40,000 was purchased and sent to the Crimea. Manufacture exercises a great influence over the quality of tobacco. Some of the samples of cheroots are very badly prepared and of inferior quality.

Two bottles of Snuff from Masulipatam; this appears to be moist and oily.

Spices and Condiments.

By the word spices, we mean those vegetable products which have an agreeable aromatic and pungent flavour rendering them useful in the preparation of food and condiments.

The general collections of spices from Travancore and Cochin deserve *special* notice—these specimens being fine and in beautiful order. To the series from Cochin as being superior to the other, the jury adjudicate a 2d class Medal.

Cinnamon.—The dried under bark of "Cinnamomum aromaticum" is forwarded from several localities—in some instances it is probably the produce of Ceylon.

The best specimen of thin rolled and compact quills is from Coorg.

Cassia or Cassia lignea is sent from Mysore, Travancore and Cochin—it is coarser than the last and has a camphoraceous flavor.

Cassia buds are exhibited from Mysore, Canara and Travancore. They are the immature flowers gathered and dried of the "Cinnamomum iners" from which the Cassia lignea is derived. This spice is less known than it deserves to be, and is now exported pretty largely from the western coast.

Nutmegs.—Fine samples of nutmegs were sent by General Cullen from his gardens, Velley Malay near Oodagherry south of Travancore, 1800 feet above the sea.

Two sorts of nutmegs were exhibited by J. S. Vernede Esq. Commercial Agent to the Cochin government; first sort, averaging 70 to the pound, and the second sort, 100 to the pound; the former are particularly fine.

In some instances the nutmegs had been coated with chunam to preserve them.

Wild or spurious nutmeg, is also forwarded from the Bababoodeen Hills, Mysore, and from Canara; it is much used as a substitute for the true spice, but is almost wholly devoid of Aroma and of no interest.

Mace.—The Arillus of the true nutmeg is also a valuable article, it is a flat branching membrane of a bright reddish yellow colour. General Cullen and Mr. Vernede have forwarded the best samples, which are equal to the mace of Penang, and considered worthy of a second class Medal.

Wild mace is also exhibited—this is occasionally used for adulterating the true mace.

Cloves.—The unexpanded flower buds of the clove tree "Caryophyllus aromaticus;" they are forwarded from Travancore, Tinnevelly, Canara, and Cochin. The plumpest and heaviest are from General Cullen's Gardens near Oodagherry, 1800 feet above the sea—these have a strong aromatic odour, and are of a dark brown colour; they are quite entire, and when pressed with the nail, the oil exudes.

The specimens from S. Warrier, Dewan of Cochin, and those from Tinnevelly District are almost equally good.

Pepper.—Being a regular crop on the Western Coast, we have it exhibited from Coorg, Mysore, Canara and Travancore.

The following varieties were examined.

Black Pepper.
White Pepper,
Long Pepper.
Cubebs.

The two first are the same substance, but the white pepper is less pungent than the black, from which the wrinkled covering has been removed by bleaching, which improves the colour, but deteriorates the quality. The quantity of black pepper exported is immense, that of Malabar is the best.

Long Pepper (Piper longum, Lin.) is extensively cultivated in the Northern Circars, its use is rather limited; as in the commercial returns it is always included with black pepper, the quantity cannot be ascertained.

Mustard is abundantly exhibited from the different districts, the samples vary in size and pungency, several species of Sinapis appear to be extensively cultivated, but more on account of the oil contained in the seeds, than for any other purpose.

Cardamoms.—(Elettaria Cardamomum.) This favorite condiment, so much used for various kinds of food, is exhibited in fine order from Mysore, Coorg, Canara and Travancore.

Ginger.—The Rhizome of the Zingiber Officinale has been abundantly sent both as *black* and *white* Ginger, the majority of the samples are of a very light colour, though unscraped and unbleached. In the Bazaars it is distinguished as green and dry Ginger. As is usual with ginger prepared in the East, the specimens are all coarse and hard.

Capsicum.—The dried fruits of several species and varieties of Capsicum have been forwarded. These are valued as a digestive condiment, and are raised all over the country, the principal use is to make Cayenne Pepper and Chilly vinegar.

The species forwarded.

Capsicum grossum (Bell pepper)
,, Annuum.
,, Frutescens.
,, Minimum (Bird's Eye.,)

Coriander, *Aniseed* and *Cummin*, which are much used as condiments, have been largely exhibited from several collectorates, they are noticed in Class IV, on account of the essential oils, which are distilled from them.

Turmeric.—The rootstock of *Curcuma longa* used extensively as a dyestuff, and as a condiment, entering into curry stuff, has been forwarded from many districts.

The finest tubers were received from Trichinopoly. As dyeing is the principal, use of Turmeric, it will be noticed in Class IV.

STARCHES.

Under this head are comprehended the various farinæ used in the Presidency for food or export.

Arrowroot.—(West Indian) Maranta Arundinacea is exhibited from Chittoor and Royapoorum. At both places, the plant is extensively cultivated and the article is considered of excellent quality. The Chittoor Arrowroot is remarkably pure, a fine impalpable powder without odour, and without taste. Mr. Spears of Royapoorum has sent a large quantity of good Arrowroot which is an equally valuable farina, if manufactured with equal care.

Arrowroot (East Indian) Curcuma Montana and Angustifolia from Travancore, Cochin and Canara. This starch has been prepared in large quantities on the Western Coast for many years, where the farina is extracted from the pendulous tubers of these and other species of Curcuma, and this excellent substitute for the West Indian article, might be produced in large quantities all over the Peninsula. The method of preparing the arrowroot is substantially the same from whichever plant it is extracted. The commercial value of the East Indian farina, is very much below that of the Maranta arrowroot. It is less used as an article of diet, but is largely bought by the starch makers of London.

Roots of *kutchoora* a general name given to the genus Curcuma are sent by Dr. Lovell, Sholapore—as well as arrowroot manufactured from them by the Chinese prisoners at Mahableshwur Hills under the superintendance of Dr. Winchester—the article is sold at 4 annas per pound giving a good profit—it is of good quality, and is a staple food of the Hill people. The roots appear to be those of Curcuma montana " Roxburgh." The jury award Honorable Mention for this interesting contribution.

Sago meal.—The pith of Caryota urens is much used in Canara when fresh, and deserves attention.

Plantain meal—Prepared from Plantains sliced, dried, ground and washed has attracted some notice in England. A sample is exhibited from Travancore. The nutritive quality of this substance, and its chemical composition are found to approach very closely to that of rice. There can be no doubt therefore of the value of this meal, and of the benefit of preparing it, whenever the fruit is produced in larger quantities than it can be consumed.

Cassava meal—Prepared from the roots of the Euphorbiaceous shrub. (Janipha manihot.) A very similar substance to the last, is sent from Travancore.

Tapioca—From Mr. Rundall, Razole near Rajahmundry, in respect of feel and taste is excellent, and is manufactured by him at the rate of Rs. 7 8 0 per maund.

Various other samples of Miscellaneous " Hill Tapiocas" are exhibited—these are obtained from the roots of different species of Arum, Dioscorea or Terrestrial Orchids: none of them appear important, and from deficiency of exact information, the jury are unable to enter into details, *Amorphophallus companulatus* (Telinga Potatoe,) esteemed a very wholesome food, is likewise exhibited from Travancore, under the name of " karnakelungoo"—The large dark coloured flowers have a very curious appearance.

Batatas ——— ?

Four small roots were sent from Australia by Mr. Dowdeswell, and planted by Mr. Rohde at Guntoor, whence it has been already largely distributed. It has been in daily use as a vegetable for the last six months, and is preferred to the common sweet potato as being less sweet and more farinaceous.

There are 3 samples of " Salep misree" contributed byDr. Riddell—" one" and " two" are labelled " Salep misree" from the Kunner Hills near Aurungabad—sold when green, and fresh dug up, at 2 pice per seer—" three" is from Booldanah Hills in Berar—when fresh dug is sold by the bheels at 12 seers for the Rupee. These small dried tubers of Terrestrial Orchids are hard, and have a horny appearance, the two first are dirty green and the third of a yellowish white color.

The Salep contains a gummy principle (Basserine) beside the large proportion of amylaceous matter, which renders it highly nutritious as a diet for invalids. Dr. Riddell's price is considerably lower than that in the bazaar of Madras.

Singhara.—Spinous fruit of Trapa bispinosa. This important article of food is only exhibited fromHingolee by Capt. M. Taylor—the plant appears to have been extirpated from the tanks of southern India, while it has been preserved in the Mahratta Country and Deccan.

AponogetonMonostachyon, *Roxb.*—The small tuberous roots dug up in swampy places, and eaten by natives have been sent from Madura under the name of " *Koteekalangoo.*"

Parkia Biglobosa.—The sweet and farinaceous pulp within the pods is highly esteemed and made into sweetmeats. The natives also make a pleasant drink by diffusing the farina thro' water. This tree has now been introduced for many years, into some of the Gardens about Madras; the farina is a new article of food in this Presidency and deserves attention.

Sugar.—A smaller number of specimens of this article are exhibited than might have been expected.

In refined Sugar, there are three samples forwarded by the Aska Sugar Company—the first of these is the best exhibited and leaves nothing to be desired in color and grain, a 2d class Medal is awarded.

Six samples of a good description are forwarded by the Astagram Sugar Company—who excel in loaf sugar and also in Sugar Candy, to them a 2d class Medal also is awarded.

Two sorts of excellent Sugar, exhibited by G. Faulkner, Esq., Rajahmundry are likewise worthy of Honorable Mention.

Sundry raw Sugars were exhibited, one sample from Madiapollum in Cuddapah District deserve Honorable Mention. The Sugar prepared by native processes is very inferior. One large mass of Sugar Candy crystallized in a Chatty from Ganjam however deserves attention.

Palm Sugars.—Jaggery obtained from the Date and Palmyra palms are exhibited as curiosities, as also Molasses.

ANIMAL KINGDOM.

Honey.—There is a considerable variety of specimens of honey, but there is no novelty of importance. The most of the samples have deteriorated by keeping in glass stoppered bottles; or are in a state of fermentation.

Isinglass.—The air bladders of several fishes yielding this alimentary substance, have been forwarded from the Western Coast. None however have been finely prepared.

Sharks' Fins.—Travancore sends this which is a favorite article of diet with the Chinese, and is largely exported.

The jury cannot close their report on food without noticing the very interesting case, contributed by the Commissary General, illustrating the various articles (157 in number) which are issued by that department. For this complete, instructive and well arranged collection of alimentary products consumed in barracks, jails and hospitals, the jury award Honorable Mention, and would have awarded a 1st class Medal, if Colonel McCally had not been their Chairman.

H. CLEGHORN,
Reporter.

EXPORTS OF FOOD SUBSTANCES FOR 1853-54.

	Quantity.	Value. Rs.
Rice	Qrs. 6,25,104	59,25,118
Wheat	Qrs. 5,208	58,736
Coffee	lb. 72,05,996	7,15,562
Sugar	Cwt. 5,33,878	33,58,346
Tamarind	Cwt. 5,438	11,156
Tabacco	lb. 16,19,787	72,577
Cinnamon	Cwt. 215	9,653
Cassia buds	,, 981	2,018
Nutmegs / Mace	None.	
Cloves	Cwt. 36	1,312
Pepper	Cwt. 1,00,796	9,88,084
Cardamums	,, 3,318	3,24,295
Ginger	,, 25,991	1,23,353
Coriander seeds	,, 7,718	11,239
Arrowroot	,, 7,400	45,069
Sharkfins	1,329	28,073
Fish Maws	501	7,528

JURY AWARDS.

CLASS III.

HONORABLE MENTION.

Pro. No.	Catalogue No.	Names of Exhibitor.	Object Rewarded.
		W. E. Underwood, Esq.	Carolina Rice.
LXVIII	1 to 149	Collector of Tanjore.	Collection of Cereals.
LXIII		Collector of Tinnevelly	Collection of Cereals
XX	5	Mr. Fischer	Coffee.
CCXXI	103	General Cullen	Cocoa.
LXXXIX	18	Mr. Faulkner, Rajahmundry	Sugar.
CCXI	42	Local Committee, Cuddapah	Sugar, (Madapollum.
XXXVI	1	Commissary General.	Collection of Commissariat Articles.
		John Rohde, Esq.	Cholum Straw, cut with Reaping Machine.

2ND CLASS MEDAL.

Pro. No.	Catalogue No.	Names of Exhibitor.	Object Rewarded.
CC	1 to 52	P. S. Mootoosawmy Moodelliar	Collection of Cereals.
CCLXXI		F. Appavoo	Collection of Pulses.
CLXXVI		Mr. Green	Coffee.
CLXXVI	120	Mr. Cannan	Coffee.
		Mr. Ouchterlony	Coffee.
LXXXIX		Mr. Rundall	Auranta Wine.
CCV		J. S. Vernede, Esq., Cochin	Collection of Spices.
CCXLIX		Aska Company	Refined Sugar.
CCXVI		Astagram Company	Loaf & Sugar Candy.

CLASS IV.

REPORT ON VEGETABLE AND ANIMAL SUBSTANCES CHIEFLY USED IN MANUFACTURES, AS IMPLEMENTS, AND FOR ORNAMENTS.

Jury.

Honorable W. Elliot, Esq., *Chairman.*

W. E. Underwood, Esq., *Collector of Sea Customs.*

Lieut. Colonel G. Balfour, C. B., *Member Military and Marine Boards.*

Dr. H. Cleghorn, *Professor of Botany.*

Lieut. H. P. Hawkes, *Deputy Assistant Commissary General.*

Lieut. Colonel A. Reid, C. B., *Quarter Master General, Madras Army.*

Dr. A. Hunter, *Director, Madras School of Arts.*

Lieut.-Colonel T. T. Pears, C. B., *Consulting Engineer, Madras Railway.*

J. Ouchterlony, Esq., *Member Chamber of Commerce.*

J. D. Sim, Esq., *Sub-Secretary Revenue Board.*

At their first Meeting the Jury took a preliminary survey, and finding the field of their operations to be of great extent and importance, they resolved themselves into two sub Juries, and appointed Reporters as follows:—Oils, Lieutenant Hawkes; Fibres, Dr. Hunter; other sections, Dr. Cleghorn.

Section—I. Gum and Resin Series.
II. Oil Series.
III. Dyes and Colours.
IV. Tanning Materials.
V. Fibrous Substances.
VI. Cellular Substances.
VII. Timber and Ornamental Woods.
VIII. Animal Substances.

SECTION I.

Gums and Resins.

Sub Jury.

W. E. Underwood, Esq., *Chairman.*
Alex. Hunter, Esq., M. D.
H. P. Hawkes, Esq.
Dr. H. Cleghorn, *Reporter.*

Although the season was noticed as having been unfavorable, in some parts, for the production, and the time too limited for the collection of these exudations, which are not generally procurable in the Bazaars, but are collected as required, yet the series of gums and resins is very interesting and extensive. In this report, the jury cannot give a detailed account of individual specimens, some of which are very little known, but they notice the chief substances, reserving others for future inquiry and research.

The term *Gum*, properly speaking, is confined to those natural exudations, which, solidify on exposure to the air, but are easily redissolved by water: they are often transparent, but vary in tint from white to reddish brown. Of the true gums, the only one which enters largely into commerce from this Presidency is *Gum Arabic*, or East Indian gum: under this term, the exudation of a variety of trees is known to be included, and the variation in quality of many of the specimens is very remarkable. When insoluble in water, but soluble in alcohol, these exudations bear the name of *Gum Resins*, they are chiefly used in medicine. When soluble in spirit of turpentine, they are *Resins*, these are used for the most part in preparing dyes, varnishes, lacquers, sealing wax, &c. &c.

Besides these two sorts, the *Elastic Gums* belong to this section. India rubber and Caoutchouc are the types of the latter, both of these substances rapidly rose in demand after their first discovery, and the merchants anxiously look for new sources of supply. Recent inquiry has shown that caoutchouc is furnished of good quality, by a large number of milky juiced plants, belonging to different families (Sapotaceæ, Apocynaceæ, Moraceæ and Euphorbiaceæ.) Assam, in particular, furnishes large quantities of India rubber from "*Ficus elastica*," whilst specimens are exhibited from Labuan of the "*Urceola elastica*" caoutchouc, and from the Peninsula of *Cryptostegia Grandi-flora*. On the other hand, the supply of Gutta Percha from the Indian Archipelago is beginning to fall off. By a late account, a few isolated trees here and there occur, but they are scarce, and Gutta Taban (as it is there commonly called,) will every year be more difficult to obtain, as the coast region is said to be pretty well cleared, and a long transport from the interior must by augmenting the labour, increase the value of the article. Up to 1844, it was calculated by Mr. Logan in the "Journal of the Indian Archipelago" that 270,000 trees had been felled—value of gutta percha 274,190 dollars—the value of each tree is thus on an average about a dollar. The difference in the appearance and properties of the gutta percha of the present day, is owing to its having become a manufactured substance with an intermixture of inferior guttas, added by the gum hunters to increase the weight.

There are several new and peculiar substances of this section, which might probably be introduced with advantage to the notice of English traders, though as

yet almost unknown to the Natives of the places, where they are procured.

The following collections of Gums and Resins were exhibited.

I. A very interesting series of gums and resins from the Malayan Peninsula, 17 in number, is exhibited by Lieut. Evans, 51st N. I. The samples being brought from Malacca, as prepared for the market, are peculiarly interesting in a commercial point of view. The series is also a most instructive collection to the Medical Student, comprising excellent specimens of Benzoin, Storax, Gamboge, Copal, Dammers and various Guttas of the Eastern Archipelago. Considering that the samples are remarkably fine and pure, such as are rarely met with in commerce, the Jury award a 1st Class Medal.

II. The Travancore collection is a very numerous series (24) of gums, resins and gum resins, and is especially valuable, because the specimens are large and generally of a first-rate quality. Several are new or scarcely known as will be seen in the list vide Appendix II. The Jury award a 2nd Class Medal.

III. This section is likewise well represented from the district of Canara. The exudations being often the same as are observed in the Travancore series, the Jury are of opinion that these forest productions will become important when their value is better known.

IV. The collection of gums and balsams exhibited by Lieut. Hawkes is numerous and interesting, comprising 53 specimens used in medicine or manufacture. The series is not confined to the products of India, but it illustrates well the variety of the resinoid substances known. The specimens are small, and are not accompanied with any statistical information, but they are of superior quality and are carefully named.

V. Dr. Cleghorn exhibits a collection of 28 gums, &c. collected for the most part from well known trees in the Botanical gardens, the value of this series does not depend upon the quality of the samples, which serve merely as illustrations of ordinary exudations commonly met with, but upon the accuracy of the nomenclature, almost every tree having been examined by himself when the exudation was being collected.

The following is the list of gums, resins, &c. shown in the Exhibition.

SIMPLE GUMS.

1. *Babool gum* largely produced and well known in commerce, the produce of the *Acacia arabica.*

2. *Woodapple gum*, obtained from the *Feronia elephantum*—this useful gum is very abundant, and with the last yields the well known "East Indian Gum Arabic." Mr. Rohde mentions that from its ready solubility without residue it gives the best mucilage for making Black Ink.

3. *Keekur gum* produced by *Vachellia farnesiana*—also a variety of Arabic.

4. *Dirisana gum (Acacia Sirissa)* yields a large quantity of this clear gum, closely resembling the preceding.

4 *Kut or Kheir gum* is a watery extract, the produce of "*Acacia Catechu*" sent from Travancore, Canara, Bangalore. The specimen from Canara was in Circular flat cakes or balls covered with paddy husk.

5. *Cashew gum*—(Anacardium Occidentale.) The trunk and branches yield on being wounded, during the ascent of the sap, a transparent gum similar in appearance to gum arabic, for which it is a good substitute. This gum is subastringent, and being unpalatable to Insects, is particularly adapted for use, where their depredations require to be guarded against.

6. *Moringa gum* from *Moringa petrygosperma* obtained in a large quantity, but does not dissolve in water, resembles in some respects Gum Tragacanth, for which it may probably be substituted.

7. *Booraga* obtained from *Bombax Malabaricum* is a pure gum.

8. *Gambir* an Extract from Uncaria Gambir was received from Pegu—the specimen was a cubical cake covered with a Malvaceous leaf.

9. *Butea gum* is extracted from *Butea frondosa*—a Leguminous tree, very common all over the country, this gum is very astringent, being a variety of kino, and might be procured in a large quantity.

10. *Vutta thamary*—A simple pure gum of a crimson colour, is exhibited from Travancore, it has been used for taking impressions of leaves, coins, medallions, &c. Specimens of the transparent castings are forwarded; when the gum is pure and carefully prepared the impressions are as sharp as those of sulphur, without its brittleness—also a twig of the tree, which has been identified as *Macaranga Indica*, the exudation so far as known is an entirely unknown production.

RESINS AND GUM RESINS.

11. *Doopada Resin*—From Mysore and Canara, exuding from the *Vateria Indica*, and constituting the piney varnish. The resin is used as a fragrant incense in Temples, the quantity procurable is very considerable.

12. *Dikamali Resin*—Produced by Gardenia lucida of Roxburgh, from Canara, Mysore and Guntoor—this fragrant resin is useful in Hospitals, keeping away flies from sores, on account of its strong aroma, and is an article in the materia of the village Farrier. It deserves more attention.

13. *Assafœtida*—(*Narthex Assafœtida*,) is exhibited from Canara, but it is imported from the Persian Gulf.

14. *Bdellium*—(Amyris Commiphora,) of this, two varieties are exhibited—the solid gum, and the balsamic fluid, as obtained from the tree. Living specimens of the balsamic tree were sent to the Horticultural Gardens, by Surgeon Lovell, to whom the Jury are in-

debted for these specimens and award Honorable Mention.

15. *Gamboge*, is exhibited from Malacca, Labuan, Coorg, Canara and Mysore ; that from Malacca is the best, in pipes—the others from Mysore, &c. are all in lumps, the results of a variety of modes of preparation —one specimen is full of air vesicles, and of a dark colour, damaged by being collected in rainy weather. The peninsular specimens are known to be produced from *Garcinia pictoria*, and are of excellent quality. Mr. Maltby, Collector of Canara, states that " it is to be found in the greatest abundance along the whole line of our Ghats, and it is probable that, if the attention of the trade were directed to those provinces, it might become an important article of export." Gamboge in tears is exhibited from Labuan, it has a different tint, and is probably obtained from a different tree, *Garcinia Cochinchinensis.*

16. A green semi-transparent hard resin from Coorg, is soluble in spirit, and promises to make excellent coach varnish, the tree is not known.

17. A Fragrant Resin from the Bababooden Hills, Mysore, forwarded by Mr. R. D. Meppen, the leaves sent appear to belong to one of the Dipterocarpeœ. A flowering twig would be acceptable, and also the fruit with the Native name and uses of the tree.

18. *Mutty Pal*, the resinoid exudation of " *Ailanthus Malabaricus*" D. C., is a peculiar substance, first mentioned by Buchanan, who observed it in the Animalaya Forests. It is exhibited from Cochin and Travancore, and is said to be used as incense.

19. *Lac*, is the name of a substance obtained from incrustations made by an insect (coccus lacca), similar to the cochineal, (coccus cacti) on the branches and twigs of many trees in India, as *Vatica laccifera*, *Croton laccifera*, *Butea frondosa*, *Inga dulcis*, *Feronia elephantum*, *Erythrina indica*, *Schleichera trijaga*, (coosumb tree,) &c. The lac is formed by the insect into cells, somewhat resembling a honey-comb, in which the insect is generally found entire, and owing to whose presence, stick-lac yields by proper treatment a red dye, nearly if not quite as bright, as that obtained from Cochineal, and more permanent. Lac is found encircling the branches of these trees in the form of a tube ($\frac{1}{2}$ inch to one inch in diameter) the broken branches with encrustations at various distances is called in commerce *stick-lac* which ought to be semitransparent.

The coloring matter, exhibited by grinding stick-lac, and then treating it with water constitutes *seed-lac.*

The crude stick-lac attached to branches of various trees as above mentioned is exhibited from 16 localities extending from Kamptee to Trivandrum.

Shell-lac is exhibited in the Tariff and by T. Ramasawmy Moodelliar, head writer, Engineer's Office, Kamptee, who sends a series of samples, showing the lac in process of formation, also samples of shell-lac prepared therefrom, with an interesting detail of the mode of collection and preparation, for which the Jury have awarded a 2d Class Medal.

The resin is abundant in the jungles of S. India, but is not much collected for commercial purposes, although always procurable in the bazaars ; the best lac is produced upon the *Schleichera triguga*, which abounds in the central provinces, and yields the colouring matter twice a year.

Seed-lac is exhibited from Canara, but it is marked as " the produce of Pegu."

Gum Elastics.

From different parts of the presidency, valuable specimens have been received possessing the useful properties of Caoutchoue and Gutta Percha in more or less degree. The exhibition of the inspissated gum elastic juice of a number of trees, from different localities, and prepared in different manner, renders it probable that there are a number of similar vegetable productions, which may be advantageously introduced into commerce.

General Cullen has forwarded a drawing and description of a large forest tree, abounding at the foot of the Ghauts N. E. of Trevandrum. The plant delineated, is evidently one of the Sapotaceœ, and the Malayalim name is " pauchonthee" and the product, of which a good sample is forwarded, on examination bears a strong resemblance to gutta percha, both in external appearance and mechanical properties. It appears to the Jury, that this gum elastic is possessed of valuable properties, and they beg to recommend that a 2d Class Medal be awarded.

2. Lieutenant Col. F. Cotton, Engineers, forwards from the Neilgherries a small sample of a product similar to gutta percha in its smell, general appearance and fracture. No drawing of the tree has been submitted, but a few leaves which surrounded the exudation, very closely resemble the real *Isonandra gutta.* The trees are said to be very large and numerous in the forest. The Jury award a 2d Class Medal.

3. The Honorable W. Elliot Esq. exhibits 7 articles (basin, ewer, tumbler, &c.) made of *Cuttimundoo gum*, moulded with the hand, without any preparation. The fresh juice is used as a vesicant, and also as a cement for fastening knife handles, &c. For the introduction of this interesting substance, a medal was awarded to Mr. Elliot at the London Exhibition of 1851, and for the further application of it to useful purposes. The Jury award Honorable Mention.

The Jury are glad to hear that several consignments have been made by Messrs. Healy and Lutrell, of Vizagapatam, and also that 2 cwts. have been sent by request to Professor Solly, Society of Arts, London. The samples exhibited illustrate the variety of uses to which this gum elastic may be applied.

4. Major General Clarke forwards from Jaulnah a Hydrocarbon, closely resembling Cuttimundoo gum, obtained from the "*Euphorbia tirucalli*" which is however considerably different from Caoutchouc or Gutta Percha in its physical qualities, for this the Jury award Honorable Mention.

5. Nursinga Row of Masulipatam has forwarded two lumps of a similar substance obtained from "Euphorbia nerüfolia" to which the same remarks apply, the Jury award Honorable Mention.

6. *Cryptostegia grandiflora*—samples of the concrete juice of this handsome climber have been sent from Nellore by F. Crozier, Esq., from Masulipatam by J. J. Cotton, Esq. from Cuddapah, by Wm. Elliot, Esq. and from Madras by W. E. Underwood, Esq. This strong climbing plant is found in abundance along the Eastern Coast, and in some places is a standard. The milky juice has long been known to contain caoutchouc, but it has not as yet been collected for the purposes of commerce, and it is doubtful, if a sufficient quantity could be obtained to render it an article of trade. The small samples forwarded by the above mentioned exhibitors, appear to be of excellent quality, and answer well for rubbing out pencil marks from paper. Mr. Underwood has made a fair attempt at producing water proof cloth by simply running the juice over the cloth which deserves Honorable Mention.

7. A remarkably fine specimen of sheet India rubber, about 2lbs. weight, is exhibited by Pulnyandy 2d dresser. For this sample, (taken in conjunction with other Labuan products shown by the same exhibitor,) the Jury would award a 2d Class Medal.

LIST OF GUMS, RESINS, AND GUM RESINS EXHIBITED BY THE LOCAL COMMITTEE TRAVANCORE.

English Names.	Botanical Names.	Vernacular Names.	Remarks.
1 Wood Apple tree gum..	Feronia elephantum .. -...	Velam marum pesin	Excellent arabic.
2 Moringa do. do...	Moringa pterygosperma....	Moringa do. do..... ..	Sparingly soluble.
3 Margosa do. do....	Melia azadirachta	Vapum do. do.....	Inferior bitter
4 Mangoe do. do...	Mangifera indica.	Mah do. do.....	Inferior.
5 Catechu.	Acacia catechu	.....	Good catechu.
6 Cocoanut tree gum ...	Cocos nucifera	Tainga marum pesin.....	
7 Mutty Paul..	Ailanthus malabaricus....	.....	Burnt in temples.
8 Vully Plachy.	Butea parviflora.....	. ...	A variety of kino.
9 Wood do.			
10 Pynee Varnish.....	Vateria indica.....	.....	Yields piney varnish.
11 Cocum butter	Fat of Garcinia pictoria .,....	.....	An article of diet, anti-scorbutic.
12 Kino gum	Pterocarpus marsupinm ..	Vengay marum pesin	Astringent medicine, kino of commerce.
13 Dhak kino.	Butea frondosa	Porasay do. do..... ..	Do. do. a variety of kino.
14 Dammer white.....	.....	.....	Coarse varnish.
15 do. black			
16 Chalinkai gum.....			
17 Vutta thamara.....	Macaranga indica	Vutta thamara.	Suits for making impressions and castings.
18 Painjain.....	Embryopteris glutinifera ..	Gab.....	Paying boats, & strengthening fishing lines.
19 Panachoo.....			
20 Jack tree gum.....	Artocarpus integrifolia	Pela marum pesin	
21 Poonarumpoly.....	Boswellia thweifera...	.....	Fragrant incense.
22 Pinnay tree gum.....	Calophyllum inophyllum ..	Pinnay marum pesin.. . ..	
23 Oolthin.....	....	.....	Known in Ceylon.
24 Marking nut	Semecarpus anacardium ..	Shainkotay marum pesin ..	

COLLECTION OF GUMS AND RESINS FROM MALACCA EXHIBITED BY LIEUT. EVANS, 51ST N. I.

1 Dammer Klootatc.
2 do. do.
3 do. Battoo.
4 do do. useful for caulking boats, &c.
5 Gum Copal (of inferior quality.)
6 Dammer, Mata Koochin or Copal.
7 do. do. do.
8 Gutta Koning or Gamboge (In pipes of the very best description.)
9 Gutta Temponay.
10 do. Gagret, or Caoutchouc of Malacca (often mixed with Gutta Taban.)
11 Gutta Jellotong (an inferior Gutta, often,intermixed with Gutta taban.)
12 do. Benkoo.
13 do. Cayer unah.
14 do. Aejole (Malay bird lime.)
15 do. Koomerrian (Benzoin) very superior, such a specimen is seldom met with.)
16 Wood oil, 1 quart, as extracted from the tree without preparation.
17 Dammer keejay.

LIST OF BALSAMS, RESINS, AND GUM RESINS, FORWARDED TO THE MADRAS EXHIBITION, BY LIEUTENANT HAWKES, SUB-ASSISTANT COMMISSARY GENERAL.

Commercial Name.	Commercial Name.
Cypress resin.	Gamboge.
Olibanum balsam.	Opium.
Mastich.	Scammony.
Dragon's blood, 1st sort.	Aloes vulgaris.
Do. 2d sort.	Aloes.
Do. 3d sort.	Aloes spicata.
Benzoin, 1st sort.	Cashew tree.
Do. 2d sort.	Neem or Margosa.
Copal.	Mango tree.
Lac (shell).	Kuteera (cochlospermum).
Refuse lac, from which dye has been extracted.	Wood-apple gum.
Lac stick.	Gum arabic.
Amber.	Peach gum.
Bengal kino.	Shaddock gum.
Dammer.	Guaiacum resin.
Dammer.	Champaca pal.
Dammer.	Chian turpentine.
Dammer.	Balsam of peru.
Bdellium or Dammer.	Mulberry gum.
Euphorbium.	Tragacanth.
Myrrh.	Euphorbia.
Olibanum.	Caoutchouc.
Opoponax.	Yercum pal.
Sagapenum.	Ben or moringa.
Assafœtida.	Cutteemundoo.
Galbanum.	Thevetia neriifolia.
Ammoniac.	

LIST OF GUMS, RESINS, &c. FORWARDED BY Dr. CLEGHORN TO THE MADRAS EXHIBITION 1855.

No.	Botanical Names.	Tamil Names.	Remarks.
1	Gardenia lucida		Useful in Hospital, for preventing the access of flies to festering wounds.
2	Balsamodendron ?		Sold as googul at Sholapore.
3	Mangifera indica	Mah marum pesin	Inferior.
4	Swietenia mahogoni	Mahogany pesin	Clear, superior.
5	Acacia catechu	Wadallee marum pesin	Good catechu.
6	Amyris commiphora		Fragrant balsamic resin.
7	Bombax malabaricum	Catoolagoo marum pesin	Good colour, but inferior.
8	Conocarpus latifolia	Vellay nagah marum pesin	Tolerable.
9	Acacia ferruginea	Vel vaila marum pesin	Inferior.
10	Garcinia Pictoria		Excellent gamboge, gum resin.
11	Garuga pinnata	Curvamboo marum pesin	Inferior.
12	Soymida febrifuga	Choar kullie marum pesin	Tolerable.
13	Azadirachta indica	Vapum marum pesin	Inferior.
14	Prosopis spicigera	Vunny marum do.	Good arabic.
15	Sterculia urens	Vellay bootallie marum do.	Inferior Gum.
16	Vachellia farnesiana	Vaday vullie marum do.	Soft red do.
17	Acacia arabica	Curvaila marum do.	Very good arabic.
18	„ sundra	Curren gallie marum do.	
19	Feronia elephantum	Velam marum do.	Excellent gum do.
29	Zizyphus jujuba	Yellandie marum do.	Inferior.
21	Bassia longifolia	Elloopa marum do.	
22	Swietenia chloroxylon	Kadawah porsh marum do.	Do.
23	Melia azadirach	Mulla vamboo marum do.	Inferior, bitter.
24	Pterocarpus marsupium	Vangay marum do.	Best Mysore kino.
25	Ægle marmelos	Vilvay marum do.	Good arabic.
26	Sterculia fœtida	Peenarry marum do.	Resembling tragacanth.

JURY AWARDS.

Section I.

1st Class Medal.

Progressive No.	Catalogue No.	Names of Exhibitors.	Object Rewarded.
		Lieutenant Evans ..	Collection of Gums.

2nd Class Medal.

Progressive No.	Catalogue No.	Names of Exhibitors.	Object Rewarded.
ccxxi		Local Committee Travancore.	Collection of Gums
ccxxi		General Cullen.	"Pauchonthee" Gum Elastic.
		Lieut. Col. F. Cotton.	Gum Elastic.
		T. Ramasawmy Moodelliar, Headwriter Engineer's Office, Kamptee	Lac and shell Lac.
		2nd Dresser Pulnyandy	India Rubber.

Honorable Mention.

Progressive No.	Catalogue No.	Names of Exhibitors.	Object Rewarded.
cccxvii		Surgeon Lovell.....	Exudation of Amyris Commiphora.
ccvi		Hon'ble W. Elliot, Esq.....	Cuttimundoo Gum.
		Major Genl. Clarke.	Euphorbia Tirucalli (Gum.)
		W. E. Underwood, Esq	Cryptostegia grandiflora (Caoutchouc.)
clxii		Nursinga Row, Masulipatam.	Euphorbia Neriifolia, (Gum.)

Section II.

OILS AND OIL SEEDS.

Sub Jury.

W. E. Underwood, Esq., *Chairman.*

Dr. H. Cleghorn,

Dr. A. Hunter,

Lieutenant H. P. Hawkes, *Reporter.*

Oils are generally divided into two primary groups, "Fixed" and "Volatile," the former class being again subdivided into drying, greasy, and solid oils. In the consideration, however, of the present collection the following classification has been adopted as being in many respects more convenient.

(1)—"Fixed Vegetable Oils," including "Drying" "Greasy" and Solid Oils.

(2)—"Wood Oils."

(3)—"Mineral Oils."

(4)—"Animal Oils."

The value of oil as an article of commerce and its numerous uses in candle and soap-making, wool-dressing, food and medicine, as well as its importance as a lubricating agent, are well known.

The following table compiled from the official reports of the Madras Custom House will show the quantity and value of all the oils exported from this Presidency.

COMPARATIVE STATEMENT OF THE GROSS QUANTITY OF OILS AND OIL-SEEDS EXPORTED FROM THE MADRAS TERRITORIES TO THE UNITED KINGDOM, FOREIGN PORTS AND HOME PORTS, FOR THE YEARS 1847-48 to 1852-53.

NAMES.	1847-48.		1848-49.		1849-50.		1850-51.		1851-52.		1852-53.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
Cocoanuts, dry..	Cwt. 74.061	2.90.393	Cwt. 1.52.642	5.60.764	Cwt. 1.32.219	5.45.876	Cwt. 1,11.216	4.31.008	Cwt. 1.28 819	5.05.316	Cwt. 151.528	5 30.928
Cocoanut oil....	Gl. 5.67.801	1.26.476	Gl. 6.26.425	1.64.201	Gl. 10·97.080	2.46.335	Gl. 6.56.118	1.44.952	Gl. 9.56.937	2.11.669	Gl. 14.57.741	3.18.655
Gingeley seed ..	Qr. 17.518	1.60.134	Qr. 8.594	1.02.726	Cwt. 1.44.125	2.99.412	Cwt. 2.27.779	4.37.185	Cwt. 1.09.414	3.02.559	Cwt. 2.51.613	5.31·864
Gingeley oil....	Gl. 19.520	14.766	Gl. 14.686	11.535	Gl. 52.721	36.294	Gl. 77.262	48.605	Gl. 46.196	26.722	Gl. 72.607	43.608
Lamp oil seeds..	Qr. 1.876	13.736	Qr. 3.921	27.388	Cwt. 1.10.076	53.870	Cwt. 6.011	12.347	Cwt. 6.125	9.993	Cwt. 73.215	54.228
Lamp oil	Gl. 26 379	12.637	Gl. 17.157	9.483	Gl. 20.181	10 578	Gl. 26.093	13.386	Gl. 24.475	11.979	Gl. 51.084	20.927
Ground nuts ...	Cwt. 939	6.315	.....	.....	.....	.....	Cwt. 795	1.728	.....	.....	.....	.....
Ground nut oil..	.....	.....	Gl. 37.204	17.438	Gl. 1.07.731	50.499	Gl. 1.10.566	52.840	Gl. 31.027	14.760	Gl. 57.207	23.603
Fish oil	Gl. 3.512	2.786	.....	.....	.....	.....	Gl. 39.489	12.717	Gl. 77.240	22.157	Gl. 2.57.217	71.769
Margosa oil ...	Gl. 1.587	1.240	.....	.....	.....	.....	.....	.....	Gl. 1.917	1.048	Gl. 3.111	1.701
Pinnacotay oil ..	Gl. 3.871	2.116	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pinnacotay seeds	Cwt. 508	1.353	.....	.....	.....	.....	.....	.....	.....	.....	Cwt. 860	1 167
Cassia oil.. ...	Gl. 794	2.121	Cwt. 50	2.240	Gl. 718	2.059	Gl. 1000	3.053	Cwt. 33	1.572	Cwt. 30	1.701
Sandalwood oil..	Cwt. 39	25.619	Cwt. 61	38.995	Cwt. 93	54.015	Cwt. 141	38.215	Cwt. 93	45 758	Cwt. 96	50.037
Cotton seed	Cwt. 2.458	2.751	Cwt. 5.141	4.581	.....	.....	Cwt. 4.143	3.540	Cwt. 4 498	3.624	Cwt. 8.090	7.613
Fœnugreek	Cwt. 301	1·079	Cwt. 1.191	3.837	Cwt. 1.567	5.628	Cwt. 591	2.136	Cwt. 1.078	3.855	Cwt. 1.451	5.322
Mustard seed....	Cwt. 5.828	11.009	Cwt. 6.767	14.953	Cwt. 9.435	25.559	Cwt 9.909	22.097	Cwt. 3.636	9.319	Cwt. 16.075	34.048
Castor oil.....	.....	.....	.....	.....	Gl. 8.670	26.969	Gl. 15.971	25.132	Gl. 12.600	15.694	Gl. 8.059	7.818
Castor seeds....	.....	.....	Cwt. 5.168	8.790	.....	.....	Cwt. 14.617	24.096	.....	.....	Cwt. 2.764	4.247
Lin seed	.....	.....	Cwt. 1.256	3.897	Cwt. 401	1.539	Cwt. 801	2 271	Cwt. 1.067	2.927	Cwt. 1.106	3.275
Linseed oil . ..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Fennel seed.....	.....	.....	.....	.....	.....	.....	Cwt. 122	1.097	Cwt. 191	1.712	.....	.....

In addition to the above, about 300,000 lbs. of Wax and Wax Candles, are yearly exported.

These exports are sent to the following—United Kingdom, America, Arabia, Persian Gulf, Cape of Good Hope, Ceylon, China, France, Maldive Islands, Mauritius, New South Wales, Pegu, West Coast of Sumatra, West Indies, Bengal, Bombay, Concan, Cutch, Goa, Guzerat, French (Indian) Ports, Scinde, Malacca and the Straits, Travancore.

One hundred and twenty fixed oils are known to be produced throughout the Madras Presidency and Burmah. These may be arranged as follows:

Fixed Vegetable oils, including drying, greasy and solid oils	105
Wood oils	10
Mineral oil	1
Animal oils	4
Total	120

Of the first class, Cocoanut, Castor, Groundnut, Gingeley and its variety Rape, Mustard and Linseed form considerable articles of foreign trade. The first three being exported in the shape of oil, the last two as oil seed, and Gingeley, both as an oil and oil seed.

In addition to these, the following are consumed to a large extent in India—Lamp, Ramtill, Kurunj, Pinnacotay, Illoopoo, Poneig or Doopada, Margosa or Neem, Physic nut, Brumadundoo, Safflower and Poppy. Of the remainder some are medicinal and some are prepared only in those localities, in which the substances producing them, happen to abound in a wild state. The prices of these products vary very considerably, not only in different parts of the Presidency, but even in various towns of the same district. It is therefore difficult, if not altogether impracticable, to fix their respective values, with any degree of certainty; an increased demand or greater facility of transit would moreover considerably affect their present value. In estimating the value of an oil producing plant or tree, the other valuable products which it yields should not be lost sight of. The linseed in addition to its oil produces the scarcely less valuable flax, hemp yields a fibre and an intoxicating resin, safflower, a dye—pinnacotay, a soft inferior gum—poonga, a valuable timber—piney, a resin—gamboge tree, a valuable pigment—mahowa, a spirit distilled from the flowers, &c., &c., whilst in the case of the poppy, the oil is second in importance to the more valuable opium.

An excellent epitome of the particular qualities, on which the value of an oil as an article of commerce depends will be found in the accompanying extracts of a letter from G. F. Wilson, Esq. to Sir William Hooker, Royal Gardens, Kew.

"Every oil, or grease, whether solid or liquid, if not poisonous or acrid, like croton oil, or viscid and gummy, like castor oil, or drying, like linseed oil, must be worth in London at least £30 a ton. Among greases solid, at above 60° Fahrenheit, the higher the melting point (other things equal), the greater the value; for example, the vegetable tallow of Borneo melting at about 90° Fahrenheit, is worth at least £5 a ton more than the cocoanut oil of Ceylon melting at 70°. The effect of the soap duty having been taken off, may probably before long, materially change the relative values of greases; but, at present, liquid oils, like the ground nut (*Arachis Hypogea*,) are worth more than soft solid oils, like the Bassia butter of India, as they require less manufacturing to fit them for use, the liquid oils after a simple treatment in a cheap apparatus, being fit for burning in lamps, while the soft solid oils being neither hard enough for use in candles, or liquid enough for use in lamps, require to go through a press before they are saleable, except for soap-making. Greases may have particular advantages, such as being little acted upon by the air, and therefore not easily becoming rancid, but these good qualities, can only be ascertained by experiments; which your correspondents had perhaps better leave to us."

"We have been engaged in some experiments upon oils, for use in medicine, in which it seems probable they will take an important place; already one vegetable oil has been found to be almost as efficacious as cod liver oil, with the advantages of being less unpleasant and cheaper. On account of this new use, it might be well to collect small quantities of oils, even if they did not obey the conditions mentioned above. The value of oil must depend a little (especially when found in out of the way places) upon the way it is held in its matrix; for example, the oil of the Lumbang nut (*Aleurites Triloba*) can be separated with much less labour and simpler machinery than the cocoanut oil, which requires very great pressure to extract it from the copperah, or dried cocoanut kernel."

"Waxes are worth more than greases, on account of their very high melting points; their relative values depend upon colour, transparency, and freedom from resinous matter. Resin may be easily detected by lighting a small piece of the wax; the more smoke, the greater proportion of resin, and therefore less value; the paler and more transparent the wax the better. The most valuable tree wax known, is the beautiful insect wax of China."

"A simple way to try an oil nut, is to crush it with a stone, and then squeeze it between your finger and thumb; if it contains any considerable quantity of grease, enough will be pressed out to judge of colour, hardness and sweetness; if the nut tastes oily, and yet oil does not come out by this treatment, it is well to dry the kernel before squeezing; and, in the case of nuts containing grease, solid at a high temperature, like that of the *Myristica Sebifera*, it is well also to heat the nut. Where a stearic candle can be got, and is burned down a little, until it has formed a cup, and then blown out, into this a little of the material to be tried may be placed; after a moment's burning, the candle material with which the wick is saturated is burnt out, the new material to be tried, in the cup takes its place, and becomes the material supplying the wick until the cup is emptied, and so can be judged of, or a piece of string dipped in the oil or melted grease makes a very tolerable wick, or simpler still, where the nut is very full of oil, if lighted at one end, it will at least show what tendency to smoke there is, and the colour of the light."

"Some of the resins ought to come in for candle making, though I believe that they have never been extensively used, except for the commonest sorts of candles, on account of their giving off so much smoke; but as some descriptions smoke less than others, there is a hope that new ones may be found smoking still less, these would then be very serviceable in candle making. The points connected with new greases, &c., that we should be most thankful for information upon, are, the manner of growth, probable expense of collecting, means of transport, and quantity likely to be obtained, with small specimens of the grease, if manufactured, and of the fruit, with both its husk and hard shell, where these exist."

Of vegetable substances producing "volatile oils" there is an immense variety, but with the exception of the oils of cassia and cinnamon, roosa and the rose uttur, few are of any commercial importance, nor are they prepared in any quantity for consumption in India.

Scented oils erroneously termed "volatile" obtained by the repeated distillation of fragrant herbs, &c., over into a receiver containing a portion of any fixed oil, to which the aroma is imparted are prepared to some extent but chiefly for native use.

Sandalwood oil and the large variety of utturs, &c., which form the principal part of native perfumery are included in this class.

The following contributions appear worthy of particular notice. A sample of "Liquid Camphor" or "Camphorwood oil" obtained from the Dryobalanops camphora, and brought from Labuan by the exhibitor, Second dresser Pulneandy, and an equally good specimen of the same from Lieut. J. D. Heath, 38th Regt. N. I. Mr. Gay exhibits Castor, Omum, and Ground nut oils. For the superior manner in which these have been purified, a 2nd Class Medal is awarded.

For excellent specimens of Castor and Cocoanut from Mr. Godefroy of Pondicherry, for superior samples of Castor, Gingeley, Cocoanut, Neem, Pinnacottay and Mustard oils from Mr. Kohlhoff of Tanjore, a 2nd Class Exhibition Medal has been awarded to each.

The following contributors are considered worthy of Honorable Mention:—Nellore Local Committee for various oils, Tinnevelly Local Committee for Poovana, Gingeley and Margosa oils.

W. E. Underwood, Esq., contributes a large and varied series of fixed oils in illustration of the Madras Tariff. Although professing to be merely the ordinary market articles, they are for the most part very good specimens, and are considered worthy of a 2nd Class Medal.

The collection of oils exhibited by Lieut. Hawkes, is very extensive, and contains a very large number of highly interesting specimens. The series exhibits the oleaginous products in a state of great purity, accompanied by the oil seeds yielding them. No consideration of cost or trouble has been allowed to interfere with providing all that is necessary to render this collection a complete illustration of the oils of Southern India. The value of the collection is greatly enhanced by the care which has been bestowed in the preparation, and the exclusion of all impurities in the process of extraction. The Jury would have awarded to this contributor, a first Class Medal, but being a Juror in this class the regulations do not allow its award to him.

CLASS I.—FIXED VEGETABLE OILS.

No. 1.—Castor Oil—Ricinus Communis, fructibus minoribus—Sitt-amunakei yennai (Tamil)—Chitt-amindialoo noona (Teloogoo)—Bareek erundie ka tael (Hind.)

Two varieties of the Ricinus communis, one bearing small and the other large seeds, are produced all over India. The small seeded variety yields the best product, and is employed in preparing the oil exported for medicinal purposes.

Mode of Preparation.—The fresh seeds after having been sifted and cleaned from dust, stones, and all extraneous matters, are slightly crushed between two rollers, freed by hand from husks and coloured grains, and enclosed in clean gunny. They then receive a slight pressure in an oblong mould which gives a uniform shape and density to the packets of seed. The "Bricks" as they are technically called, are then placed alternately with plates of sheet iron in the ordinary screw or hydraulic press.

The oil thus procured is received in clean tin pans, and water in the proportion of a pint to a gallon of oil being added, the whole is boiled until the water has evaporated, the mucilage will be found to have subsided and encrusted the bottom of the pan, whilst the albumen solidified by the heat, forms a white layer between the oil and the water. Great care must be taken in removing the pan from the fire, the instant the whole of the water has evaporated, which may be known by the bubbles having ceased, for if allowed to remain longer the oil which has hitherto been of the temperature of boiling water or 212°, *suddenly* rises to that of oil or nearly 600°, thereby heightening the color and communicating an empyreumatic taste and odour.

The oil is then filtered through blanket, flannel, or American drill, and put into cans for exportation. It is usually of a light straw colour, sometimes approaching to a greenish tinge.

The cleaned seeds yield from 47 to 50 per cent. of oil worth in England from 4*d.* to 6*d.* per lb.

The following is the result of experiments made at Madras and Calcutta to ascertain the per-centage of oil in the Castor seed. (January 27th, 1853.)

Calcutta.—1400 lbs of seed yield Kernels and raw oil as follows:—

	Kernels.	Oil.
1st Sort	632lbs.	324lbs.
2nd Sort	184lbs.	87½lbs.
3rd Sort	164lbs.	76½lbs.

Making a total of 980lbs. of kernels and 488lbs. of raw oil from 1,400lbs. of seed.

Madras.—1400 lbs. of seed yield Raw oil as follows:

1st Sort	318 lbs. of oil.
2nd Sort	88 lbs. do.
3rd Sort	74 lbs. do.

Making a total of 480 lbs. of oil from 1400 lbs. of seed.

The Cost of the Madras oil is as follows:

1400 lbs. of seed at Rs. 3 3 per bag of 164 lbs.	27	3	4
Husking and selecting kernels and cooly hire	3	11	9
Crushing, moulding, pressing and boiling	2	7	1
Filtering and sundries	2	8	0
Overseer's pay, Godown Rent, &c. &c	1	6	2
300 empty Quart bottles, corks &c	34	4	8
Cleaning and Packing charges	4	8	0
	Rs. 76	1	0

Or an average of Annas 4$\frac{17}{300}$ per quart of First, Second and Third sort oil=4d per lb.

Uses.—This oil is chiefly used as a mild Purgative. Soap of good quality may be made of it, but the cost and disagreeable smell which it communicates, preclude its general use.

Exports.—Average for the last 4 years 1849-50 to 1852-53 11,325 galls. per annum.

The samples of this oil exhibited by Mr. Gay, Madras, Mr. Kohlhoff, Tanjore, and Monsieur Godefroy of Pondicherry are particularly fine. Mr. Gay's specimen is the clearest, and most limpid, and devoid of any offensive smell. These qualities however do not arise from any superiority of the seed, or care in extraction, but from repeated decolorization with animal charcoal, which in the opinion of many eminent Medical men considerably detracts from its strength and efficacy. Appavoo Pillay of Tinnevelly, the Nellore Local Committee, and Lieut. Hawkes also exhibit excellant specimens.

When manufactured in the ordinary Native mill, this oil is sometimes used by the richer classes in Lamps.

Castor oil (extracted hot). This differs from the preceding only in the mode of preparation—The seeds are boiled for two hours in water, dried for three days in the sun, freed from the shells, pounded and then boiled in fresh water, until the whole of the oil has risen to the surface. Five seers of the seeds or 3$\frac{1}{3}$lb. should by this process yield a quart of oil.

This is the sort generally used in medicine by native practitioners, it is straw colored, and free from any unpleasant taste or smell.

A good sample of this oil is contributed by Lieut. Hawkes.

No. 2.—Castor or Lamp oil. Ricinus communis fructibus Majoribus—Vullak ennai (Tam.) Ped-amidum (Tel.)—Chiragh-ka-tael—(Hind.)

This oil which is obtained from the large seeded variety of the "Ricinus communis" is sometimes drawn cold, and a straw-colored specimen scarcely distinguishable in quality from the oil of the small seeded variety is shown by Lieut. Hawkes. It is however more usually extracted by heat, and forms the common "Lamp oil" of the Bazar.

Mode of preparation—The seeds having been partially roasted over a charcoal fire, both to coagulate the albumen and to liquify the oil, are then pounded and boiled in water until the oil rises to the surface. The roasting process, however, gives it a deeper red colour and an empyreumatic odour.

Price.—The price of this oil varies in different parts of the country from Rs. 1 10 0 to Rs. 3 13 6 per maund of 25lbs. The average of nineteen large stations, in all parts of the Presidency for the Quarter ending 31st October 1854 was Rs. 2 8 6 per maund.

Uses.—Chiefly for lamps.

Exports.—Average of the last six years. Galls. 27.561 per annum.

Specimens of this oil are shown in the collection illustrative of the Madras Tariff, by Major Miller of Bangalore, the Nellore Local Committee and Lieutenant Hawkes.

No. 3.—Illoopoo Oil—Bassia Longifolia—Illepie Yennai (Tam.)—Mohay-ka-tael (Hind.)

This semi-solid oil is expressed from the seeds of a tree which is everywhere common in Southern India. It is seldom sold in the Bazaar, but the seeds are collected, and the oil manufactured by the Natives for private consumption. The seeds contain about 30 per cent of oil of a bright yellow colour.

It is procurable in South Arcot at Rs. 25 per candy, or Rs. 1 4 0 per maund—in Bellary at 3 8 0, in Bhopaul at Rs. 3 12 0. In Tanjore, it may be had to the extent of 2,702 candies at the rate of 2 8 8 per maund.

Uses.—This oil makes excellent candles and soap. Of the latter, several specimens are contributed (Cl. xxix) from Tanjore, Madras, &c. Its chief use is, however, for burning in lamps, and as a substitute for Butter in Native cookery.

The very great difference in colour, consistence and flavour, which is observable in the many specimens of this oil sent for exhibition, is entirely attributable to the mode of preparation, and to the presence in some

cases of a very large proportion of mucilage and other extraneous matter.

A bright colored specimen from Tanjore, on being treated with dilute sulphuric acid, proved remarkably pure, samples of the same oil from Rajamundry and Tinnevelly and from Lieut. Hawkes were equally good, but those from Nellore and Mysore deposited a large amount of mucilage.

No. 4.—Cocoanut oil-Cocos nucifera—Taynga yennai (Tam.)—Tencaya noona (Tel.)—Nariel-ka-tael (Hind.)

The average annual quantity of this oil exported from 1847-48 to 1852-53 is about Galls 9,00,000 per annum. Of this by far the largest portion is sent to the United Kingdom and France, the remainder finds its way to Arabia, Mauritius, Bombay and the French (Indian) Ports.

Price.—The prices of this oil vary considerably in different parts of the country. For the quarter ending 31st October 1854 the max : and min : were Rs. 8. 5. 4 at Jubbulpore and Rs. 1. 12. 9 at Mhow per maund. The average of twenty one large Stations in the Madras Presidency giving Rs. 4. 9. 5 per maund, or about £41-2 per ton. The market-value of "Cochin oil" in London (January 1855) was £46. 10—the average being £46 to 48.

The best oil is that exported from Cochin, and the neighbouring ports on the Malabar Coast. It usually fetches 20*s.* per ton more than the Ceylon or Coromandel coast article.

Uses. In Europe, for Candle and soap manufacture, for lubricating machinery, &c. &c. In India, for making soap, anointing the person, for cookery, lamps and in medicine.

A very excellent sample of this oil is shown by Monsieur Godefroy of Pondicherry—The Canara Local Committee, the Madras Tariff, Soobroya Pillay, Mr. Kohlhoff and Lieut. Hawkes also contribute excellent specimens.

No. 5.—Bryonia oil—Bryonia—Toomuttikai yennai (Tam,) Boddama kaia noona (Tel.)

This oil is used for burning in Lamps in some parts of the country, where the fruit abounds. It is extracted by boiling in water, and is procurable only in very small quantities.

A specimen is shown by Lieut. Hawkes.

No. 6.—Ground nut oil—Arachis Hypogea—Vayr-cuddala-yennai (Tam.)—Manilla noona (Tel.) Willayetie-moong-kie-phullie-ka tael (Hind.)

This valuable oil, which of late years has been exported to a large amount, is obtained by expression from the seeds of the Ground or Manilla nut, which is now cultivated to a considerable extent in most parts of the Peninsula.

In the year 1848-49—37,000 gallons were shipped, but in the two following years the Exports exceeded 1,00,000 gallons. It has however fallen to 57,207 gallons in 1852-53.

It does not seem to be consumed to any large extent in this country, although the nut itself is much eaten by the poorer classes. It is said to be used for adulterating gingeley oil in North Arcot, where it costs from Rs. 1-8-0, to 2-12-0, per maund. In the Nellore District, the seeds are procurable at Rs. 1-8-0, per maund and in Tanjore about 200 acres are cultivated, producing annually 75 candies of oil at Rs. 2-6-0 per maund.

The seeds yield about 43 per cent. of a clear straw coloured edible oil, which is an excellent substitute for olive oil, and makes a good soap.

Its value in London in January 1855 was £47-10 per ton.

The Madras Tariff, the Tanjore Local Committee and Lieut. Hawkes exhibit excellent specimens. Mr. Gay contributes a perfectly clear and colourless specimen, evidently purified in the same manner as the castor oil before alluded to, the perfect decolorization in the present instance, however, far from depreciating, considerably enhances the value of the oil, and entitles this specimen to Honorable Mention.

No. 7.—Poppy oil—Papaver somniferum—Cas-casa yennai (Tam.)—Casa-casa noona (Tel.)—Khush-khash-ka tael (Hind.)

The poppy is largely cultivated throughout Malwa and the Opium districts, where the drying oil obtained from the seed is more extensively used than any other both in lamps and as food. At Bhopaul the oil is procurable at the rate of Rs. 4 8 0 per maund of 25lbs. or £40 6 per ton.

Good specimens of the unbleached oil are shown by Lieut. Hawkes, in the collection illustrating the Madras Tariff, and by the Tanjore Local Committee.

By simple exposure to the rays of the sun in shallow vessels, this oil is rendered perfectly colourless, and a very excellent sample of the bleached article exhibited by Lieut. Hawkes deserves Honorable Mention. It is much prized by European artists.

No. 8.—Mustard Oil—Sinapis species—Kadaghoo yennai (Tam.)—Avaloo and Sursava noona (Tel.) Raye ka tael (Hind.)

Five or six species of Sinapis are cultivated in all parts of India, for the sake of the valuable oil they yield, those most frequently seen are *S. glauca, toria* and *racemosa.*

The seeds of the "sinapis alba" yields by expression 36 per cent of a bright yellow, pleasant tasted, edible oil, having a strong smell, and slight taste of mustard.

The seeds of "sinapis nigra," yield only 28 per cent of an oil in all respects similar to the above.

The average price of mustard seed in eighteen large stations, in all parts of the Presidency, for the Quarter ending 31st October 1854 was Rs. 1 2 8 per maund of 25lbs., the maximum being Rs. 1 11 6 at Cannanore and the minimum As. 10 5 at Nagpore. In Vizagapatam it costs Rs. 208 per Sicca garee.

The oil is not exported, but the seeds have been shipped as follows:

In the years	1847-48.....	Cwt. 5,828
,,	1848-49.....	,, 6,767
,,	1849-50.....	,, 9,435
,,	1850-51	,, 9,909
,,	1851-52.....	,, 3,636
,,	1852-53.....	,, 16,075

Uses.—This valuable oil, although seldom sold in the Market, is made when required, is used in most parts of India in cookery, and is considered superior to all other oils for anointing the body, which it is supposed to invigorate. In medicine, it is sometimes given internally, but is more frequently applied as a rubefacient.

The following exhibitors contribute very good specimens, Mr. Kohlhoff of Tanjore, Madras Tariff, Trichinopoly Local Committee, and Rajahmundry Local Committee.

Lieut. Hawkes, exhibits a complete and interesting series of oils and oil cake (common mustard) obtained from four different sorts of sinapis.

No. 9.—Gingeley or Sesamum Oil (black seeded variety)—Sesamum Orientale—Nool ennai (Tam.)—Mundie Noonay (Tel.)—Meetha Till ka tael (Hind.)

This oil which is perhaps consumed to a greater extent than any other by the Natives of India, is, moreover, second only to cocoanut oil in its importance as an article of commerce.

It is extensively cultivated throughout the whole of the Presidency, and has been exported as follows.

Gingeley Seed.

Years 1847-48.	Years 1848-49.
Qr. 17,518....Rs. 1,60,134	Qr. 8.594....Rs. 1,02,726
Years 1849-50.	Years 1850-51.
Cwt. 1,44,125...Rs. 299,412	Cwt. 2,27,779 Rs. 4,37,185
Years 1851-52.	Years 1852-53.
Cwt. 1,09,414...Rs. 302,559	Cwt. 2,51,613 Rs.5,31,664

Gingeley Oil.

Years 1847-48.	Years 1848-49.
Gl. 19,520....Rs. 14,766	Gl. 14,686 ....Rs. 11,535
Years 1849-50.	Years 1850-51.
Gl. 52,721.....Rs. 36.294	Gl. 77,262.... Rs. 48,605
Years 1851-52.	Years 1852-53.
Gl. 46,196.....Rs. 26,722	Gl. 72,607..... Rs.43,608

Of the gingeley seed exported in 1852-53 the United Kingdom received cwt. 12,713—Ceylon, cwt. 590—France, cwt. 2,87,225—Pegue, ewt. 741—Bombay, ewt. 113—Malacca, cwt. 33 and Travaneore, ewt. 148.

Of the quantity of oil (72,607 gals.) exported in the same year—gals. 42,043 were shipped to the United Kingdom—gals. 2,968 to Ceylon—gals. 4,232 to Mauritius and Bourbon—gals. 19,698 to Pegue—gals. 46 to Bengal—gals. 27 to the French (Indian) ports, and gals. 3,593 to Malacca.

Mode of preparation.—The great disparity of color observed in the specimens of this oil in the exhibition is to be attributed to the mode of preparation.

The method sometimes adopted is that of throwing the fresh seeds, without any cleansing process, into the common mill, and expressing in the usual way. The oil thus becomes mixed with a large portion of the coloring matter of the epidermis of the seed, and is neither so pleasant to the eye, nor so agreeable to the taste, as that obtained by first repeatedly washing the seeds in cold water, or by boiling them, for a short time, until the whole of the reddish brown coloring matter is removed, and the seeds have become perfectly white. They are then dried in the sun, and the oil expressed as usual. This process yields 40 to 44 per cent. of a very pale straw colored sweet smelling oil, an excellent substitute for olive oil.

Uses.—In India, it is chiefly used in cookery, in anointing the person, for making soap, and for burning in lamps.

In England, it is chiefly used for the manufacture of soap, and for burning in Table-lamps, for which it is better suited than cocoanut oil, owing to the lower temperature at which it congeals.

Price.—Present value in England (January 1855) £47.10 per ton. In different parts of the Presidency the price of this oil varies from Rs. 1 5 0 to-Rs. 6 0 0 per maund of 25lbs. In S. Arcot it is procurable at Rs. 27 12 5 per candy.

The prices per maund of this oil, at the undermentioned stations,for the quarter ending 31st October 1854, were as follows,

Arcot.....	Rs.	3	8 0	Madura	Rs.	5	8 3
Bangalore.....	,	3	7 3	Mangalore ...	,,	4	1 8
Bellary.....	,,	3	2 0	Nagpore.....	,,	1	12 0
Berhampore...	,,	2	8 0	Palamcotta ...	,,	4	12 0
Cannanore.....	,,	6	0 0	Paulghaut	,,	3	7 0
Cuddapah	,,	2	13 0	Samulcotta...	,,	2	10 8
Jaulnah.....	,,	2	6 0	Secunderabad.	,,	2	3 11
Jubbulpore ...	,,	1	5 0	Trichinopoly.	,,	4	1 8
Madras	,,	3	14 0	Vellore.....	,,	3	14 0
Masulipatam ..	,,	3	0 0	Vizagapatam..	,,	3	2 0

Excellent specimens of this oil are exhibited by the Cochin, Tinnevelly, Rajahmundry, Tanjore, Nellore and Canara Local Committees, by Mr. Kohlhoff of Tanjore and Lieut. Hawkes.

Second sort Gingeley Oil, erroneously called "Rape," (Kharasanee yelloo), red seeded variety.—This oil which is expressed from a variety of sesamum differs but little from the one abovementioned.

Good samples are shown from Rajahmundry and Tinnevelly, and by Lieut. Hawkes.

In Tanjore, it is procurable at Rupees 3 0 0 per maund.

The following particulars concerning the two varities of plant, yielding this important oil have been furnished by F. Copleston, Esq., Rajahmundry.

Two varieties of Sesamum,are cultivated for the sake of the oil.

The gingeley seed *par excellenee* is the produee of the plant, which is sown in the month of March, after the rice erop, and is irrigated twice, once at sowing, and once afterwards. The seed which is *black*,and is called 1st sort gingeley,from the fact of its yielding the largest pereentage of oil, ripens in May, and sells at the rate of Rs 60 per eandy of 500 lbs. The oil obtained from both varieties, sells at the same price, viz. Rs. 2 14 6 to 3 per maund of 25 lbs. according to quality.

Second sort gingeley is sown in June, and produees a *red* seed. The plant although a little larger resembles in most respects the former, it has, however, a somewhat longer leaf, and the flower differs a shade or two in color. A candy of 500 lbs. of this seed sells at Rs. 57 8 0. The price of the oil is the same as that of gingeley.

This seed has of late been exported to France, in eonsequenee of which the present price is double what it was three years ago.

No. 10.—Ramtill oil—Guizotia oleifera, verbesina sativa—Valeesaloo Noonay (Tel.)—Kala Tiel ka tael (Hind.)

This sweet tasted edible oil is plentiful in the Mysore, Vizagapatam and Ganjam Districts. It is used for nearly the same purposes as the sesamum.

It is procurable in the Nuggur Division of Mysore at Rs. 3 8 0 per maund, but is eonsidered inferior to gingeley oil.

Good samples are shown in the Madras Tariff, by the Rajahmundry and Canara Local Committees, and Lieut. by Hawkes.

No. 11.—Margosa or Neem oil—(Azadirachta Indica ; et Melia Azadirach.) Vaypum yennai—(Tam.)—Vapa noona (Tel.)—neem ka tael (Hind.)

This valuable and much used medieinal oil is obtained by either expression or boiling, from the seeds of the abovementioned trees,which are common throughout the Presidency.

It enters much into the practice of native Physicians, by whom it is administered internally as an anthelmintie,and externally as a liniment in Rheumatism, headache and as an application to uleers.

The oil is of a deep yellow eolour, has a strong smell and an unpleasant bitter taste. In the year 1847-48 galls 1, 587 were exported, and in the year 1851-52, galls, 1, 917, in 1852-53, galls 3-111. The chief market is Ceylon, but the demand is not constant.

It is frequently burnt in lamps, and is sold in the bazaar, under the name of "bitter oil" Excellent samples are exhibited by Captain Miller, the Nellore Local Committee and Lieutenant Hawkes.

No. 12.—Linseed oil—Linum usitatissinum—Alliverie yennai (Tam.)—Aveesee noona (Tel.)—Ulsee ka tael (Hind.)

The seed from which this oil is expressed, has long been cultivated to a limited extent in Nagpore, Bellary and other parts of the Presideney. There is an impression that the oil obtained from the Indian plant is inferior to that imported from England, but it will be found on experiment, that this arises from the former having been imperfeetly freed from mucilage, which prevents its drying.

The seed is now an artiele of export to the amount at (1852-53) of cwt. 1,106.

The Rajahmundry Local Committee, Lieut. Hawkes and the Madras Tariff exhibit exeellent samples of this oil. It is said to be procurable in Bellary at Rs. 3-8-0 per maund.

In the year 1852-53, English Linseed oil to the amount of galls 4-552 and valued at Rs. 8,763 was imported into Madras, whilst at the same time cwt. 1,045 of the seed were exported from hence mostly to England, it appears that it can be made on the spot for much less than the average value of the English oil. This fact, it is hoped, needs only to be pointed out, to be taken advantage of. It would, however, be necessary to guard against the adulteration of this oil, with any of the other greasy oils which would of course infallibly destroy its drying properties.

No. 13.—Hemp seed oil—Cannabis sativa—Ganja yenna (Tam.)

This oil is obtained by expression from the seeds of the common hemp, which is cultivated in many parts of the country. In Russia, the oil is much used for burning in Lamps, but it is unknown to the natives of India.

Three specimens are exhibited, one of a deep green colour from Tanjore, another of an olive green sent by Lieut. Hawkes and the third in the Madras Tariff.

No. 14.—Ben or Moringa oil—Moringa Pterygo sperma—Morunghy yennai — (Tam.) — Morunga noona (Tel.)—Sahujna (Hind.)

Ben nut oil has long been considered valuable on account of the lengthened period, which it may be kept without contracting rancidity. The tree from which the "nuts" are obtained, is common in all parts of the country, the flowers leaves and fruit are eaten by the natives, and the rasped root is used by Europeans as a substitute for horse-radish, to which circumstanee it owes its common name of "horse-radish tree." The oil however is seldom made in India, nor does it now form an article of export.

Lieut. Hawkes, the Tanjore Local Committee and the Madras Tariff exhibit very good specimens.

No. 16.—Portia nut oil—Thespesia populnea Poorasun yennai (Tam.)—Paris pip-pul-(Hind.)

This deep red colored and somewhat thick oil is obtained from the seeds of the portia tree, which grows in great abundance in the vicinity of Madras, and other parts of the Presidency.

It is extensively planted as an avenue tree, for which its quick growth and the beauty of its flowers renders it a favorite. The wood is capable of being worked when fresh cut and is used for boat building and cabinet work.

The juice of the tree is used on the western coast, as a remedy for various cutaneous affections, and the oil which is yet unknown to the natives, might probably be of use in similar cases. Its expense precludes its use otherwise than medicinally.

Specimens of this oil are exhibited by the Madras Tariff and Lieut. Hawkes.

No. 17.—Brumadundoo or Coorookoo oil—Argemone Mexicana—Brumadundoo yennai—(Tam.)—Brumadundie Noona (Tel.)—Faringie datura ka tael (Hind.)—Prickly Poppy—Jamaica yellow thistle.

This pale yellow, limpid oil may be obtained in large quantities from the round corrugated seeds of the prickly poppy, which was originally introduced from Mexico in ballast, but now flourishes luxuriantly in all parts of India.

It is sometimes expressed by the natives and used in lamps, but is doubtless adapted to other and more important uses. In North Arcot it costs from Rs. 1-14-0 to Rs. 2-1-0 per maund.

Excellent specimens of this oil are exhibited by the Tanjore Local Committee by Mr. Kohlhoff, Lieut. Hawkes, Capt. Miller, Rajahmundry Local Committee and the Madras Tariff.

No. 19.—Safflower oil—Carthamus Tinctorius Chendoorookoo yennai (Tam.)—Koosumba noonay Tel.) Kurrur or Coosum ka tael (Hind.)

A light yellow clear oil obtained from the seeds of the plant, yielding the well known dye. It grows plentifully in Mysore and Tinnevelly.

In Mysore and Bellary, it costs about Rs. 2-8-0 per maund, and is used for Lamps, culinary and other purposes.

Good specimens are shown by Lieutenant Hawkes and Captain Miller.

No. 20.—Pinnacotay or Poon-seed oil—Calophyllum inophyllum—Pinnay yennai (Tam.)—Pinnay noona (Tel·)Surpun ka tael (Hind.)—

The fresh seeds of the "Alexandrian laurel" when shelled, and subjected to pressure yield a dark green oil of a peculiar odour. Old seeds yield a higher colored and thicker product.

In the year 1847-48, Galls. 3,871 of the oil, and cwt. 508 of the seeds, were shipped chiefly to Ceylon and the Straits, it has now ceased to be an article of Export.

In Tanjore, 437 acres producing on an average $24\frac{5}{8}$ cullums per acre of seed are covered with this tree this yields $2671\frac{1}{4}$ maunds of oil at Rs. 20-4 per maund. In Tinnevelly, it costs As. 4-8 and Trichinopoly As. 4 per seer. In Tanjore, it is used for Lamps, and for caulking vessels, but it appears to be chiefly valuable as a medicine. It is seldom procurable in the bazar, but is expressed when required.

Excellent samples are shown by Mr. Kohlhoff, from Tinnevelly and Travancore, the Tanjore Local Committee, Cochin and the Madras Tariff—Also from Canara, under the name of "Honay," from Goa by the name of "Oleum unda," from Cochin called "Perun Poonaka," and from Masulipatam.

No. 21.—Soapnut Oil—Sapindus emarginatus—Poovandie cottay or Poongum-kai yennai (Tam.)—Koocoodie noona (Tel.)—Reethay ka tael (Hind.)

This semi-solid oil is used medicinally by the natives, and is extracted from the kernel of the Soap-nut. Its cost prevents its general use.

Excellent specimens are shown by the Trichinopoly Local Committee, and Lieut. Hawkes, also fair samples from Tanjore and the Madras Tariff.

No. 22.—Poonga or Kurunj Oil—Dalbergia arborea vel Pongamia Glabra—Poonga yennai (Tam.)—Kanoogoo noona (Tel.)—Kurunj ka tael (Hind.)

This oil which in some parts of the Country is used to a large extent in adulterating lamp oil, is expressed from the seeds of a tree, common in most parts of the Presidency.

In North Arcot, Bellary, and the Nuggur Division of Mysore, the oil is procurable at Rs. 2-8-0 per maund. The Travancore and Guntoor Local Committees and Major Miller contribute excellent samples. Those from Mr. Kohlhoff, the Madras Tariff, the Masulipatam and Tinnevelly Local Committees and Lieut. Hawkes are also good, but high colored.

It is chiefly used as a Lamp oil by the poorer classes.

No.23.—Croton or Napaulah oil—Croton tiglium Neervalum yennai (Tam.)—Naypalum vittiloo (Tel.)—Jumal-gotay-ka tael (Hind.)

This well known medicinal oil, the use of which as a drastic purgative, seems to be decreasing, is exhibited

by Mr. Gay (particularly good) the Madras Tariff and Lieutenant Hawkes.

No. 25.—(A) Cashew nut Oil—Anacardium occidentale—Moondree cottay yennai (Tam.)—Kajèo ka tael (Hind.)

The light yellow, sweet tasted and edible oil obtained from the *nut* of this tree, is in every respect equal, if not indeed superior, to either Olive or Almond oil.

It is very seldom prepared, the nuts being used as a table fruit.

Excellent specimens are exhibited by the Tanjore Local Committee, the Madras Tariff and Lieutenant Hawkes.

No. 25.—(B) — Cashew Apple Oil—Anacardium Occidentale.

This powerfully vesicating oil obtained from the pericarp of the Cashew Apple has been long known to the Native Physicians, and much resembles in its properties the acrid oil obtained from the marking nut (Semecarpus Anacardium).

Specimens are shown from Cochin, Mr. Kohlhoff, and the Travancore and Tanjore Local Committees.

No. 26.—Belgaum Walnut Oil—Aleurites Triloba—Hidglee Badam Ka tael (Hind).

The Molucca tree which produces the "Lumbang nut" grows plentifully near Hydrabad. The nuts yield a very large per centage of Oil, and the tree is found to be very prolific. The nuts are said to be strung upon a thin strip of bamboo, and when lighted will burn like a candle; a notice of this interesting substance may be found in the Transactions of the Agri-Horticultural Society of India. (Vol. 8. p. 220.)

Specimens of this oil are contributed by Dr. Riddell and Lieut. Hawkes.

No. 27.—Poovana Oil—Sarcostigma Kleinii.

Is exhibited by the Tinnevelly and Travancore Local Committees, and by the Rev. E. Johnston, Cottayam, and is reported to be useful in Rheumatism.

No. 28.—Piney Tallow or Doopada Oil—Vateria Indica—Piney Yennai (Tam.)

This most valuable tree, which, besides the product under consideration, yields a Resin nearly equal to copal, and an excellent building wood, grows plentifully in the jungles of the Western Coast.

The oil which is perfectly solid even in hot climates, is prepared by cleaning the seeds, then roasting and grinding them into a mass. To 5 seers of seed, add 12 seers of water, and boil until the oil rises to the surface. Remove the oil, stir the contents of the vessel, and allow it to stand until the following day, when more oil will be observed on the surface, which may be collected and the process repeated.

The oil is principally used for lamps, but is very suitable for soaps and candle making.

Specimens are exhibited by the Madras Tariff, Canara Local Committee, Narsing Row, and Lieut. Hawkes.

No. 30.—Wild Almond Oil—Terminalia Catappa.

A specimen of oil said to be obtained from the fruit of this tree is exhibited in the "Madras Tariff." A sample labelled "Almond oil" from Tanjore is the product of this species of Terminalia.

No. 31.—Neeradimootoo oil.—? Neerada mootoo yennai (Tam.)—Junglie badam ka tael (Hind.)

This valuable oil has been sent to the Exhibition under the various names of Neeradee-mootoo, jungle Almond, Maroty, Tamana, Maravettie, Neervettie and Soorty. It is said to be in great repute, as a medicine amongst native practitioners, and the kernel enters largely into their prescriptions. It might probably be found of use in the arts, it much resembles almond oil but is rather thicker.

The seeds cost in Madras As. 2-6 per seer—excellent specimens are contributed by the Madras Tariff, Travancore and Cochin Local Committees and Lieutenant Hawkes.

No. 32.—Glaucous leaved Physic nut Oil—Jatropha glauca—addale or Authaulay yennai.

This oil which in appearance approaches castor seems to be but little known. It is fluid and light straw colored, and is procurable in South Arcot, where the plant grows in waste land.

It is now chiefly used medicinally as a counter irritant, but if procurable in sufficient quantity seems likely to prove an useful oil.

A high colored specimen is sent from Tinnevelly and one of a pale straw colour from Lieutenant Hawkes.

No. 33.—Angular-leaved Physic-nut Oil—Curcas Purgans—Caat-amunak yennai (Tam.)—Adevee amedapoo noona (Tel.)—Junglie erundie ka tael (Hind.)

This oil which has of late been imported into England, as a substitute for Linseed oil, is expressed from the fruit of a species of Iatropha, which abounds in all parts of the Presidency. The color is somewhat paler than the best linseed oil. It can be obtained in some parts of the country where it is plentiful, for little more than the cost of manufacture.

It is now chiefly used in lamps. A light straw colored specimen is shown by Lieutenant Hawkes and several good but rather high colored samples from the Tanjore and Travancore Local Committees and the Madras Tariff.

No. 36.—Malkungunee or Staff tree Oil—Celastrus paniculata—Valuluvy yennai (Tam.)—Bavungie noona (Tel.)—Malkungunee ka tael (Hind.)

The deep searlot colored oil obtained by expression from the seeds of this shrub is used in medicine, the seeds submitted to destructive distillation yield the oleum nigrum.

The Madras Tariff, Major Miller and Lieut. Hawkes exhibit specimens of this oil.

No. 38.—Fennel Flower Oil—Nigella sativa-carun—seeragum (Tam.) Nulla Gillikarra (Tel.) Kulonjee and Siah danah (Hind.)

The black aromatic seeds of the nigella sativa, yield by expression a dark colored fragrant oil, which is shown by Major Miller, Lieut. Hawkes and the Madras Tariff.

No. 40.—Cheerongie Oil—Chirongia sapida or Buchanania Latifolia—Saraypuppoo noonay (Tel.) Cheeronjie or Charoolie ka tael (Hind.)

The kernels of this tree are eaten by the Natives, to promote fatness, they abound in a straw colored, sweet tasted and limpid oil which is seldom extracted.

The tree grows plentifully in Mysore and Cuddapah; good specimens are exhibited by Major Miller and Lieut. Hawkes.

No. 41.—Cucumber seed Oil—Cucurbita pepo—Valerikoi yennai (Tam.)—Thosa noona (Tel.)

A clear edible oil. A particularly fine sample is contributed from Masulipatam. The Madras Tariff, Tanjore Local Committee and Lieut. Hawkes also exhibit very creditable specimens.

No. 42.—Melon seed Oil—Cucumis melo—Pitcha Pusjhum—Dharbooza, Khurbooza.

No. 43.—Pumpkin seed Oil.

No. 45.—Nutmeg butter—Myristica Moschata Iadipootrie tylum (Tam.) Iajikarra noona (Tel.) Japhul ka tael (Hind.)

Is obtained by expression from the nutmeg, it has an aromatic smell from the volatile oil it contains.

No. 49.—Gamboge Butter—Garcinia Pictoria (Rox.) Mukki—tylum (Tam.)—Arasinagoorghy yennai (Can.)

The solid butter contained in the seeds of the "Gamboge tree" a species closely allied to the G. purpurea which produces the "soeum butter" has attracted attention. The Gamboge tree grows abundantly in certain parts of the Mysore and Western coast jungles. The oil which is procurable in moderate quantities, is prepared by pounding the seed in a stone mortar and boiling the mass, until the butter, or oil rises to the surface. Two and a half measures of seed should yield one seer and a half of butter. In the Nuggur Division of Mysore, it is sold at the rate of As. 1-4 per seer of 24 Rs. weight, or at £36-6 per ton, and is chiefly used as a lamp oil by the better classes of natives, and by the poor as a substitute for ghee. The butter thus prepared does not appear to possess any of the purgative qualities of the Gamboge resin, but is considered an antiscorbutic ingredient in food. (The above interesting particulars have been furnished by H. R. Oswald, Esq. M. D. Nuggur Division, Mysore Commission.)

Specimens are shown by Narsing Row of Shemoga, and Lieut. Hawkes.

No. 50.—Marking nut Oil. Semicarpus anacardium—Shayng cottay yennai (Tam.)—Nellajiede noona (Tel.) Bhillahwan ka tael (Hind.)

The acrid and vesicating oil which is found between the two laminæ of the pericarp of the marking nut is collected and used, as a preventive against the attacks of white ants, and by native practitioners in Rheumatic and Leprous affections.

By boiling the whole nut not divested of its pericarp, an oil is also obtained which acts as a blister.

The qualities of the oil of the kernel of the nut of which a good specimen is shown by Lieut. Hawkes require investigation.

The preparation or collection either of the oil or acrid juice is liable to cause much irritation and inflamation of the hands, face, &c. of those engaged in the work.

Specimens of the acrid juice (improperly called oil) are shown by the Tanjore and Goa Local Committees, Madras Tariff and Major Miller.

No. 51.—Bonduc nut Oil—Guilandina Bonduc—[Calichikai yennai (Tam.)

The oil of this common seed is mentioned by Ainslie, as being considered useful in convulsions and palsy. The seeds themselves are believed to possess tonic virtues. Used solely as a medicine.

No. 52.—Mahowa Oil—Bassia Latifolia.

Several specimens of oil under this name are exhibited, but doubt exists as to their being really the produce of the B. latifolia, which has always been described as a solid oil or butter, whereas those now shown are quite liquid at ordinary temperature.

The B. latifolia is produced plentifully in Bengal, but it is not yet ascertained that it grows in this Presidency.

No. 53.—Fetid Sterculia Oil—Sterculia Fætida—Coodira pusjun yennai (Tam).—

This semi-solid oil obtained by expression from the seeds of a large Jungle tree, appears to contain a large per centage of Stearine, but it is doubtful if it can be

obtained in large quantities, it was sent to the great Exhibition of 1851 from Bombay.

No. 58.—Moodooga Oil—butea Frondosa.

The seeds of this tree yield a small quantity of a bright clear oil which is sometimes used medicinally.

No. 61.—Mimusops Oil—Mimusops Elengi.

A medicinal oil. Obtainable in tolerably large quantities in some parts of the Country. It is exhibited by W. E. Underwood, Esq. as a new oil, but is known in England.

No. 63.—Nux vomica Oil—Strychnos nux vomica—Moo yettie cottay yennai (Tam.) Carun-jooty (Can.)

An empyreumatic oil prepared from the fresh nut, is used medicinally by Native Practitioners. It is exhibited by the Travancore Local Committee under the name of Carun-jooty oil and by Lieut. Hawkes.

No. 68.—Wild cummin seed Oil—Vernonia Anthelmintica—Caat seeragum yennai (Tam.)

Specimens of this oil are exhibited by Major Miller and Lieutenant Hawkes.

No. 70.—Garlic Oil--Allium sativum--Vellay Poondoo yennai (Tam.)

Good specimens of this medicinal oil are exhibited by Major Miller, the Madras Tariff and Lieut. Hawkes.

No. 77.—Radish seed Oil.—Raphanus Sativus.

Exhibited in the Madras Tariff.

No. 78.—Cabbage seed Oil.

Exhibited in the Madras Tariff.

No. 79.—Cardamom seed Oil (fixed.)

This is sent as a "new oil" by Mr. Rose, but is already well known. Pereira. p. 1031.

Exhibited by the Madras Tariff.

No. 83.—Colocynth seed Oil.—Cucumis Colocynthis.

Exhibited W. E. Underwood, Esq.

No. 85.—Oleum Nigrum—Celastrus Paniculata Valuluvy tylum. (Tam.) Vaylarie tylum.

An empyreumatic oil obtained by the destructive distillation of the seeds of the Celastrus, either alone or in combination with other ingredients. It is much used in the treatment of Beri-beri, Malcolmson's Essay p. 312.

Specimens are exhibited by the Bangalore Local Committee and by Lieutenant Hawkes.

The oils in the foregoing list which appear more particularly to merit attention are the Poppy, Brumadundoo, Kurunj, Belgam walnut, Poovana, Neeradimootoo, Physic nut, oils and Gamboge Butter.

To render the above List of Fixed oils complete the following which are known to be produced in this Presidency are added.

No. 18.—Sunflower oil.
24.—Thorny trichilia.
29.—Cyperus oil.
35.—Cotton seed oil.
37.—Thorn apple oil (empyreumatic.)
39.—Cocum butter.
47.—Fœnugreck oil.
55.—Condamunnee oil.
56.—Adenanthera Pavonina seed.
59.—Gutta Percha seed oil.
60.—Saul seed oil.
62.—Eugenia oil.
66.—Dammer tree oil.
72.—Kikuel, or Salvadora Persica oil.
73.—Cocculus Indicus oil.
75.—Limbolee or Bergera Kœnigii oil.
76.—Balanites Œgyptiaca oil.
89.—Hyosciamus.

With the exception however of Cotton seed, Sunflower, and one or two other of the above mentioned oils, most of these can only be procured in very small quantities and are chiefly used for medicinal purposes.

NEW OILS.

In determining the claim of any contribution to be entitled a "new" product, the Jury have been guided partly by recent works on the subject, and partly by their own experience.

Although the greater part of these substances are medicinal, they are obtainable only in very small quantities, yet one or two appear worthy of further enquiry.

The Perun Poonaka oil from Cochin, the Pootroojie from Madras and Mysore, Country Cress, Nagasumpunghee, Viscid cleome and Silk Cotton seed oils, as well as several new oils and Tallows exhibited from Canara are particularly worthy of notice.

The following fixed oils are exhibited by Mr. Rose through W. E. Underwood, Esq. as noveltics. They may perhaps prove of medicinal value, but their searcity and cost preclude their use for ordinary purposes.

No. 46.—Rosebay Oil—Wrightia antidy senterica.

A thick, scarlet colored, medicinal oil partaking doubtless of the properties of the seed.

No. 84.—Cordia Oil—Sebestana officinalis.

No. 67.—Belleric Myrabolan Oil—Terminalia Bellerica.

No. 27.—The Revd. E. Johnston of Cottayam forwards a specimen of the oil of *Sarcostigma Kleinü*. This substanee has been long known under the names of

Poovana and Poovengah, but the exhibitor is considered deserving of Honorable Mention as being the first to ascertain its correct Botanical name.

This medicinal oil is used largely on the Western Coast, and seems especially to merit further investigation.

No. 87.—The *Adul oil* of Travancore was forwarded to the great Exhibition of 1851, but merits further attention. It seems to be medicinal, but the Botanical name of the plant producing it is not given.

The Wound tree oil, or Gayapanoona of Rajahmundry although locally known for sometime, is now prominently brought to notice.

The Broonga Malagum Ointment and the Vishnamoosty or Snake tree ointment of Masulipatam appear to be new products, but being unaccompanied with any information as to source from which they are derived, this cannot be accurately determined.

No. 80.—A new Oil under the name of *Cherroo Pinnacottay* (Calophyllum calaba ?) is sent from Cochin.

Major Miller, Assistant Commissary General, Bangalore, forwards a new oil under the name of "Pootronjie." The same oil is also shown by Mr. Rose of Madras and Lieut Hawkes.

The following new or partially known oils are exhibited by Lieut. Hawkes.

No. 11.—Country Cress Oil—Lepidium sativum—Alie-verie-yennai (Tam.)

This oil is extracted from the seeds of the "Chinese wall cress." Its qualities and uses have yet to be determined. It must not be confounded with "Linseed oil" the Tamil name of which is the same as that of the present article.

No 34.—Naga-sumpunghee Oil—Mesua Ferrea.

This valuable oil is procurable in Canara, at the rate of Rs. 4 and the seed at 1-8-0 per maund. It is used both as a lamp oil, and as a healing application to sores.

No. 44.—Coorookoopilly Oil—Inga dulcis.

The seeds of this common hedge plant yield by expression a light colored oil, about the consistence of castor oil. Its qualities and uses require to be ascertained.

No. 46.—Rosebay oil—Wrightia Antidysenterica Vaipallay yennai (Tam.)

A medicinal oil—little known.

No. 48.—Viscid Cleome Oil—Polanisia Viscosa—Nahi-cadaghoo (Tam.)

This warm and pungent little seed when subjected to very powerful pressure, yields a moderate per centage of a light olive green colored limpid oil, which promises to be useful for purposes requiring a very liquid oil.

No. 54.—Sandal seed Oil.—Santalum album—Chundana pusjhum yennai (Tam.)

The seeds of the sandal wood tree yield by expression a thick and viscid oil which is burnt by the poorer classes in lamps.

No. 57.—Sand Box tree Oil—Hura Crepitans.

The seeds of this tree (which has been introduced from Jamaica) yield by expression an oil, as the whole tree abounds in poisonous matter, this oil probably partakes of its deleterious nature. The tree grows in the Horticultural Gardens.

No. 64.—Silk Cotton seed Oil—Bombax pentandrum.

A dark brown though clear oil is obtained by expression from the seed of the silk cotton tree, the fibre of which is largely used as a stuffing for pillows, mattresses, &c. &c.

No. 65.—Macassar Oil.

The qualities of this oil which is said to have been obtained from Macassar, the capital of the Celebes Island require to be determined, it is used by the natives of Singapoor as a hair oil.

No. 67.—Belleric Myrabolan Oil—Terminalia Bellerica—Tanikai yennai (Tam.)

A medicinal oil obtainable in small quantities from the kernel of the Bellerie Myrabolan, the use of this drupe as a tanning material is well known.

No. 69.—Wild Olive or Pootroojie Oil.

Obtained by expression from a handsome tree growing plentifully in Canara and Mysore.

No. 71.—The "Exile" Oil—Thevetia Neriifolia.

The kernels of the seeds of this common shrub yield by expression a large per centage of a clear bright yellow colored oil, the qualities of which have not as yet been determined.

No. 74. A medicinal oil is procurable in very small quantities from the kernel of the *Chebulic Myrabolan.*

No. 88. Mooroogana tallow.—This valuable substance which even at high temperatures is perhaps the most solid oil with which we are yet acquainted, was forwarded together with the following from Canara by F. N. Maltby, Esq. If procurable in large quantities, and at a moderate cost it promises to be a valued material for the manufacture of candles, &c. &c. It is used for medicinal purposes, &c. &c. and a cure for cattle wounded by Tigers.

Thoronogullo Oil.—Pongamia glabra ? from Canara used for cutaneous diseases.

Manaloo Oil.—From Canara used for lamps.

No. 86.—Thortay Oil.—*Hydno-Carpus inebrians.*—From Canara a very valuable vegetable tallow, used for sores.

Ghirgilly Oil.—From Canara obtained from the pulp of the tree ; considered an excellent remedy for Rheumatic pains.

Sahcottay Oil —From Canara, used for cutaneous diseases.

No. 90.—Wild Castor Oil.—(A new species) from Canara. Is burnt in lumps.

An empyreumatic medicinal substance called *Tuntapoo oil* (cassia tora ?) is contributed by the Masulipatam Local Committee.

W. E. Underwood, Esq., exhibits an empyreumatic oil and pyroligneous acid obtained by the destructive distillation of cocoanut shells. The latter substance has been used successfully in developing photagraphs by the collodion process. The oil or tar mixed with ordinary "japan varnish" is said to be used with advantage in the "backing up" of positive pictures.

OIL SEEDS.

The oil seeds most generally cultivated in India are the castor, gingelley and rape, mustard, ground nut, ramtill, and linseed; poppy is cultivated for its opium the seed forming a secondary consideration.

The following plants grow in a wild state, their fruit being collected and the oil expressed as occasion requires; margosa, ben, brumadundoo, pinnacottay, soapnut, kurunj, cashew-nut, poovanna, piney, neradimootoo physic nut, cheeronjee, coorookoopilly, &c. &c. &c.

WOOD OILS.

This class of oils is obtained for the most part from the Burmese coast and the Straits. They are usually procured by tapping certain trees of the order Dipterocarpeœ, and applying heat to the incision. The oil which flows from the wound, is a mixture of a balsam and volatile oil, and when applied as a varnish to wood or other substance the oil evaporating deposits a hard and durable coat of resin.

They are chiefly used as natural varnishes, either alone, or in combination with colored pigments, also as a substitute for Tar in paying the seams of shipping, and for preserving timber from the attacks of white ants. They are said also to be useful as an ingredient in Lithographic inks.

Owing to the distance from which they are brought, and the imperfect knowledge we yet possess of the country whence they are imported, the names of the trees from which these valuable substances are derived, are involved in some degree of obscurity.

The oils, therefore, generally receive the names of the localities from which they are imported. Some of them differ considerably in colour and consistence, but they all possess the same balsamic odour, and are derived from various trees of the noble family of Dipterocarpeœ.

In this section, may be remarked three good samples of wood oil from Canara. Also, a very interesting series of ten oils from various parts of the Madras Presidency and Burmah contributed by Lieut. Hawkes to which series the Jury award Honorable Mention.

Lieut Evans 51st Regt. N. I., in addition to other contributions, exhibits a bottle of wood oil from Malacca in its natural state as procured from the tree. The mode of extraction is as follows. "About the end of the dry season, that is in March or April, several deep incisions are made with an axe into the heart of the wood, and a good sized piece scooped out, into these holes fire is placed, and kept burning until the oil begins to run, when it is received into a bamboo, and allowed to run slowly drop by drop."

The following are exhibited by Lieut. Hawkes.

No. 91.—Teak Wood Oil.

An opaque dull ash colored oil under this name, is procurable in most of the large Bazaars of India ; when allowed to rest for some time, it separates into two layers, an upper or dark colored clear stratum and a lower and more solid deposit.

Its chief use is for applying to woodwork of all sorts, either alone as a natural varnish, or in combination with certain resins.

No. 92.—Wood Oil from Pegu.—It is much to be regretted that the Botanical names of the trees, yielding this and the following wood oils cannot with any certainty be ascertained. The oil which is generally known by this name, is a very clear and liquid substance forming a natural varnish when applied to wood or other substances.

No. 93.—Deodar or Shemanathu Oil—Erythroxylon areolatum.

An empyreumatic medicinal oil.

No. 94.—Wood Oil from Chittagong.—This substance much resembles the "Teak wood oil" and the "Wood oil from Pegu," above mentioned. It is less liquid than the latter, but is used for the same purpose ; procurable in all large Bazaars

No. 95.—Wood Oil from Moulmein.

No. 96.—Wood Oil from Rangoon.—This appears to differ very considerably from any other specimen of

"wood oil" in the Exhibition, it is quite white and almost solid—but has the usual resinous smell of this class of oils.

No. 97.—Wood Oil from Singapore.

No. 98.—Wood Oil from China.—Although scarcely coming within the limits of this report, this valuable product merits notice as being one of the substances of which the well-known and much prized China lacquer is made. It is used in Singapore for painting the beams and wood-work of Native houses, and may also be mixed with paint when not exposed to the sun.

No. 99 —Sissoo-wood Oil.—Dalbergia sissoo.
An empyreumatic medicinal product.

No. 100.—Wood Oil from Tinnevelly.
An empyreumatic product similar to tar, chiefly used medicinally by Native Practitioners.

No. 102.—Camphor-Wood Oil—*Dryobalanope Camphora.*—The last of this series belongs to the class of "Volatile oils," but may be here noticed. The specimen exhibited by Lieut. Hawkes was forwarded to him from Singapore through Lieut. Heath of the 38th Regiment N. I., and another excellent specimen which is exhibited by Second Dresser Pulneandy was brought by him from Labuan. It is used largely in Singapore as a substitute for turpentine, and sells at from 15 to 20 cent. a bottle.

The Jury consider Lieut. Heath and 2d Dresser Pulneandy deserving of Honorable Mention.

Wood Oil, as obtained from the tree without any preparation.

This very interesting specimen which was before mentioned as being contributed by Lieutenant E. J. M. Evans, 51st Regt. N. I., by whom it was obtained from Malacca, is obtained from a large tree of the Dipteraccous family, which is very common in the dense jungles of the Malayan Peninsula, and grows to a great height. When not tapped too soon, the base of the trunk is often of immense girth—the wood is reddish brown and has a smell not unlike that of English fir, the bark is smooth, the leaves alternate, pinnate and exstipulate, fruit a one seeded drupe, seed angular and anatropal.

The oil when permitted to remain at rest divides itself into two layers, the upper consisting of a clear chesnut colored liquid balsam and the lower being in appearance like flakes of granulated sugar and consisting probably of the surplus resin deposited by the action of the atmosphere.

The Jury consider the Exhibitor deserving of Honorable Mention.

MINERAL OILS.

No. 101. Specimens of *Petroleum* are exhibited by the Madras Tariff and Lieut. Hawkes, the produce of our Burmese Possessions.

Its uses are well known.

ANIMAL OILS.

No. 105. Fish Oil.—The preparation of fish oil is chiefly confined to Malabar and the Western Coast whence it is exported to England in large quantities, the demand is also yearly increasing.

No. 106.—Fish Liver Oil.—Is also prepared chiefly on the Western Coast although some is now made at Madras.

The liver of the white shark is that generally used. The mode of preparing the best Cod liver oil which is equally applicable to "Fish liver" is thus described.

"Cod Liver Oil."—The proper season for preparing this oil is early in January when the livers are plump, firm, large, white, and full of oil—the livers are sometimes found diseased, and are specifically lighter than water, these should be rejected. Good livers should cut smooth, and not tear, when cut none of the substance should flow out in a half liquid state.

The quantity of oil produced by livers depends much upon the time of the year.

In the beginning of January 1000 livers were found by experiment to yield 37 Imperial gallons, and at the end of February an equal number only gave 23 gallons of oil. In the beginning of January 1000 livers of average size weighed 900 lbs. whilst in the last day of March the same number weighed only 575 lbs.

The oil at these different seasons was equally pale, and the livers equally white, although much smaller and more flabby in the latter season.

To prepare the oil—Wash the livers very carefully, first removing the gall bladders which adhere to them, and infuse them in rain or other water free from salt. Place them over the fire and never allow the heat to exceed 120 or 130 °. On this head especial care must be taken, a higher degree of heat although yielding a larger product, communicates a rank fishy taste and smell and heightens the color of the oil, thereby rendering it disgusting to the Patient.

No. 107.—Neats foot Oil—is exhibited by the Madras Tariff—Tanjore Local Committee and Lieut. Hawkes. Its uses as a softener of leather, &c. &c. are well known.

No. 108. Oil of Wax—Oleum Ceræ.

Bees wax submitted to destructive distillation with the addition of a little salt yields an empyreumatic oil which is much used in medicine by Native Doctors.

No. 109.—Guana Oil.—A specimen of this oil is exhibited by J. Rohde, Esq. of Guntoor.

VOLATILE OILS.

No. 9.—Lemon Grass Oil, Andropogon Schænanthus—Camachie Pilloo Tylum.

This well known Oil is obtained by distillation from a grass, which grows plentifully in many parts of the country. It is much used as a rubefacient for Rheumatic affections, as well as in Perfumery, for which purposes it is said to be largely exported from Travancore. When newly made, this Oil is of a light straw color, but age changes it to a deep red.

Excellent specimens are exhibited by the Travancore and Tanjore Local Committees and by Lieut. Hawkes.

Mrs. Goodsir forwards an excellent sample obtained from Ceylon.

No. 8.—Roosa Grass Oil, Andropogon Calamus Aromaticus.

This Oil differs but little either in appearance or quality from the Lemon Grass Oil. It is used for the same purposes.

Good specimens are exhibited by Dr. Riddell and Lieut. Hawkes.

No. 12.—Bishops Weed Oil, Anethum Sowa.

These well known carminative seeds yield by distillation a very useful Oil which is given medicinally, as a stomachic.

Good specimens are shown by Mr. Gay, the Tanjore Local Committee and Lieut. Hawkes.

The following volatile Oils contributed by W. E. Underwood, Esq. are deserving of especial mention as they are but little known.

No. 11.—Noochie Oil, Vitex Negundo.
Carpooravully Oil, Anisochilos Carnosum.

In addition to those mentioned above, the following are contributed by Lieut. Hawkes.

No. 1.—Oil of Anise—Pimpinella Anisum.

No. 2.—Oil of Cinnamon — Cinnamomum Aromaticum.

No. 3.—Oil of Sweet Fennel—Fæniculum dulce.

No. 4.—Oil of Cajeput—Melaleuca Cajaputi.

No. 6.—Oil of Cloves—Caryophyllus aromaticus

No. 7.—Oil of Nutmegs—Myristica Moschata.

No. 10.—Oil of Sassafras—Laurus sassafras.

No. 15.—Oil of Cassia—Cinnamomum Iners.

No. 17.—Oil of Lemons—Citrus Limonum.

No. 24.—Oil of Pepper—Piper Nigrum.

The following substances grown in India produce volatile oil.

No. 7.—Oil of Nutmegs, Myristica Malabarica.
No. 13. ,, Cardamoms, Elettaria Cardamomum.
No. 14. ,, Star anise, Illicum Anisatum.
No. 16. ,, Cummin, Cuminum Cyminum.
No. 18. ,, Spikenard, Andropogon Nardus.
No. 19. ,, Cuscus, Do. Muricatus.
No. 20. ,, Ginger grass, Do. Iwarancusa.
No. 21. ,, Tobacco, Nicotiana Tabacum.
No. 23. ,, Sweet Flag, and 13 others.

SCENTED OILS.

No.41.—Sandalwood Oil—Santalum album—Chundana yennai (Tam.)

Specimens of this oil are exhibited by the Salem and Canara Local Committees, the Madras Tariff and Lieut. Hawkes.

The exports amount annually to about 100 cwt.

A set of Scented oils or utturs from Hyderabad comprise the following.

Moteah	Uttur.
Chumbaley	,,
Ryatroo	,,
Inah	,,
Kaserah	,,
Chumpah	,,
Gool	,,
Banjeree	,,
Burmookee	,,
Dhoolpend	,,
Cuscus	,,
Moleserree	,,
Rowsep	,,
Showahg	,,
Sona Manthre	,,
Nohrutten	,,
Sandal	,,
Muzmah	,,

They vary in price from 4 Annas to 5 Rs. per tola.

A very complete collection of these oils is exhibited by W. E. Underwood, Esq. comprising

Oil of Sandal wood.
,, Star Anise.
,, Coriander.
,, Pepper.
,, Bitter orange.
,, Cummin.
,, Screw Pine.
,, Cloves.
,, Patchouli.
,, Cuscus.
,, Mint.
,, Nutmeg.
,, Cardamom.
,, Indian Southern wood.
,, Jessamine.
,, Bishops weed.
,, Sweet Fennel

Lieutenant Hawkes also exhibits the following.

No. 41.—Oil of Sandal wood from Coorg.
No. 41.—Oil of Sandal wood from Bangalore.
No. 44.—Oil of Jessamine.
No. 42.—Oil of Fragrant Screw Pine.

JURY AWARDS.

Second Class Medal.

Pro. No.	Cat. No.	Name of Exhibitor.	Objects Rewarded.
		Underwood, W. E. Esq.	Collection of oils in illustration of the Madras Tariff.
ccxxvii	1	Gay, Mr. W.	Superior mode of de-Colorizing oil.
civ		Godefroy, Monsieur.	For Castor and Cocoanut oil.
lxv	1	Kohlhoff, Mr. W. D.	For Castor, Gingeley, Cocoanut, Neem, Pinnacotay, and Mustard oils.

Honorable Mention.

Pro. No.	Cat. No.	Name of Exhibitor.	Objects Rewarded.
		Heath, Lieut. J. D.	For Camphor wood oil.
		Pulncandy, 2d Dresser	For Do.
		Johnston, Revd. E.	For oil of the Sarcostigma Kleinü.
ccxc	1	Evans, E. J. M. Lieut.	For wood oil.
cccl	36	Nellore Local Committee	For various oils.
lxiii	311	Tinnevelly L. C.	For Poovana, Gingeley oils, &c.

TABLE *shewing the names of the various Oils sent from or obtainable in the different Districts of the Madras Presidency, with their present prices.*

N. Arcot.

		Rs.	A.	P.
Castor oil	Maund	2	1	0
		3	8	0
Lamp oil, 1st	„	2	0	0
		3	0	0
Lamp oil, 2nd	„	1	14	0
		2	8	0
Cocoanut oil	Maund	3	8	0
		4	0	0
Gingeley oil	„	2	12	0
		3	12	0
Ground nut	„	1	8	0
		2	12	0
Kurunj	„	1	2	0
		2	8	0
Illoopoo	„	1	8	0
		2	8	
Physic nut	„	1	10	0
		1	14	0
Neem oil	„	2	1	0
		5	0	0

S. Arcot.

		Rs.	A.	P.
Illoopoo	Candy	25	0	0
Rape seed	„	31	4	0
Pyaroo gingeley	„	27	12	5
Neem	„	25	0	0
Mustard	„	0	0	0
Neeradimootoo	„	0	0	0
Lemon grass	„	0	0	0
Pinnacottay	„	0	0	0
Cassia oil / Cathartocarpus	„	0	0	0
Bryony oil	„	0	0	0
Physic nut, (33)	„	0	0	0
Physic nut, (32)	„	0	0	0
Fetid sterculia	„	0	0	0

Nuggur.

Dr. H. R. Oswald, Esq.

		Rs.	A.	P.
Lamp oil	Maund	3	4	0
Cocoanut	„	3	0	0
Gingelcy	„	4	0	0
Ramtill	„	3	8	0
Safflower	Seer	0	1	0
Kurunj	Maund	2	8	0
Sandal wood oil	Seer	6	0	0
Neem oil	Maund	7	0	0
Gamboge butter	Seer of 24M.	0	1	4
Sandal seed oil		0	0	0
Malkungunee oil		0	0	0
Mustard oil		0	0	0
Illoopoo oil		0	0	0
Ground nut		0	0	0
Brumadundoo		0	0	0
Safflower		0	0	0
Poppy		0	0	0
Wild cummin		0	0	0
Pootroojie		0	0	0
Margosa		0	0	0
Neeradimootoo		0	0	0
Ol. nigrum		0	0	0
Piney tallow		0	0	0

Bellary.

Dr. Day.

		Rs.	A.	P.
Castor oil	Maund	4	8	0
Lamp oil	„	2	8	0
Cocoanut oil	„	3	4	0

		Rs.	A.	P.
Gingelcy do.	Maund	2	8	0
Ramtill do.	„	5	4	0
Linseed do.	„	3	8	0
Safflower do.	„	2	8	0
Kurunj	„	2	8	0
Neats foot do.	Gallon	1	4	0
Illoopoo do.	Maund	3	8	0
Neem do.	„	3	0	0

Bhopaul.

Poppy oil	9 Seers	1	0	0
Illoopoo do.	Seer	0	1	0
Malkungunee do.	„	0	8	0
Neem do.	„	0	0	0
Teakwood do.	„	0	0	0

Canara.

F. N. Maltby, Esq.

Moorgana tallow		0	0	0
Gamboge butter / Arasinagoorghy		0	0	0
Thoronagulloo		0	0	0
Malkungunee kungun		0	0	0
Cana ghairas		0	0	0
Rape seed or khorasanee yellow	Maund	3	0	0
Ghirghitly		0	0	0
Naga sumpaghy	Maund	4	0	0
Thortay		0	0	0
Joghy nulloo		0	0	0
Poondy oil		0	0	0
Boley do.		0	0	0
Sahcottay		0	0	0
Mahnaloo		0	0	0
Neeradimootoo soorty		0	0	0
Cāt urraloo, a new species		0	0	0
Gingeley oil		0	0	0
Ramtill oil		0	0	0
Cocoanut		0	0	0
Fish oil		0	0	0
Neem oil		0	0	0
Pinnaycottay		0	0	0
Piney tallow		0	0	0
Sandalwood oil		0	0	0
Cassia oil		0	0	0
Lamp do.		0	0	0
Wood do.		0	0	0
Fish liver		0	0	0

Trichinopoly.

Castor oil	Measure	0	6	0
Lamp oil		0	5	0
	„	0	4	0
Cocoanut	„	0	8	0
Gingeley	„	0	7	0
Pinnacottay	„	0	4	0
Kurunj	„	0	3	0
Illoopoo	„	0	6	0
Neem	„	0	4	0

Vizagapatam.

		Rs.	A.	P.
Castor oil	Seer	0	3	4
Lamp oil	„	0	4	0
Cocoanut oil	Maund	5	10	0
Gingeley oil	Seer	0	4	7
Kurunj	„	0	2	8
Mustard oil	„	0	3	0
Illoopoo	„	0	2	0
Rape seed	„	0	4	7
Cotton seed oil	„	0	2	4
Neem oil	„	0	2	6
Brumadundoo	„	0	2	6
Ramtill	„	0	3	0

Tanjore.

Illoopoo		0	0	0
Pinnacottay		0	0	0
Cocoanut		0	0	0
Castor		0	0	0
Lamp		0	0	0
Physic nut		0	0	0
Neem		0	0	0

Coimbatore.

E. B. Thomas, Esq.

		Rs.	A.	P.
Lamp oil	Maund	3	0	8
Cocoanut oil	„	4	9	4
Gingeley oil	„	4	0	0
Kurunj oil	„	4	0	0
Neem oil	„	4	0	0

Ganjam.

Lieutenant Touch.

Castor oil		0	0	0
Gingeley oil		0	0	0
Ramtill oil		0	0	0
Marking nut oil		0	0	0
Mustard oil		0	0	0
Viscid cleome seed		0	0	0

Malabar.

Lieutenant Rolston.

Castor oil	bottle	0	8	0
Lamp oil	cootty	0	12	0
Cocoanut	„	0	11	4
Gingeley	„	0	12	10
Fish liver oil	bottle	0	12	0
Sandal wood oil	lb.	6	8	0

Tellicherry.

Dr. West.

Povethum (herb)	oz.	0	0	5
Kaurookolay urree	oz.	0	0	4
Cherroopoonaka	oz.	0	0	5

	Rs.	A.	P.
Chitellay (flower).... .....oz.	0	1	0
Thukkolah winday urree from China ....oz.	0	1	0
Kottay kai (fruit) ....oz.	0	0	6
Kodaga pal urree .....oz.	0	0	5
Korasanee hycundrum from Bombay..... ....oz.	0	0	10
Chuddoopah .. ..oz.	0	0	6
Kurunj	0	0	0
Brumadundoo.....	0	0	0
Gingeley	0	0	0
Cadarumbum gingeley	0	0	0
Ground nut oil.....	0	0	0
Soapnut oil	0	0	0
Almond oil.....	0	0	0
Cashew nut oil.....	0	0	0
Fish oil.....	0	0	0
Neat's foot oil.....	0	0	0
Tobacco oil..	0	0	0
Cashew apple oil	0	0	0
Mustard oil..	0	0	0
Marking nut oil	0	0	0
Ben or moringa	0	0	0
Poppy oil..	0	0	0
Cucumber oil....	0	0	0
Adjowan oil	0	0	0
Hemp seed oil	0	0	0
Lemon grass oil.....	0	0	0
Pinnacottay oil.....	0	0	0
Castor	0	0	0
Cocoanut	0	0	0
Kurunj	0	0	0
Gingeley	0	0	0
Neeradimootoo....	0	0	0
Lemon grass.....	0	0	0
Margosa.....	0	0	0
Cashew nut .....:	0	0	0
Poovana	0	0	0
Illoopoo	0	0	0
Physic nut	0	0	0
Pinnacottay	0	0	0
Wood oil.....	0	0	0
Nux vomica .. .. Curungooty	0	0	0

Nellore.

Gingeley..... .. ..bottle	0	2	11
Illoopoo oil .. .... „	0	2	6
Neem oil .. .. „	0	2	0
Lamp oil . .. . „	0	2	8
Linseed oil.. .. .... „	0	3	2
Castor oil .. ..Viss	1	0	0
Brumadundoo.. .... „	0	4	0
Poppy oil .. .. „	1	4	0
Ground nut..... ..... „	1	0	0
Cucumber oil..... .... „	0	4	0
Mustard oil .. .. „	0	10	0

Travancore.

Illoopoo oil .... „	0	4	0
Pyroo Gingeley ... . „	0	6	0
Neem oil .... „	0	2	0
	0	8	0
Deodar wood oil ....Seer	0	8	0
Nux vomica oil .... „	0	8	0

Tinnevelly.

C. Bird, Esq.

Lamp oil ....M. Seer	0	6	6
Gingeley.. .. .... „	0	9	0
Kurunj .... „	0	5	0
Pinnaycottay..... .... „	0	4	8
Safflower .. .. „	0	5	4
Illoopoo .. .. .. „	0	4	11
Rape seed.. .. .... „	0	8	11
Brumadundoo.. .. .... „	0	6	0
Neen .. .. „	0	6	7
Wood oil.. .. .. „	0	4	0
Poovana oil.. .. .... „	0	8	0
Physic nut .. .. „ Adjale .. .. .. „	0	5	0

SECTION III.

DYES AND COLOURS.

SUB JURY.

W. E. UNDERWOOD, ESQ.—*Chairman.*
J. OUCHTERLONY, ESQ.
A. HUNTER, ESQ.
H. CLEGHORN, ESQ.—*Reporter.*

ASSOCIATES.

J. ROHDE, ESQ.
VEERA PERMALL PILLAY.
C. CUNDAPAH CHETTY.
BALA CHETTY.

The methods of dyeing practised in India are generally tedious and complicated, yet the natives have long possessed the Art of giving beautiful and permanent colours to cotton goods. The country supplies all the raw materials for producing a variety of colours, and the Hindoos have long been acquainted with Alum and the salts of Iron, &c., which are still employed as mordants. But in a country where chemical science may be said to be unknown, we naturally cannot look for any of those signs of progress, which in Europe, have marked the application of that science to the art of dyeing. The process is as rude as it was ages ago, and any improvement in a colour, or production of a new one, has been rather the result of a happy accident, or an elaborate pains-taking experiment, than a skilful combination upon understood principles. Yet the field is one, that well merits labour and research, for, whatever

the external influence that operates in this country, the colours produced in dyeing are unquestionably brilliant, and the best test of their superiority is understood to have been afforded some years past, when Manchester cloths were sent out to the country to be dyed, and returned home to enter the market as the "Blue cloths of Commerce." It is almost entirely cloth of Cotton that the natives of this part of India treat, and they are able to impart durable colours to this in reds, blacks and blues, and the various modifications of either ; but their deep greens, yellows and other colours appear to be very fugitive. Dr. Heyne has published an accurate account of the mode of dyeing cotton yarn, as practised on this Coast, in his Tracts, (P. 204,) and there is appended to this report, a statement furnished by a Native working dyer at Madras, of the manipulation and materials employed by him for producing various colours. It is very evident from these documents, that the Native dyers have at this day much to learn, and that their processes may be very materially improved.

From the great diversity of substances used in dyeing, including metals, woods, flowers, roots, barks, leaves, fruits, lichens, insects, &c., all of which require essentially different treatment; there is considerable variation in the methods practised, —and this variety is further increased by the different nature of the materials submitted to the dyes, *viz.*, *Animal substances*, Wool, Silk and leather ; *or Vegetable materials*, as Cotton, flax and wood. Experience shows that the colouring matter, which takes upon Animal substances, will not suit vegetable matter, a piece of wool will bear an acid, which would corrode and destroy a cotton fabric, and the dyeing of mixed fabrics, where animal and vegetable matters are combined, and where several brilliant colours are blended together, requires the manufacturer to practise all the nicety of his Art.

Dyeing is indeed a purely *Chemical* process, and it is owing to the progress of that *Science* in Europe, that such great improvement has been made of late years, and that many colouring matters, which were formerly considered of but little value, are now rising in importance, (such as Munjeet, Chayroot, Logwood, Annotto,) and being more extensively brought into use. The collection now under report presents most of the above, and comprises an instructive and important series of well known dyes, with a few little known substances as Puply Chuckay, Ratinara, (Lichen), and extract of Casuarina, &c.

Amongst some of the little known dyes, here exhibited, there are several well deserving a careful examination. It is to be hoped, that some method may be devised of rendering available these new colouring materials, as well as of applying more economically, those long in use, and which may be procured in large quantities and at low prices.

The following is the series of Dye stuffs shown in the Exhibition.

1. *Indigo*—the most important of Indian dye stuffs, is a blue colouring matter, extracted from several tropical plants, but chiefly from the various species of *Indigofera*, which form a most valuable article of Agricultural produce in the District of Cuddapah and elsewhere. In former years the usual mode of extracting Indigo, as practised in Southern India, was from the dry leaf, a process which will be found minutely described in the pages of Heyne and Roxburgh. But this is now almost entirely superseded, by the better system of the *green leaf* manufacture, which is followed in all the Indigo growing districts of this Presidency, save the Province of South Arcot. In the latter, the *dry leaf* process is still persevered in, but it is likely that it is only so, from the distance to which the leaf has generally to be carried before it reaches the factory, and the consequent partial drying that takes place on the journey. The Indigo trade of Madras has of late years sustained a great development, though, owing to the draught of 1854, the export fell off above 50 per cent, it having in that year only reached 2,162 Candies (about 4,300 chests) while in 1853, it amounted to 5,445 Candies (about 10,900 chests). The subjoined table of the quantity landed each year in the port of London will show the progress of the trade since 1840.

Landed in 1840	3600	chests
1841	3312	,,
1842	6436	,,
1843	5318	,,
1844	7731	,,
1845	11348	,,
1846	8261	,,
1847	8948	,,
1848	3848	,,
1849	5383	,,
1850	6094	,,
1851	8582	,,
1852	9311	,,
1853	9761	,,
1854	9229	,,

The average import from Bengal during the same period was about 22,000 chests, so that Madras now contributes 30 per cent. of the whole supply of this dye from India to the London market. But notwithstanding this importance of the traffic, the general manufacture is so indifferently conducted, or rather on so imperfect a system, that the value of the article produced is seriously diminished, and its currency injured as an article of trade. It is not that the quality of Madras Indigo is inferior to the ordinary run of that of Bengal, for where the manufacture has been conducted on a large scale, and with elaborate care and skill, as in the factories of Messrs. Arbuthnot and Co. at Cuddapah and Bimlipatam and Messrs. Hart and Simpson in the Cuddapah and Nellore districts, an article is produced which is held in high estimation in the home market, and commands as current a sale as the produce

of any Bengal factory. But Indigo is commonly manufactured over the Madras Presidency in driblets; one vat-owner often not producing enough to fill even a chest, and the consequence is, that no one can make a purchase of a quantity of Indigo in the Madras market upon a sample, as is commonly done in Bengal,—that every parcel, and often the same chest is of mixed qualities, and that the value of the dye becomes thereby disproportionately depreciated at home.

Nine samples of *Green leaf* Indigo and four of *Dry leaf* have been sent to the Exhibition. The First Prize for the former has been awarded to the produce of Messrs. Hart and Simpson's Factory, a beautiful specimen of the dye. Ranking closely with it, is the produce of Messrs. Arbuthnot and Co.'s Factory, which, though not quite coming up to the former specimen in colour, is so well manufactured, so even, square and uniform in quality, as to deserve the highest commendation. The several contributions sent are classed below. The dry leaf specimens were all of ordinary quality.

Green Leaf.

Messrs. Hart, Simpson and Co. ..... Middling fine, purple violet, large square.

Messrs. Arbuthnot and Co. (A. F. Kurpah).. Good purple violet, square and even.

Cuddapah No. 85—A 1st sort ....A single specimen of superior quality, good violet, imperfect square.

Guntoor ....A single piece good violet and copper.

Salem (Avery).. .. ..Ordinary copper and violet, specky.

Chittoor, broken..... Ordinary copper.

Nellore ....Broken ordinary copper, heavy.

Masulipatam ..... Very inferior.

Dry Leaf.

Auchanoor (Tanjore)... Square fair—ordinary grey purple specky.

Tanjore (Mr. Kohloff).... Light good square, ordinary soft grey purple.

Pondicherry..... Fair ordinary, light clean but dull.

Tinnevelly..... Very inferior.

Pala Indigo.—Of the Indigo manufactured from the Pala tree, Wrightia tinctoria, three samples have been sent from Madura, Salem, and Canara, but only one deserves mention, that from Messrs. Fischer and Co. of Salem, which is well manufactured. Fair specimen of the variety, broken square, light, even ordinary copper, sandy. The other samples were heavy, sooty, coarse and grey, as were all the specimens of Indigo sent from the Western Coast.

3. *Red Sanders Wood.*—(Pterocarpus santalinus) This dye wood is the produce of a large tree, growing on the Pulicat and Tirpaty mountains, it is usually seen in billets of 2 to 3 feet in length, of a deep red colour, the concentric circles being divided by dark lines. With different mordants, it yields various shades of red, these are said not to be permanent. This wood is largely exported but little used in the country. The exports for 1854 amounted to 47,431 cwts. value 59,570 Rupees.

4. *Sappan Wood.*—(Cæsalpinia sappan), specimens were exhibited in billets and chips from Tanjore, Travancore, Goa and Cuddapah. A red dye is made from an aqueous extract of the chips of this wood, but it is not reported to be a fast colour, and is principally used for common and cheap cloths. It is precipitated dark brown with iron, and red with alum.

5. *Safflower.*—(Carthamus tinctorius), Coosumba, four specimens of the powder were exhibited from Cuddapah, Chittledroog and Madura, and several packets of the seeds were sent from other Districts. The dried florets of "*Carthamus tinctorius*" yield a very beautiful colouring matter, which attaches itself without a mordant: it is chiefly used here for colouring cotton, and produces various shades of pink, rose, crimson, scarlet, &c. In Bangalore, silk is dyed with it, but the dye is very fugitive, and will not bear washing. An Alkaline extract precipitated by an acid (Lime juice is commonly used) will give a fine rose colour either to silk or cotton. The colouring matter is not suitable to Wool.

The coosum is cultivated extensively throughout the Ceded Districts, &c. the seed yielding an Oil, and the flower a dye. The flower is gathered and rubbed down into a powder, and sold in this state. When used for dyeing it is put in a cloth and washed in cold water for a long time, to remove a yellow colouring matter; it is then boiled and yields the Pink dyeing liquid. The Chinese safflower is worth four times the amount of the Indian article (Professor Solly), and the loss from careless drying and preparation has too often been set down to the "nature of the article."

6. *Turmeric* (Curcuma longa) specimens are exhibited as a root from Trichinopoly, Tinnevelly, Madura &c. and in a prepared state from Goa.

The root affords without a mordant, a yellow dye which is brilliant, but not permanent. It enters into curries and is largely used by native females as a paste to colour their faces. Dr. Pereira considered Madras Turmeric "as the most showy of all kinds of Turmeric," and the Jury observe the tubers are very large and the colour a bright yellow.

7. *Chayroot* (Oldenlandia umbellata). Eight specimens were exhibited from Guntoor, Masulipatam, Nellore, Tanjore, Tinnevelly, Travancore and Madura. The plant is a small biennial weed, growing in light sandy ground near the sea where its roots strike very deep—the colouring matter resides entirely in the bark

of the root, the inner portion is white and useless. The root is of great importance to the Indian dyer, yielding a red dye similar to munject, which is used to a great extent in the southern parts of Hindostan. The celebrated red Turbans of Madura are dyed with the Chayroot, which is considered superior of its kind, but this is probably owing to some chemical effect which the water of the Vigay River has upon it, and not to any peculiar excellence of the dye itself. Wild chay is considered to yield one-third more colouring matter than the cultivated root, this probably arises from too much watering, as much rain injures the quality of the root. Roots of 2 years growth are preferred when procurable. It is currently reported that chayroot rapidly deteriorates by being kept in the hold of a ship, or indeed, in any dark place.

8. *Morinda bark* (Morinda tinctoria, citrifolia and umbellata). Specimens of the bark and root of various species of Morinda were exhibited from different parts of Southern India and the Northern Circars. These form a very valuable red dye which is fixed with alum: the colour, though not brilliant, is far more permanent than many other red colours—the most of the Madras red Turbans are dyed with the root bark of the *Nona* tree, which is pretty common, and is in flower great part of the year. The large Triplicane burying ground is thickly studded with the tree. The quantity procurable is very large, and the dye appears worthy of the attention of practical dyers.

9. *Aliakoo* or Casau elay (Memecylon tinctorium). A small tree common in jungles in the Carnatic. The wood is brought into Madras for firewood and a large quantity of the leaves are imported daily for dyeing purposes. Cold infusion of the leaves imparts a yellow dye.

10. *Arnotto* (Bixa orellana.) Many good specimens of fruits and seeds were exhibited. A specimen of Cake Arnotto, of a thick pasty consistence, prepared by macerating the seeds was forwarded by Lieut. Colonel Grant, Trivandrum. An Orange colouring matter is obtained in this way. This is soluble in Alkalies, by which means it is fixed to silk or wool; sometimes (as appears to have been the case in Colonel Grant's specimen) the colouring matter is mixed with oil before drying, the dye is also used by milkmen to colour butter and cheese, and by others for tinging oils, spirits and varnishes.

11. *Pulas* or Moduga flowers (Butea frondosa) used for dyeing red—received from Madras, Mysore and Cuddapah.

12. *Cupla rung* (Rottlera tinctoria). The stellate pubescence covering the 3-coccous capsule of this large tree, is collected for sale in Mysore, where it is used for dyeing silk an orange colour. In the Edinburgh Philosophical Journal, April 1855, Professor Anderson of Glasgow gives a very satisfactory report on the colouring matter of this dye, and the trials which he has made with it are sufficient " to show that it really merits the attention of silk dyers." The tree is widely spread over the Madras Presidency, and large supplies of the dye might be easily obtained. The colouring matter does not require a mordant, all that is necessary being to mix it with water containing about half its weight of carbonate of soda. " On silk, the colour is a rich flame or orange tint of great beauty and extreme stability ;" and " the fact that the material supplied by commerce, contains between 70 and 80 per cent. of real colouring matter, ought to induce the silk dyers of this country to turn their attention to it."

13. *Pupli Chuckay.* The bark of the Pupli root yields an orange dye, and is treated with alum, Myrobolans, &c. This dye is exhibited from Bellary, Mysore and Salem. It was noticed by Buchanan (Mysore 1. p. 168.) and was named by him somewhat doubtfully as Ventilago ? a Rhamnaceous genus. Flowering or fruit bearing specimens of this scandent shrub have not been procured to settle the point in question.

14. The *Myrobolans* of commerce yielded by *Terminalia chebula, belerica* and *citrina* (called also Gallnuts) are oval fruits of a dingy yellow colour, containing much tannin ; hence, they are useful to the tanner as well as the dyer. With alum, this dye yields a good durable yellow, and with salts of iron, a black colour, little inferior to that produced by Oak Galls. The Myrobolans although a very common dyeing and tanning material of this country from time immemorial, have not been many years introduced into English commerce, but so useful have they been found, that they have become a very important article of trade, and the consumption is now fully 2000 tons annually (Archer).

On this subject, the Canara Local Committee observe as follows. " During the last season a sudden " demand arose for the Gallnut, and large profits were " made by the persons who collected it from the jungles. " The exports for five years have been as follows :"—

Fuslies.		Quantity		Value.		
		Candies	Mds.	Rs.	As.	P.
Fusly	1259.....	207	3	918	,,	,,
	1260.....	380	16	1877	,,	,,
	1261.....	537	19	2860	,,	,,
	1262.....	530	17	2614	,,	,,
	1263.....	2154	4	3029	,,	,,

15. *Ratinara*, a solitary specimen of Lichen with a fragment of the black extractive matter, (in a mass) was forwarded from Nellore. Illustrations of the practical use of this new dye, and a chemical analysis of its constitution are required to enable the Jury to give an opinion of its value.

16. *Casuarina.* An entirely new dyestuff is exhibited by M. Jules Lepiné (late of Pondicherry,) obtained from the bark of the *Casuarina Equisitifolia.*

The manufacturer states that the Extract is fixed by a solution of Bichromate of Potass : with *Alum* as a mordant the Casuarina gives a reddish nankeen colour, with Iron a black colour, and if these mordants are mixed, the result is grey. The Casuarina dye becomes fixed by exposure to air without mordants, a nankeen red is obtained after 30 minutes exposure. At the end of an hour, M. Lepiné states that the colour is not affected by water, alkalies, solar light, or heat. The crystallised Extract and cloth dyed with the Casuarina were laid before the Jury, and the reddish brown colour of the cloth stood the test of washing well. Considering the discovery to be highly creditable to M. Lepiné, the Jury award a 2d Class Medal.

17. *Lac* has been already fully mentioned in Section I. It is largely used as a dye, as will be seen in the Appendix.

The Jury however beg to notice the specimen of Lac Lake prepared by Mr. Flynn, who supplies the following information. "The Lao Lake was prepared by boiling coarsely powdered Rangoon stick lac in several portions of water, until it ceased to yield any colouring matter, a small quantity of Alum was then added to the filtered solution, after a few minutes, a small quantity of Liqr. Potassœ was used to throw down the *Alumina* with the colouring matter, the fluid at the same time being constantly agitated. The precipitate was allowed to settle for a day, the fluid then drawn off and the sediment pressed into cakes and dried in the shade." The Jury award Mr. Flynn Honorable mention.

18. *Cochineal* (from *Chittledroog*) is a small Insect, "*coccus cacti*," which feeds upon different species of Cactus. The cochineal exhibited is "silver grain." It forms a very fine and permanent dye in red, crimson, scarlets. It answers on wool and silk, but not on cotton. It is a most expensive colour, and is rarely in the hands of the dyer, but if supplied to him, he understands the method of using it.

The attention of the East India Company was for many years directed to the production of this dye, but with little success. The insect was with much difficulty procured, and introduced about 50 years ago, and a large quantity was produced under the superintendence of Dr. Anderson, and encouragement held out by the Madras Government, but unfortunately the insect turned out to be the wild species.

What was exported, proved to be small and deficient in colouring matter, and very inferior to any brought from New Spain.

The Court of Directors offered £2000 for the introduction of the true Mexican Cochineal, but this never was accomplished.

Series of Dye Stuffs, shown in the Exhibition.

English Names.	Botanical Names.	Vernacular Names.	Remarks.
Indigo	Indigofera tinctoria	Neelum	Green leaf and dry leaf, about 20 different samples.
Pala Indigo	Wrightia tinctoria	Palay neelum	Exported to England, falling into disuse.
Red Sandal wood	Pterocarpus santalinus	Sevapoo chandanum	Exported in billets.
Sappan wood	Cœsalpinia sappan	Puttengee puttay	Exported in cakes.
Safflower	Carthamus tinctorius	Koosumba	
Turmeric	Curcuma longa	Munjal	
Morinda bark	Morinda Umbellata	Muddy chuckay	The bark and root of these are used.
	citrifolia	Noona chuckay	
	tinctoria	Soorinjee chuckay	
	Ventilago ?	Pupli chuckay	
Pulas flower	Butea frondosa	Porasum poo	
	Cassia tora ?	Tantapoo seeds	
		Malapoo	Flower of a tree, unknown.
	Rottleria tinctoria	Cupla rung	
		Chiragoodoo puttoo	
		Soorool puttay	
Ratinara	Lichen	Ratinara	Forwarded from Nellore.
Wood Turmeric		Mara munjal	Confied to Western Coast.
Chay root	Oldenlandia umbellata	Chaya	
Extract of cassuarina	Casuarina equisetifolia		An entirely new dye.
Bastard Indigo	Tephrosia tinctoria	Calacootee vittaloo	
Arnotto	Bixa orellana	Jabra veray	
	Memecylon tinctorium	Aliakoo or Casau elay	
	Toddalia aculeata	Mirapagandra chuckay	
Marking nut	Semecarpus anacardium	Shain cottay	
Gamboge	Garcinia pictoria	Urshin goorgee	Used sparingly for dyeing cloth in Canara.
Lake prepared from stick lac		Komboo arakoo sevapoo choyam.	
Cochineal insect	Coccus cacti		

APPENDIX.

PROCESS OF DYEING CLOTH PRACTISED BY BALA CHETTY AT MADRAS.

Red Colour.—Dissolve a small quantity of Ashes, procured by burning the milk hedge tree, in water, filter and add an equal quantity of sheep's droppings and Gingeley oil to the solution. Soak the yarn in the mixture twice a day for 20 days, drying the yarn in the sun during the intervals. Wash the yarn white in pure water and dry. Steep it in a mixture of chay root powder, and causa leaf, coarsely powdered, for three successive days, both morning and evening, drying the yarn during the day, steep the yarn again for 5 days (morning and evening) in a mixture of chayroot powder and drying it for 5 successive days and on the 6th night, boil the yarn in a closely covered vessel for 12 hours, and wash it in pure water, on the following morning, when a fast red colour will be found.

Purple. If the yarns dyed by the above process be steeped for some time in a solution of Indigo, a deep purple colour will be produced.

Light Purple.—If white yarn prepared as above detailed, be soaked for 5 successive days, both morning and evening, in a solution of *Soorool Puttay*, dry the yarn in the sun and boil it as prescribed for the red colour, a shade of purple colour will be produced.

Shade of Purple Red.—If the yarn prepared, as for the light purple, be soaked in a solution of Puplichuckay powder a different shade is produced.

Blue Black.—Indigo. If a mixture made of powdered chunam and extract of Thakaravaray (cassia auriculata) be put into an earthen vessel, partly burned in the earth and the yarn steeped in it for 8 days, will produce different shades of black.

Note.—The mixture must be constantly stirred during the process of dyeing.

Sky Blue.—When a light preparation of the mixture, above prescribed is made and the yarn soaked in it 3 times a day, will produce the sky blue colour.

Black.—If white yarn be soaked in a paste made of Kadukay powder (Terminalia chebula) and green vitriol and again steeped in a bath of Tank mud, the yarn will take various shades of black colour—and this will depend upon the intensity of the dye used.

Pink or Rose Colour.—If Powdered Coosumba flower (carthamus tinctorius) be well washed with water and mixed with Applacarum—it is then to be trodden under feet, strain and add, lime juice to it—bleached yarn to be soaked in this mixture and a beautiful rose colour will be produced.

Orange Colour.—Mix Turmeric, powder in water, soak the bleached yarn in this mixture, and dry, soak the yarn again in the Coosumba mixture and an orange colour will be produced.

Yellow Colour.—Mix a quantity of Turmeric powder in water, soak the yarn for 24 hours, squeeze and let it dry, repeat the operation for 4 successive days, then soak the yarn again in a solution of Turmeric powder with Alum, morning and evening, squeeze the yarn and let it dry when a bright yellow colour will be produced.

Straw Colour.—Soak the yarn in a solution of Turmeric powder and water 4 or 5 times, squeeze and steep the yarn again in a solution of lime juice and fresh water for about an hour—squeeze it well, and dry, when a straw colour will be produced.

Green Colour.—Soak the bleached yarn in a solution of Indigo, dry and then steep it in a solution of Turmeric powder and water for 48 hours, wash the yarn in a mixture of lime juice and water and dry it in the shade when a green colour will be produced.

Orange Colour.—Tie a quantity of Annato seeds in a piece of cloth, soak it in water for 12 hours, squeeze the colouring matter out in a basin of fresh water, add cocoanut water, lime juice and alum powder, steep the yarn in the mixture for 4 hours and then boil it for an hour—squeeze and let it dry, when a deep orange colour will be produced.

Bleaching silk.—Steep the silk in a solution of chunam and Dhobys' earth for 24 hours, wash the yarn in fine water and then soak it in Alum for an hour (which is a mordant) and again for 2 hours in a mixture of soap and Indigo when the yarn will be bleached to a white colour, wash and let it dry.

Red Colour.—Tie a quantity of stick lac, coarsely powdered, in a strong cloth and macerate it in warm water, bruising it occasionally with a wooden hammer, till it ceases to yield any colouring matter : add to the liquor a small quantity of Tamarind pulp and Alum powder, boil the silk in this mixture for 2 hours, and wash, when a deep red colour will be produced.

Crimson Colour.—Make a mixture of Chironjee seeds, Buchanania latifolia add a small quantity of Alum and boil the silk (which has been previously bleached and dyed deep red) for an hour squeeze and dry, when a crimson colour will be produced.

Orange Colour.—Make a mixture of Fuller's Earth and Cupla powder, add a smallquantity of Alum and boil the silk (which has been previously bleached and dyed red) for 2 hours, when cold, squeeze and dry, when an orange colour will be produced.

JURY AWARDS.

Class IV.

Section III.

2d Class Medals.

Pro. No.	Cat. No.	Names of Exhibitors.	Object Rewarded.
CCI	53	Messrs. Hart and Simpson.....	Green leaf Indigo.
CCI	54	M. Jules Lepiné (late of Pondicherry)....	Casuarina dye.

Honorable Mention.

Pro. No.	Cat. No.	Names of Exhibitors.	Object Rewarded.
		Messrs. Arbuthnot and Co.....	Green leaf Indigo.
		Mr. G. W. Flynn.....	Lake prepared from Lac.

Section IV.

TANNING MATERIALS.

Sub Jury.

W. E. Underwood, Esq.—*Chairman.*

J. Ouchterlony, Esq.

A. Hunter, Esq., m. d.

H. Cleghorn, Esq., m. d.—*Reporter.*

Associate.

J. Rohde, Esq.

The Manufacture of leather in this Presidency, is by no means so thriving as it might be, considering the great abundance of Tanning materials at command. This is probably owing to the very low rank of the Artisans, *(Chucklers* or *Chumarwallas,)* for the art of leather production is well understood and successfully practised by the European tanners at Pondicherry, Hoonsoor, Guntoor, Bangalore and Madras, the leather being scarcely inferior to that made in Europe.

Goat skins, Sheep skins, Buffalo and Bullock hides are much used and are generally procurable, but are very badly dressed, as may be readily imagined from the excellent description of the usual process given by Mr. Rohde, which accompanied the consignment of leather from Guntoor: indeed, currying the leather being the province of the shoemaker's wife, while manufacturing it for the market belongs to the husband, inferiority of Indian leather may be ascribed to want of skill on the part of the currier, and the use of quicklime.

It is generally acknowledged that there is no better tanning material than Oak bark—but it has been shown in the class of Leather (including saddlery and harness) that similar substances, if treated with care and skill, may be employed with great success, as for instance, Divi Divi, Catechu, Tanghedu Bark, &c., these produce their effects more rapidly, and the leather so manufactured is said to be nearly as durable.

A valuable series of Tanning materials accompanied the leather prepared by Mr. Bowden at Guntoor, and some interesting samples were shown from the Government Tannery, Hoonsoor, with hides tanned by the different barks, which illustrate the practical application of these various substances.

We shall notice them in detail, beginning with the Divi Divi, which comes nearest to Oak bark.

Cœsalpinia coriaria, a considerable tree, introduced from South America, the pods are indifferently called *Libi Divi* and *Dibi Divi* (the last name is most usually adopted) and is said to contain about 50 per cent of Tannin. This valuable tree was propagated from a young plant sent from the Botanical Garden at Calcutta (about 12 years ago,) the quantity available is yet limited, but the Jury are informed that small plantations of it are thriving well at Guntoor, Hoonsoor, Bangalore and Masulipatam.

The average produce of a full grown tree is estimated in the West Indies at 80 pounds, which, deducting 20 pounds for seeds, leaves 60 pounds of tanning material. The tree is found to grow well in dry and sterile ground, and the results of Mr. Bowden's industry abundantly prove the value of this substance to the Tanners and Dyers; the pod being superior to any other material used in our Tanneries.

When leather is tanned throughout with *Divi Divi* it resembles that tanned with Oak bark.

Cassia Auriculata. Turwer, *Hind.* Tanghedu, *Tel.* Avaray puttay, *Tam.* One of the commonest shrubs in the Presidency, and which grows abundantly in the sterile tracts, is of great importance to the tanner, the virtues of this plant are well known to the native Chuckler, who can obtain a large quantity of the bark at a low rate, and with it a soft and durable leather may be turned out. On the whole, it is perhaps the best of our indigenous astringents for this purpose.

Cathartocarpus Fistula, Rella, *Tel.* Kakay, *Can.* likewise abounds in many parts. It is not in equal repute with the Chucklers, the proportion of astringent extract being much smaller, and it is said to thicken the leather, but will probably be found to be well suited to the tanning of hides and butts. It is very probable that other species of Cassia are suitable for the purposes of tanning, but the two preceding species are the most astringent as well as the most abundant.

Acacia Arabica. Acacia or Babool bark. This material makes a good leather under proper management, but in native hands the leather is porous, brittle and ill coloured.

Acacia Catechu. (Terra Japonica.) The well known watery extract of *Acacia Catechu* as well as the extract of *Nauclea Gambir*, forms a good leather of a red or orange colour.

Terminalia Belerica, citrina, &c. (Myrobolans are the dried fruits of a tree, very common in many districts of India; they are derived from several species of *Terminalia.* They are much valued as a tanning material. The Myrobolans are about an inch in length, about the size and shape of a Spanish olive, with an ash yellow coloured pericarp, generally strongly marked with longitudinal wrinkle. They have become a very important item in commerce, but their introduction to general use can only date back about ten years. The imports into England, according to Mr. Poole, now amount to about 1200 tons annually: from Madras, 1853-54, the exports were 4,145 cwt. value 8,447 Rs.

Terminalia chebula.—Huldee Kay, *Tel.* Kadukay, *Tam.* The tender leaves are punctured by an insect, and its eggs deposited therein; hollow galls are subsequently formed, these are powerfully astringent, and make as good ink as oak galls. They also yield to Chintz painters and the Carpet weavers at Ellore the most durable yellow. Mr. Rohde states that it forms perfect leather, but is too expensive for ordinary tanning purposes.

Syzygium Jambolanum.—Neradi Bark has been classed as a tanning substance by Buchanan, in his journey to Mysore, and in the Jury Reports of the Great Exhibition, but it proved a failure even with the careful management of Mr. Bowden.

Azadirachta Indica.—The Neem bark, although containing a powerful bitter, does not seem well suited for tanning purposes.

Acacia Sundra.—Zummi. *Tel.* This Bark has also been tried and was found of no value for tanning purposes.

An Extract of Divi Divi has been forwarded by Captain Blagrave, which possesses valuable properties in the opinion of the Jury, and for which they award a 2d Class Medal.

JURY AWARDS.

2d Class Medal.

Progressive No.	Catalogue. No.	Name of Exhibitor.	Object Rewarded.
cxliv.	7	Capt. Blagrave.	Extract of Divi Divi.

Section v.

FIBROUS SUBSTANCES.

Sub Jury.

The Honorable Walter Elliot, Esq.—*Chairman.*

Lieut. Colonel Balfour, c. b.

Lieut. Colonel T. T. Pears, c. b.

W. E. Underwood, Esq.

J. Ouchterlony, Esq.

J. D. Sim, Esq.

H. Cleghorn, Esq., m. d.

A. Hunter, Esq. m. d.—*Reporter.*

A very extensive and varied collection of fibrous substances has been contributed from all parts of the Presidency. Many of these are already known, and a few of them are cultivated as articles of commerce, but a number of interesting facts have been brought to light which show that Southern India is abundantly supplied with fibrous materials for every description of textile manufacture from the coarsest packing cloth, to the finest cambric, lawn, or muslin. The series also contains a number of novel specimens suited to particular manufactures, but hitherto little employed except for the commonest purposes. A good deal of trouble has been taken by the Local Committees, and by private exhibitors, to make this part of their collections as complete as possible, and in addition to the care bestowed on the preparation of many of the fibres the Jury remark that much trouble and expense have been incurred by some exhibitors, in proving that their contributions are suited to the manufacturing wants of this country.

It would be impossible to say how far the cultivation of fibrous plants might be carried, and what would be the demand for them in this Presidency, if properly prepared for the market; but there is no doubt, that the usual careless and slovenly mode of preparing these materials, has hitherto tended greatly to interfere with their sale in the European market. This fact is very clearly demonstrated, by comparing the samples of one or two of the common fibres prepared in various ways, and exhibited by 20 or 30 different parties. In almost every instance, the relative softness or clearness of the fibre has proved a good criterion of its strength and *vice versa.* The Jury are much indebted to the Principal Commissary of Ordnance, and the Military Board for a valuable series of experiments tried to ascertain the relative strength of the fibrous substances exhibited. (See Report on Ropes sent to the Arsenal to be tested.)

As this collection is one of the most varied and extensive in the Exhibition, some classification will be requisite, but it is not necessary to describe every specimen, as a reference to the printed catalogue will show nearly all that have been contributed. A few samples arrived too late for insertion in the catalogue,

but those which were considered of good quality have been noted in this Report.

The simplest and most scientific classification is that usually followed by Botanists, viz. under the head of *Endogenous* or inside growing plants, (characterised by the absence of bark, by having parallel veins in the leaves, and a single seed leaf,) and *Exogenous* or outside growing plants (characterised by having a true bark—reticulated veins in the leaves, and two cotyledonary or seed leaves.)

Under the head of Endogenous plants yielding fibres may be classed the

Palms.
Aloes and Agaves.
Yucca or Adam's Needle.
Sanseviera, or Marool.
Fourcroya, or gigantic Aloe.
Ananassa or Pine Apple.
Musa or Plantain.
Pandanus or screw pine.
Rushes.
Grasses.
Sedges, &c.

The Exogenous fibrous plants embrace those yielding Cotton and silk cotton, Flax and its substitutes, viz.:

Calotropis, or yercum.
Tylophora asthmatica.
Cryptostegia grandiflora, or Palay.
Damia extensa, or Ootrum.
Hemp—Cannabis Sativa, and its substitutes.
Jute, Corchorus olitorius.
Sunn or Junapum, Crotolaria Juncea.
Ambaree, or Hibiscus cannabinus,
Bendee, or Abelmoschus.
Toothee, or Abutilon.

Barks of Trees, including varieties of Ficus.
Bauhinia.
Grewia.
Dalbergia.
Isora.
Butea.
Vernonia.

and a number of plants which have not yet been identified, but which probably belong to some of the preceding classes:—

Palms.

The most generally useful of this class, is the Cocoanut, or *Cocos nucifera*, which yields the Coir of commerce, prepared from the husk of the fruit. There is a very great difference in the specimens contributed, depending chiefly on the modes of preparation that have been adopted. While many of the samples are clean, pale yellow, and strong, others are coarse, dirty and brittle, from the apparent want of careful preparation.

The modes of cleaning the different fibres will be described at the end of this report, so as to avoid repetition, and to facilitate reference. Good clean coir is contributed by the Tanjore, Travancore, and Cochin local committees. Also from Poodoocotta, Chittledroog, and Cocanada. The best specimens have evidently been prepared from the fresh cocoanut by beating and washing the fibre before it was discolored by the sap. The Tanjore, Cochin and Travancore specimens are sufficiently clean to take dyes, and the ropes made from them are nearly equal in quality. There is a large export trade in coir from the Western Coast, the best of which comes from the Laccadive Islands, and the cocoanut appears to grow more luxuriantly there, than in other parts of this Presidency. The following quantities were exported in 1853-54. Coir and coir rope—cwt. 1,30—1,30,828—828—value 297-639 Rs. A prize has been awarded in another class, to the Canara local committee for some colored flooring mats manufactured from this substance. When carefully prepared and well dyed, it might be applied to finer manufactures.

Borassus flabelliformis, or Palmyra of Europeans. Some clean but brittle fibres are exhibited by the Tinnevelly, Madura and Travancore local committees and well twisted rope accompanies most of the samples, but the material is said to be stiff, brittle, and liable to rot when wet. This substance does not appear to have undergone any preparation, and it contains so much woody fibre, that it is questionable whether it would ever be suited for manufacturing purposes. Its chief uses are for securing thatch and tying bamboos in building native huts, the dried leaves of this plant are used for writing upon with an Iron style, also in thatching, making fans, and light baskets for irrigation.

Elate or *Phoenix Sylvestris*, wild Date. There are only three exhibitors of the leaves of this plant, and these are in a crude unprepared state, or simply split and twisted into rope, its chief uses are for thatching and making light mats, for building huts. The fibres of the leaf stalk are used for cables in the Red Sea.

Caryota urens, the nar of the Indian Sago palm, is exhibited from Cocanada, Nellore, Masulipatam and Travancore. It is much used by the natives for making fishing lines and bow strings, it is very strong, resists water for some time, but is liable to snap if suddenly bent or knotted. It resembles black horse hair and might be employed for similar manufactures.

Calamus rotang.—Among the palms, is also exhibited a sample of what is called the marsh date, the leaves of which are used at Cuddapah for making ropes and mats: this may be the ground rattan, or *Calamus rotang* which grows abundantly in marshy ground, and bears leaves resembling those of the date.

Aloe Family or Liliaceous Plants

Agave Americana, Common American Aloe, Cuttalay, Bramarachasee Nor or Kitha Nara.—Some very fine specimens of this fibre are exhibited by the Tanjore, Travancore, and Nellore local committees, also by Dr. Riddell from Bolarum: Mr. Underwood, Madras: Major Dobbs, Chittledroog: the Lunatic Asylum, Bangalore: Mr. Thorpe, Monegar Choultry, Madras: Assist. Surgeon H. Nott, Tranquebar: Capt. Meadows Taylor, Nizam's Territories: and the Madras School of Arts. In addition to these, there are indifferent and bad specimens of the same fibre, from almost every part of the Presidency. Although this plant is not indigenous, it seems to be one of the most widely diffused in Southern India. It is particularly well suited for cordage, and from the repeated trials which have been made with it (see "Fibrous plants of India" by J. Forbes Royle, M. D. F. R S. 1855. Reports of experiments made in the Arsenal Fort St. George, and the Madras Journal of Arts) there is no doubt that when carefully prepared, the fibre is as strong as Russian hemp. The Aloe fibre now forms an article of export, from the Western Coast; in the year 1853-54, 3,658 cwts. were exported, valued at Rs. 21,506. It was employed for several years, instead of English hemp, in the Arsenal at Madras, but it was ascertained that the fibre was liable to rot, when frequently wet, and its use was discontinued on this account. It has also been tried in the Arsenal as a substitute for tow in packing shot, but is found to be more easily cut.

Further experiments, however, would probably point out some means of overcoming this defect. The Jury are indebted to Mr. Thorpe for pointing out the cause of this defect, viz. its tendency to rot, and to Mr. Underwood for suggesting a means of obviating it. (See process of cleaning the fibres of Agave.)

Agave vivipara.—A good specimen of fibre from this plant is contributed by Dr. Kirkpatrick. It is long in the staple, clean and strong and has been prepared without rotting, by the simple process of beating, scraping and washing. The manufacturo of this and of rope have been introduced as an employment for the Lunatics in the Asylum at Bangalore. The rope finds a ready sale in the bazaar, and pays all the expenses of the manufacture, besides providing a few comforts for the most industrious inmates.

The jury consider Dr. Kirkpatrick entitled to Honorable Mention for the introduction of this useful manufacture.

A specimen of fibre said to be from the *Agave viridis* is exhibited by the Cuddapah Local Committee. It is of fair quality, but not so clean as the last, it is probably the produce of the same plant.

Fourcroya gigantea.—Nearly allied to the Agave, is the Fourcroya or Seemay Cathalay, this fibre is of 5 or 6 feet in length a little finer than the Agave fibre, but possessed of similar properties. Good samples are exhibited by Mr. Jaffray from the Horticultural Garden; by the Bangalore Local Committee; the Madura Local Committee; and the Madras School of Arts. The plant is one of the largest of its class, the leaves often attaining the length of 10 feet, but it is not so abundant as the Agave, though as easily propagated.

Sanseviera Zeylanica. — Marool, Murle, Moorva, Moorghabee, Dant Saga or Sago Nar. This plant appears to abound in most parts of this Presidency, it has narrow striped leaves and resembles the Agave in some of its characters, but produces finer fibres, which are easily separated from the pulp. The best specimens are contributed by the Travancore and Tanjore local Committees, the Madras School of Arts, Mr. Jaffray and Mr. Thorpe: several of the contributions from other localities are discolored from steeping, and one or two are dirty grey and brittle. This fibre has long been known as a useful material for cordage and it is soft, silky and pliant when well prepared. It is sometimes called Bowstring Hemp, and is about equal to the Agave fibre in point of strength; as it is a finer material, it might be applied to a better description of manufactures. The plant is easily propagated and yields a good crop under cultivation. It was tried against Russian Hemp, on board the *Thalia* East Indiaman, when commanded byCaptain Biden, aud was highly approved of; it has also been made into fine cloth. Some good thread, twine, rope, and cord made from this fibre in the Justice's jail, and house of correction are exhibited by Dr. Hunter, along with ropes made from the Agave, Musa, Yucca, and Calotropis fibres.

Yucca Gloriosa.—Adam's needle. This plant yields a strong white fine but rather stiff fibre, suited for the manufacture of cordage, it very soon becomes discolored by steeping, but is not so liable to rot as some of the other fibres of this kind. Very good specimens are exhibited by Dr. Riddell, Dr. Kirkpatrick and Revd. P. Methuselah; the plant does not appear to be abundant in Southern India, but grows easily and might be propagated to a great extent.

Yucca Aloifolia.—This fibre is white, pliant and strong when well prepared, it resembles the Agave fibre in some respects, but is liable to be discolored by steeping, which the Agave is not. A good specimen of this fibre is exhibited by the Madras School of Industrial Arts; the specimen exhibited by Mr. Jaffray is grey, stiff and chaffy, from too long steeping.

Pine Apple, Bromelia ananas or Ananassa Sativa.

Some very clean and well prepared samples of this fibre are exhibited by Dr. Riddell of Bolarum, from Cocanada, South Arcot and Travancore. The Madras School of Industrial Arts exhibits a series of well dress-

ed and hackled fibres, thread, yarn, twine and tow for string, prepared from the common Pine apple, and the variegated variety introduced a few years ago from Singapore. All the above samples are nearly white, very soft, silky and pliant, and the material seems to be good substitute for flax, as it is known to be strong, durable, and susceptible of fine subdivision—It has also the advantage of being as long in the staple as flax, and it can be worked up with the same machinery. The objection which used to be made to this material, that it would not bleach, has been found to arise from the faulty mode of preparation by steeping, which is resorted to in Manilla and Singapore,—where the fibre is prepared in large quantities. The specimens sent from Travancore and Tranquebar are stiff, hard, dirty, and brittle from steeping.

Pandanus Odoratissimus.

Screw Pine—Keora—Kaldera bush—Thaium, Thaulay Mazalic, Scethay Nar and Umbrella Tree.

The number of names by which plants are known in different districts of India is very confusing. The screw pine is a good instance of this. The only clean specimens of this fibre are exhibited by Mr. Underwood, and the Madras School of Industrial Arts. All the others are discolored by rotting. The leaves of the plant are used by the natives for making mats—baskets and hats. There are extensive manufactories of these articles at Pulicat, Cuddalore and several other localities. The fibre of the leaf is white, soft, and pulpy, but possessed of little strength. It appears to be a good material for the preparation of paper, but ill suited for cordage. The aerial roots are much used as coarse brushes for white washing houses, when beaten with a mallet, they open out like a soft brush.

Rushes, Grasses and Sedges.

Although these substances are extensively used in India for the manufacture of mats, ropes, baskets, and thatching, there is but a poor display of them in the Exhibition. The Travancore Local Committee and the Canara Local Committee exhibit the *Cyperus Textilis*, and a finer kind of grass called kooray or koaray both used for making mats. The celebrated mats of Paulghaut and Cochin are noticed in another class. Several species of Typha, Juncus, and Saccharum are known to abound in this Presidency, and to be applied to useful purposes. The *Phrynium dichotomum* of Bengal is used for making the sital patee mat.

The Saccharum Munja is used in Bengal for making strong ropes for tying up cattle and drawing water.

The S. Sara yields the common Reed Pen of India, specimens of which are exhibited in this class.

A few neat table mats are exhibited from Kimedy, and some teazing brushes made from the roots of a grass called Chepooroo valelloo. These are likely to command a ready sale, if they could be brought prominently to notice. The botanical names of the plants from which they are made are not yet ascertained. Further enquiries are requisite in this department of Raw produce.

Musa Paradisiaca.

Plantain, Banana, Valey. This plant is cultivated everywhere in Southern India. It yields a fine white silky fibre of considerable length, specifically lighter than Hemp, Flax and Aloe fibre by 1-4th or 1-5th and possessing considerable strength. There are numerous varieties of the Plantain, which yield fibres of different qualities, viz.:

Rustaley, superior table plantain.
Poovaley, or small Guindy variety.
Payvaley, a pale ash colored sweet fruit.
Monden, 3 sided coarse fruit.
Shevaley, large red fruit.
Putchay Laden or long curved green fruit.

These varieties as might be expected, yield fibres of very different quality. The only samples in which the different plants are noted, are those contributed by the South Arcot Local Committee, but they are not well cleaned. Very fine specimens of this fibre are contributed by the Local Committees of Masulipatam, Tanjore, Malabar, Canara, Nellore and Travancore. Very carefully prepared Plantain fibre, Hackled Do yarn, string, rope, tow and half stuff for paper are exhibited by the Madras School of Industrial Arts. The same fibre is exhibited from almost every district in the Presidency, and varies in shade and quality according to the method of cleaning that has been adopted. This plant has a particular tendency to rot and to become stiff, brittle and discolored by steeping in the green state, and it has been ascertained by trial that the strength is in proportion to the cleanness of the fibre. If it has been well cleaned, and all the sap quickly removed, it bears immersion in water as well as most other fibres, and is about the same strength as Russian Hemp. The coarse large fruited plantains yield the strongest and thickest fibres, the smaller kinds yield fine fibres, suited for weaving, and if carefully prepared, these have a glossy appearance like silk. This gloss however can only be got by cleaning rapidly, and before the sap has time to stain the fibre, it is soon lost if the plant be steeped in water. By far the greater number of specimens of Plantain fibre exhibited are discolored from steeping, and they have acquired a dull ash grey or brown color, which in this plant is always accompanied by stiffness and brittleness; one or two of the specimens are so brittle as to break when gently rubbed; others are harsh and stiff. Some well made rope, line, and string are exhibited by several of the Local Committees. A 2d Class Medal is awarded for the ropes from Mayaveram in Tanjore, these are clean, strong, silky and well laid up. A 2nd Class Medal

is awarded to Mr. Thorpe for the cleanest and largest bundles of Plantain fibre, prepared in the Monegar Choultry. The Madura Local Committee exhibits fine specimens of fibre cleaned both by the quick process and by soaking, the latter have lost their gloss and are stiff and not so strong as the others.

The Travancore Local Committee exhibits some excellent fibre and rope, the latter very carefully laid up but stiff from over twisting. This kind of rope ought not to be hard spun, as it becomes stiffer when wet and is liable to snap if it gets into a twist or knot. The Plantain fibre being one of the most abundant in India, will be again noticed under the head of Cultivation and cleaning of fibres.

Exogenous Fibrous Plants, or those characterised by having a true bark and reticulated leaves : the most important of this class are the commercial varieties of cotton.

Gossypium Herbaceum, or Parooty, Oopum, Punjee.

There are several exhibitors of this staple of Indian commerce, though few of the samples are in large bales, and a large proportion are too dirty to attract the attention of the mercantile community. The best series of cottons grown from imported seed is that exhibited by Mr. Jaffrey, consisting of samples of Bourbon, Sea Island, New Orleans, Mexican, Brazilian, and American cottons, all of these are carefully selected, well cleaned, and long in the staple, but as prizes have already been awarded for them at the annual exhibition of the Agri-Horticultural Society, they cannot now compete with recently grown samples.

The best bales of Cotton are those exhibited by Messrs. Fischer and Co. grown at Salem from Bourbon seed. This is fine in quality, clean and of good staple. The Jury award a 2nd Class Medal for these bales.

Mr. Meppen also exhibits good samples of New Orleans, Sea Island, and Hybrid cotton grown in the Mysore Government experimental farm at Cuddoor. The two latter are clean, of excellent quality, and of fair staple. The experiments of Mr. Meppen on Hybridising the cotton plants of India and America are worthy of commendation, and the Jury award a 2nd Class Medal for his contributions—some well cleaned cottons are exhibited by the Guntoor and Tanjore Local Committees, and from Chittledroog, but they are short in the staple, and generally coarse in quality.

Some Nankin cotton, of a dark color and rather coarse quality, is exhibited by the Madura Local Committee grown near Dindigul.

There is a very poor display of plain cotton yarns and none deserving of special notice.

Bala Chetty of Madras exhibits a very good series of colored yarns among which the different shades of Red, Purple, Brown, and Orange are very brilliant and clear. A 2nd class medal is awarded for this series.

Some dark colored yarns and thread are exhibited by the Guntoor Local Committee and from Ventapollem.

Silk Cottons.

Small samples of the silk cotton from the *Bombax*, *Ochroma lagopus*, *Calotropis* and *Cryptostegia* are exhibited, but they appear to have been put to no other use than stuffing pillows ; they might be employed for the manufacture of paper, and the silky down of the Cryptostegia being very strong might be applied to some textile manufactures.

Flax.

Flax, *Linum Usitatissimum*. There are but three samples of the true flax exhibited, and they are all stained and badly cleaned. This is to be regretted, as the staple is of good length and the fibre is said to be procurable in large quantities in Goomsoor, and the Nizam's territories, if previous intimation be given to the Cultivators.

Substitutes for Flax.

There is a very good display of fibres resembling flax in appearance and other qualities. One of the most promising of these is the Yercum, *(Calotropis gigantea)* a soft white fibre possessed of great strength, and susceptible of being spun into the finest yarn for Cambric.

Very good well cleaned samples of this fibre are exhibited from a number of districts. The best is a large bundle of carded fibre prepared by Mr. J. F. Crampton of Madras. The jury award a 2nd class medal for this specimen.

Some very good samples of rope and string are exhibited by the Tanjore and Bangalore Local Committees, and of fibre, thread, and cloth by the Cuddapah Local Committee—Bala Chetty of Madras exhibits some fine yarn, and Mr. Underwood some cambric made from this fibre for which a prize is awarded in another class.

The Palay *(Cryptostegia grandiflora)* is another climbing plant, belonging to the same family as the last (viz. the Asclepiadaceae) it yields a very fine strong white fibre, which resembles flax, and is susceptible of being spun into the finest yarn. Mr. Underwood is the only exhibitor of this fibre in the clean state, and spun into yarns of different qualities. It has not yet been woven into cloth, but it appears to be deserving of attention, as the plant is common, and yields a considerable percentage of Fibre. (See Remarks on Cultivation and cleaning of Fibres. The Koorinja, (*Tylophora Asthmatica*) is another plant of the same family, which yields a strong while Silky fibre resembling Flax, a small sample of it is exhibited by the Tanjore Local Committee and is noticed under the substitutes for Flax.

The Ootrum fibre (*Dæmia extensa*) is another promising substitute for Flax which has been noticed

under that head, as exhibited by Captain Meadows Taylor.

Indian Hemp (*Cannabis sativa*) Gunga Nar or Vari Banghy Nara. There are only four exhibitors of this fibre, the best and cleanest sample having been sent from Nellore. This plant does not thrive in Southern India so well as in the North West Provinces, and the colder parts of Bengal; it there produces a strong fibre suited for cordage and weaving, but in Southern India the Fibre deteriorates, and has little strength, it grows best at altitudes of 3 to 7000 feet.

There are a number of Indian plants, which yield good substitutes for Hemp, some of which are extensively cultivated in this Presidency.

Sunn Hemp, (*Crotalaria juncea*) called also—Sunnub, Vuckoonar, Shanal or Jute gramee.

This plant is largely cultivated for the manufacture of Rope, string and gunny bags. It is exhibited from a great many districts, but every specimen has been more or less discolored, and its strength impaired by steeping too long. The best sample is exhibited by the Masulipatam Local Committee. This fibre is not so strong as many others, but it is well suited for the manufacture of gunny bags and paper, and is sometimes sold as Jute; it will be noticed again under the head of cleaning fibres.

The exports from Madras in the year 1850-51 were

Sunn Hemp.....cwt.	2,095
Twine from Do.....cwt.	1,372
Gunny bags.....	58,950

Jute (*Corchorus olitorius.*) The true Jute of Bengal is not exhibited, the most abundant of the Hemp plants of this Presidency, are the species of Hibiscus and Abelmoschus, which appear to thrive in almost every district, and to be cheaply and easily cultivated. The species are sometimes mistaken for each other, and much uncertainty still exists regarding the local names by which they are known. The most common kinds are the *Hibiscus cannabinus*, or sour greens called Poolychay, Ambaree, Palungoo, Googoo, Gonkura, Poonrick, Pooly-manjee and Thella Googoo.

The *Hibiscus Sabdariffa*, or Rozelle, called Yera googoo. Kaserika, Poolychay keera.

Good samples of the Hibiscus vesicarius, or wild Ambaree are exhibited by Captain Meadows Taylor.

H. Vitifolia, H. Lampas, H. Rosa Chinensis and H. Mutabilis are contributed by Mr. Jaffrey and the Madras School of Arts.

The *Abelmoschus esculentus*, Bandikay, Bendee, Vendee, Ambaree. This plant yields long silky fibres possessed of considerable strength and pliancy, well suited for the manufacture of Rope, String, Gunny bags, and Paper, and bearing considerable resemblance to the true Hemp of Europe. There is a great consumption of them in this Presidency, chiefly for Rope and gunny bags, and they are exported to a small extent as Hemp. In the year 1853-54 the following quantity was exported 6,112 cwt. valued at 27,113 Rs. Samples of these fibres are exhibited from a number of districts, but nearly all of them are discolored and their strength much impaired from steeping. They retain their gloss even when very brown and rotten. The best specimens are contributed by Dr. Riddell, Captain M. Taylor, Dr. Kirkpatrick, and from Trivady in Tanjore, Cocanada, and Masulipatam. Some of these appear to have been cleaned without steeping and are of good strength, soft, pliant, whitish yellow in color and very silky.

The *Abelmoschus ficulneus* belonging to the same class also promises to be a useful fibre for gunny bags and paper. The bark contains a large proportion of white reticulated fibre, similar to that obtained from the Mulberry. Mr. Jaffrey exhibits a very good clean sample of this fibre which is of great length, but not very strong. It grows abundantly on the black cotton soil in this presidency.

Nearly allied to this class is the *Abutilon tomentosum*, or Toothee; some small indifferent specimens of which are exhibited from two or three districts. The *Abutilon polyandrum* also yields a silky long fibre resembling Hemp exhibited by Mr. Jaffrey.

Some small samples of Fibres from the Althæa rosea, and varieties of Sida are also exhibited but they do not merit particular attention.

Some good white fibres from the bark of the *Isora Corylifolia* are exhibited by the Madura Local Committee, by Mr. Saldanah and Mr. Jaffrey. The same fibre is called Googull and is made into excellent Ropes at the Training Depot.

Dr. Riddell exhibits fibres of the Grewia Asiatica, G. Tiliæfolia and Maliope grandiflora, but they are coarse and indifferent.

The *Decaschistia Crotonifolia* exhibited by Mr. Jaffrey appears to yield a good fibre. It is to be regretted that no samples of Nettle fibre, Urtica or Boehmeria, have been contributed, as it is known that these abound on the Neilgherries, and other localities, and that they yield a long and silky fibre like the true Rheca or China grass. The *Girardinia Leschenaultiana* figured by Wight (Icon. t. 1976) is frequent all over the higher range of the Neilgherries, the bark yields a fine strong white flax-like fibre, which the Hill people obtain by plunging the plant in hot water to deprive it of its virulently stinging properties, and then peeling the stalks. The textile material so prepared is of great strength, and the Todawars use it as thread.

A large and interesting class of Fibrous substances, which have hitherto attracted but little attention, is the unprepared Barks of Trees, many of these yield a strong and ready substitute for rope, and from the

quantity of Tannin, which some of them contain, they resist moisture, and retain their strength for a long time, with a little care and the employment of simple machinery, excellent ropes, mats and baskets might be prepared from some of these substances, and they would probably find a ready sale for agricultural and commercial purposes. One of the most common of these barks is the *Bauhinia diphylla*, called Authee nar, Yepy, and Apa. This is a strong coarse brown bark of which the Natives make a temporary rope for securing thatch, matting or fences. The barks of several other Bauhinias are used for the same purposes. The Ara nar is the bark of the Bauhinia parvifolia. of which matches for native guns are made. This class also includes the barks of the Banian, Ficus indica or Ala nar, Peepul, Ficus religiosa Arasa nar, Ficus racemosa, Atti nar, Ficus oppositifolia, Bodda nar, Ficus (?) Cullethy nar. The Honorable Mr. Elliot exhibits fibre and cloth made from the bark of the Ficus Tomentosa. We have also the barks of several species of Acacia, as the Babool *(Acacia arabica,)* or karoovalum nar, the white Acacia, or Oday nar, (Acacia Leucophlea,) Velvaila nar, Wrightia tinctoria, and a number of other plants not yet identified.

The trailing roots, twigs, tendrils, and drops of a number of plants are used for the same purposes, and this is a subject well deserving of further enquiry.

On the Cultivation and Cleaning of Fibrous Plants.

Few subjects present a wider or more interesting field for investigation, than the best modes of cultivating and cleaning fibrous plants. Hitherto, these branches of industry have not been carried on in India, with sufficient care or energy, to make profitable returns to the Agriculturist or the merchant. Some very serious faults have been committed in the process of cleaning Indian fibres, which have tended in a great measure to deprive them of their value for manufacturing purposes. In order to save labour, the usual practice has been to steep the plants till the sap and vegetable juices are thoroughly decomposed, and the fibre can then in most instances, be easily beaten or washed out, but this method though applicable to a certain extent, in cold climates, where decomposition takes place slowly, is found to be very injurious to the fibre, and to be almost inapplicable in warm climates, where fermentation often passes into putrefaction within three days, and the decomposed sap acquires acid and other properties which not only deprive the fibres of their strength but discolor them in such a way as to render them quitcunfit for manufacturing purposes. Most vegetable substances contain besides the fibrous tissue, sap, cellular tissue, and a little coloring matter ; the sap consists usually of water, gum, fecula and alkali with occasionally tannin. When plants are dead or dried up, they pass into a red or brown usually streaked with deep yellow and grey. It is often possible to detect a regular succession of colors in the different parts of the same plant, and a few very useful lessons may be drawn from them—1st, that pale yellow or greenish parts of a plant contain fresh, tender fibres—2dly, that deep green parts of a a plant contain fibres in full vigor, and 3dly that red or brown parts indicate that the fibre is past its prime and beginning to decay. In the latter case, the fibre becomes stiff harsh and often brittle. If plants be cut and exposed to the air or steeped in water, the same succession of colors may be observed, while they are drying or passing into decomposition, and these form a criterion by which the value of the fibre may be detected. As soon as a plant is cut, the circulation in its leaves ceases, and a new process is set a going which if carefully watched, will be found to be a beautiful and wise provision for reducing the parts to their primitive elements; the fecula and gum begin to ferment passing first into sugar, then into spirit and lastly into vinegar, the rapidity of the changes is usually in proportion to the water in the sap and the temperature of the air; the drier the plant the more slowly does it usually decay, but if the sap be allowed to dry up in a cut plant, the above changes still go on, though they are less perceptible, and the plant undergoes another change which is an equally wise provision for reducing it to its pristine elements. It becomes stiff and brittle, light and crumbly, parts falling into dust while the fibre and woody parts often remain to point out how the plant grew, derived its nourishment, and accomplished the ends for which it was created. It is from a careful observation of the laws of vegetable growth and decay, that man has been enabled to take advantage of many of the beautiful vegetable products that lie scatterred about in luxuriant profusion, and in proportion to the pains he takes to observe the laws of nature, and the judgment he displays in applying this acquired knowledge to scientific or useful purposes, so are the results beneficial to the community at large; one man looks perhaps at the Chemistry of vegetation, another merely at the Physiology, while a third considers it useless to waste time with such abstruse studies, and enquires merely what is the mercantile value of fibrous substances, and how cheaply they can be brought into the market. Now all these enquiries have their relative importance but unfortunately for India, scientific and practical researches have not been carried far enough, and mere economy of production has been studied, and as far as most of the fibrous plants have been concerned, the results are anything but satisfactory. It would be as useless as it is uncalled for, to enter into a detailed account of the method of cleaning every kind of plant, but some broad and simple principles may be laid down, which have been found by experience to be applicable to the cleaning of most fibres.

The Cutting of Plants for Fibres.

The leaves, stalks or barks of plants should be cut when in full vigor and of a bright green color—when old, dry or decayed, they yield coarse and stiff fibre—no more should be cut at a time, than can be cleaned within two days, and the cut plants should not be left long exposed to the sun, as the sap dries up, and the process of cleaning then becomes more tedious. The sooner the sap, pulp, and impurities can be removed from the fibre, the cleaner and stronger will it be. The process of rotting plants, or steeping till fermentation takes place, is objectionable in a warm climate, and is now being abandoned even in cold climates, as it discolors the fibres and takes from their strength. Beating, crushing and scraping fibres improves their quality, instead of injuring them, as was at one time supposed. In fact, the more a fresh fibre gets knocked about, provided it is not cut across and rendered too short in the staple, the softer and more pliant does it become. If a plant be well crushed or beaten soon after it is cut, it may be immersed in water for a night and a good deal of the injurious part of the sap will be removed.

The above remarks are applicable to the cleaning of nearly all plants. Some special observations will now be necessary as regards particular classes.

The Palms—Cocoanut Coir.

It has lately been proved that the fibre from the husk of the ripe fruit is greatly improved in quality and appearance by beating, washing, and soaking, and that the old method of steeping in salt water for 18 months or 2 years, is quite unnecessary, and that it produces a harsher and dirtier coir. The Tannin which this substance contains prevents the fibre from rotting, but most of the coir of commerce is a dusty harsh produce, very different from many of the clean and dyed samples exhibited, which are suited to a superior class of manufactures, as fine mats and furniture brushes.

Leaves of the Palms.

These are employed for thatching and making fans, they do not undergo any preparation; a better description of mats for packing purposes might be made, and if kept always on hand would probably find a sale.

Leaf Stalks of the Palms.

These are harsh, stiff and brittle, but if beaten and washed they become softer and whiter; if carefully split and drawn like wire through perforated steel plates, a neat clean and durable basket work might be made from them.

Leaves of the Screw Pine.

Some neat kinds of basket work have been made from this substance, it has also been tried for paper and yields it of good quality, light and strong. Further experiments are required to separate the green parts of the pulp from the white short fibre.

Rushes, Grasses, and Sedges.

A good deal of uncertainty exists regarding the number and the names of the species employed. There is a great difference in the quality of the mats exhibited, but it is uncertain whether this depends upon the treatment of the grass and the modes of splitting it, or on the different qualities of the species employed. The Paulghat and Cochin mats have long been considered the finest.

Liliaceous Plants.

These include the different varieties of Aloe, Agave, Yucca, Foureroya and Sanseviera. These plants are all hardy, and require but little care for their cultivation They are comparatively easily cleaned, and yield good white fibres of considerable length. All that is necessary for cleaning them is to beat or crush the pulp with a common mallet, a pair of crushing cylinders, or a brake, then scrape away the pulp and wash the fibre. There are large exports of Aloe fibre from the Western coast, and the cultivation of these plants might easily be extended on this coast, as it was on a former occasion. (See Report in Records of Military Board on Aloe Ropes supplied to the Arsenal from the years 1797 till 1805.) It was lately ascertained by Mr. Thorpe of Madras, that the Aloe fibre contains a thick, viscid milky juice which remains in the fibre after it has been cleaned and imparts a stiffness to it. This juice can only be removed by hard beating or crushing. Mr. Underwood has invented two simple and effective machines, one a cheap modification of the brake, and the other a grooved cylinder press covered with sheet Iron, by which the juice is removed, and the fibre afterwards becomes soft, pliant and fit for weaving. It is probable that this juice gives the aloe fibre its tendency to rot when much exposed to moisture.

Flax and its Substitutes.

Several experiments are now being tried to improve and extend the culture of Flax from European and country seed. It is found to grow on the Shevaroy Hills, Mysore, Cuddapah in the Nizam's Territories and the Northern Circars. In cultivating Sunn, Hemp or Flax, it is important to remember that the seeds should be sown thickly together, in order that they may shoot up into long wandlike plants, which will yield much longer fibres, and be much less branched than if sown wide and freely exposed. The most promising substitutes for Flax appear to be the Pine Apple, Yercum, Palay, Ootrum and Kooringa. Several of these grow abundantly in Southern India, but experiments are required to test their productiveness and the expense of their culture.

Plantain Fibre.

This plant is extensively cultivated throughout India, but very little attention has been paid to the clean-

ing of its fibres. The plants being cut down and allowed to go to waste. The fibre is easily cleaned, but some simple machinery is requisite, of the description invented by Mr. Underwood, or by Major Maitland, both of which appliances have been found on trial to be efficient. Natives would require to be instructed in the use of these machines, and rewards should be offered for the best bales of fibres exhibited.

Hemp, Jute and Sunn.

Of all Indian fibres, these appear to hold out the best prospects of proving remunerative. They are easily cultivated, and appear to thrive in most parts of the Presidency. Though not so strong as flax and its substitutes, they are suited for cordage, coarse cloth and other manufactures. The demand for them is steady and would probably increase if they were prepared of good quality. They could be cleaned economically by the same machinery as is used for cleaning flax, but the machines would require to be made, and their uses taught to the Natives; liberal encouragement ought to be held out to cultivators and cleaners of the fibres. Further experiments might also be tried on the barks of some other promising plants as the species of Hibiscus, Abutilon, Abelmoschus, Althaea, Ficus, Bauhinia, Grewia, and Wrightia.

Another point of some importance, which still requires to be determined, is whether Tanning or Tarring is the better mode of preserving Cordage, and whether a substitute for tar might not be discovered in some of the numerous Resins and Gum elastics of Southern India.

It should also be borne in mind that it would be more advantageous for India to turn her fibrous substances to profitable account in manufactures, than to allow other nations to reap the benefits of her fertile soil and abundant vegetation.

Alex. Hunter.
Reporter.

LIST OF INDIAN PLANTS YIELDING FIBRES.

Common Name.	Botanical Name.	Uses.
Sara	Saccharum sara	Moonshee's pen, reed grass.
Mat-Grass or Coaray	Cyperus textilis	Used in the manufacture of mats.
Camachy pilloo	Andropogon schœnanthus	Used in thatching.
Moorghee or Marool	Sanseviera Zeylanica	Bow string hemp, abundant along coasts.
Pita in Adam's Needle	Yucca gloriosa	Fibre and Oakum, clean and strong.
	Yucca aloifolia	Clean white and silky.
Pita fibre in great Aloe	Agave Americana	American aloe, now common in every part of India, used for cordage.
Kathalay	Agave Vivipara	Long in the staple, clean and strong, used for cordage.
	Agave Viridis	Not strong do.
Seemay Kathalay	Fourcroya gigantea	White, strong, fit for cordage or paper.
Pine Apple fibre	Ananassa Sativa	Fibres of various kinds, and worked handkerchief, cords of different sizes.
Plantain fibre	Musa paradisiaca	Preserved fruit and meal, fibre, tow, cords, ropes, tarred rope, canvas, worked handkerchief and paper.
Fragrant Screw Pine	Pandanus Odoratissimus	White, good for paper.
Cocoa	Cocos Nucifera	Cocoa mats, cord and ropes.
Palmyra fibre	Borassus flabelliformis	Good colored fibre only fit for basket work or coarse cordage.
Flax	Linum usitatissimum	Flax of commerce.
	Grewia asiatica	Coarse strong bark.
	Do. tiliœfolia	Do.
	Triumfetta angulata	Do.
Jute	Corchorus olitorius	Jute, cloth, gunny bags and rope.
	Do. capsularis	Jute, cloth, gunny bags and rope.
Poolychay fibre	Hibiscus cannabinus	Gunny bags and cordage.
Roselle fibre	Do. Sabdariffa,	Strong and silky.
Wild ambara	Do. Vesicarius	Soft and silky, fit for weaving.
Shoe plant fibre	Do. Rosa chinensis	Clean and silky, fit for cordage.
	Do. Vitifolia	Good color, strong do.
	Do. Lampas	Fit for rope and paper.
	Abelmoschus ficulneus	Good color and long do.
Vendee fibre	Do. esculentus	Strong and clean.
	Decaschistia crotonifolia	Strong, silky and of good color, fit for weaving.
	Abutilon tomentosum	Silky, good color, not strong.
	Do. polyandrum	Silky, stronger than the last, fit for rope.
Toottee	Do. Indicum	Clean and stong, fit for rope.

LIST OF INDIAN PLANTS YIELDING FIBRES.—*Continued.*

Common Name.	Botanical Name.	Uses.
Cotton	Gossypium indicum	Canvas and rope.
Brazil cotton	Do. acuminatum	1½ inch staple, very clean.
Valumbrikai	Isora corylifolia	Strong, white, fit for weaving.
	Erioehlœna Candollii	Dark color, fit for rope.
	Guazuma tomentosa	Slightly woody, only fit for rope.
Brown hemp	Butea frondosa	Gunny bags.
Sunn, or wuekoo nar	Crotolaria juncea	Strong, clean, fit for cordage and weaving.
	Do. tenuifolia	Stained but strong.
	Sesbania cannabina	Fibre and rope.
Malfhun	Bauhinia racemosa	Makes strong ropes.
Yepy tree bark	Do. diphylla	Used in Cuddapah, makes strong ropes.
	Do. Vahlii	Do.
Odar fibre	Acacia leucophlœa	Clean, young bark.
Karoovalum nar	Do. arabica	Coarse bark fibres.
Ak, Mudar, or Yereum	Calotropis gigantea.	Fibres clean, a good substitute for flax, fit for cambric cloth and twine.
Ootrum ka bel	Dœmia extensa	Very fine, strong and like flax do.
Koorinja	Tylophora asthmatica	Strong, clean, and resembling the yereum.
Hemp	Cannabis sativa	Very good, clean, strong fibre fit for cordage.
Neilgherry nettle	Girardinia Leschenaultiana	Yields a fine strong flax.
Arasa nar	Ficus religiosa	A coarse fibre for ropes.
Atti nar	Do. racemosa	Dark coarse bark.
Aulamarum nar	Do. indica	Do.
Bodda nara	Do. oppositifolia	Soft fibre, fit for weaving.
Elavum parooty	Salmalia malabarica	Very fair for stuffing pillows.
Coat seeragum	Vernonia anthelmintica	Coarse fibre.
Parunday nar	Cissus quadrangularis.	Dirty uncleaned fibre.
Arengee	Antiaris saccidora	Sacks made of bark for carrying rice.

JURY AWARDS.

Class IV.

Section V.

Fibrous Substances.

2d Class Medals.

Pro. No.	Catal. No.	Names of Exhibitors.	Objects Rewarded.
cxxiv.	218	Messrs. Fisher and Co., Salem.	Bales of Cotton.
clxxvi.	———	Mr. Meppen	Cottons.
ceexlv.	———	Bala Chetty	Colored Yarns.
lxiv.	———	Mr. Thorpe, Monegar Choultry.	Aloe, yereum and Plantain fibres.
lxiv.	171	Mr. Crampton	Yereum Fibre.
lxxiv.	123—126 127	Mr. Horne.	Hemp lines and Coir Rope.
ceexv.	236 to 240	H. Forbes, Esq.	Rope made at Tanjore.

Honorable Mention.

ceexxi.	56—64	Travancore Local Committee.	Fishing lines.
ccxxi.	265 to 297	Mr. Sheddan of Travancore	Fibrous Substances.
clxxvi.	174—205	Dr. Kirkpatriek	For introducing manufacture of Rope in Lunatie Asylum, Bangalore.
lxxxiii	59—114	Madras Local Committee.	For Fibres.
lxiv.	143—170	Mr. Jaffray	Do. do.

Section VI.

Cellular Substances.

Sub-Jury.

Lieutenant-Colonel G. Balfour, C. B., *Chairman.*
Lieutenant-Colonel T. T. Pears, C. B.
J. D. Sim, Esq.
H. Cleghorn, Esq., M. D, *Reporter.*

There are only two substances demanding the attention of the Jury in this Section, *viz.* Cork and "Shola."

Two specimens of cork were exhibited, one good, from the "Western Coast Jungles," by A. Hunter, Esq., and another inferior from Coimbatore, the trees producing the samples are not mentioned. The deeply cracked spongy bark of the "*Bignonia suberosa*" (country-cork tree) yields an inferior kind of cork.

Two samples of pith (Shola, obtained from "*Aeschynomene aspera*") were received from Nellore and Shemogah.

This substance is much used in India for making hats, bottle cases, &c. From its loosely-cellular structure, it is a very bad conductor of heat, and this, together with its great lightness, admirably fits it for the manufacture of hats, as was proved in the late Burmese War.

Shola is also advantageously used for making models of Temples, Houses, &c. which possess all the appearance of ivory. Beautiful specimens of these were exhibited in Class XXX.

Besides these, several light porous woods, such as *Gyrocarpus Jacquini* and *Salmalia Malabarica;* and the fruit of the Baobab used as floats for fishing nets are exhibited.

Section VII.

Timber and Ornamental Woods.

Sub-Jury.

Lieutenant-Colonel G. Balfour, C. B.—*Chairman.*
Lieutenant-Colonel T. T. Pears, C. B.
J. D. Sim, Esq.
H. Cleghorn, Esq., M. D.—*Reporter.*

Associates.

John Rohde, Esq.
Lieutenant French.
Mr. Deschamps.
Mr. Williams.

The importance of this Section of the Exhibition, can scarcely be overrated, in a country like this, for it must be remembered, that the value of wood and timber here, is not to be measured by the estimation in which they are held, in temperate climates. Here, they are not only applied to those economic uses, with which we are all familiar, but they also furnish fuel to all classes, supplying the place of that valuable mineral, coal, which has not yet been found in any quantity within the limits of the Presidency. Besides this, the influence of trees on climate is very considerable, tending as they do, to prevent the too rapid withdrawal of moisture from the soil, a point of great importance in a country, where the heat of the sun is intense, and the supply of water is dependent only upon periodical falls of rain.

The value of timber would be best shown by the vast extent, to which it is employed in the various purposes of life. It is impossible to ascertain the amount used in this country, but the quantity of firewood alone imported by sea into Madras during 5 years is given below, that for 1849-50 being estimated by the Military Board to be equal to 12,000 tons.

Years.	Billets.	Value Rs.
1845-46	63,61,816	32,536
1846-47	42,77,013	22,746
1847-48	56,78,794	31,974
1848-49	104,75,590	58,026
1849-50	98,51,050	66,101

The above is exclusive of imports by Cochrane's Canal, and the trunk roads which the Military Board estimated at upwards of 85,000 tons per annum.

The trade Reports of this Presidency show that the exports of the following 5 woods alone, amounted in value to 3,84,000 Rupees in 1854, viz.—

Sandalwood,	ewt.	11,684	137,944
Redwood,	,,	47,431	59,570
Sappanwood	,,	5,248	15,350
Ebonywood,	,,		4,859
Teak,	,,		216,368

These returns are all the Jury have at command, but they may mention that the imports of timber into great Britain alone in 1850, amounted to ten millions of cubic feet. From these facts, may be deduced the great importance of endeavouring to ascertain first, which is the best kind of timber for each particular purpose, and 2d, whence the supply can be obtained with the greatest certainty and economy.

The number of individual contributors in this division is, as might be expected, small, but the specimens sent are numerous, and include many objects of great value and interest. It is evidently impossible for the Jury in their report to remark in detail on each specimen, which has come under their consideration. They have therefore referred to the lists of the different collections, published in the General Catalogue, and, for facility of reference, they have drawn up a Classified List, of 155 woods, containing in a condensed form, all the information within their reach. To this, therefore, the Jury solicit the attention of those, who either for practical purposes, or as a branch of scientific enquiry, feel an interest in this important subject. The Jury will limit themselves to a few general observations on each collection, to a statement of the grounds, on which they have adjudged the awards recommended by them, and to a brief notice of those points, to which in the ensuing exhibition, the particular attention of contributors should be invited.

Travancore.—The collection of woods, forwarded by the Committee of Travancore, is the most numerous (158 specimens) and best selected, and for these reasons, the Jury consider it deserving of a *First Class Medal.*

Among the many interesting specimens, which this collection includes, the Jury would draw attention to one of a tree, undoubtedly of the Cedar family, and named, though doubtfully, " Cedrela Toona."

The specimen is of considerable size, the outer wood is whitish in colour, and of little use, but the internal portion, forming about 2-3rds of the entire trunk, is close grained, hard, of a rich dark red, and takes a high polish. The tree is stated to be abundant, 25 miles Nort East of Trivandrum, and to yield planks from 2 to 3 feet in diameter, and the Jury are informed by competent practical advisers that it promises to be a good substitute for Mahogany.

2. *Mr. A. T. Jaffray.*—The collection which ranks next, in the opinion of the Jury, is one contributed by Mr. A. T. Jaffray, Superintendent of the Horticultural Gardens at Madras. The specimens, 88 in number (with one or two exceptions,) were obtained from the Gardens under his management, as a necessary consequence, they are of small size and chiefly of sapwood, but this defect is counterbalanced by their careful Botanical nomenclature, a point in which the other collections are unfortunately deficient: a few of the large Timber trees, for the same reason, have no representative in this miniature collection, which is, however, rich in many

new and interesting introduced woods, such as "Lignum vitæ," "Mahogany, Logwood, &c." The specimens are well prepared, showing the horizontal as well as vertical section of each tree, the bark being in all cases retained. The Jury recommend the award of a 2nd Class Medal to Mr. Jaffrey, and they would submit that his collection, or one prepared in the same manner, of full grown trees, would be valuable to the Government, as an index to the specimens in its possession, which show only the timber without any guide to the external appearance and character of each tree.

3. The *Tinnevelly* collection is numerous containing 63 specimens, in the form of "truncheons." The native names are all carefully given; from the short period allowed for preparation, the specimens are necessarily unseasoned, and many of them are sapwood, but the collection deserves Honorable Mention, and gives a good idea of the resources of the Southern portion of the Peninsula.

The *Mysore* territory which forms the central portion of Southern India, and occupies a generally high level is well represented in the collections of Captain Miller, Assistant Commissary General, of Captain Gustard, Superintendent of Coorg, of Mr. Apothecary Xavier, and of Dr. Cleghorn.

4. *Captain Miller's* contribution contains 67 specimens, in the shape of truncheons, with the Canarese and Botanical names attached, though the accuracy of the latter is in some cases doubtful, for this collection the Jury award Honorable Mention.

5. The *Coorg* collection is numerically small, considering the vast forests in that territory. They are however, excellent samples, in regard to size and preparation, being cut from sound heart-wood, and well adapted for testing the working qualities of each tree.

6. *Mr. Xavier's* contribution contains 56 specimens accompanied with an account of the general uses, and local distribution of each tree, altogether reflecting great credit on that exhibitor; its deficiencies being obviously attributable to his limited resources, and the Jury award Honorable Mention.

7. *Dr. Cleghorn's* collection was made about 8 years ago. It consists of small thin slabs of 43 different kinds of woods carefully selected from trees of full growth. From the size of the specimens, the utility of the woods for building, and other such purposes cannot of course be tested, but the collection is of value, from its showing well the grain of the different woods, and their adaptation for cabinet purposes. The Jury would specially remark the Michelia Rheedii, (*Wight*) Sumpaghymara, which yields a pretty olive colored mottled wood, close grained, without being heavy, and well suited for cabinet making.

8. *Mr. Rohde.* The Jury are indebted to Mr. Rohde for six specimens of wood, the highly ornamental character of which, is well displayed, to many, probably for the first time. They are turned into cylinders, which form seems well suited for displaying the character of the wood, and its suitability for cabinet purposes. The Jury would point to the Tamarind and Margosa trees, which abound in every part of the country, and by Mr. Rohde's skilful treatment, are shown to be suited for the most ornamental as well as the commonest purposes.

9. *Hyderabad.* The Jury would next notice the collection received from Hyderabad, from which some knowledge may be gained of the resources of the territories of His Highness the Nizam. The specimens are in a rough state, but obtained generally from trees of mature growth. The collection contains several woods of great promise, now probably used only for fire wood, and shows the need of a careful and systematic enquiry into the resources of this large tract of country. The Jury have only to refer to the fact that timber is now imported from Rangoon for the building of Churches and Barracks at Secunderabad. Monsieur Deschamps who favoured the Jury with his counsel produced a specimen of an unknown wood, procured from the Deccan, and eminently suited from its great beauty to the purposes of the cabinet maker.

10. The Jury have before them a few specimens from Rajahmundry, Nellore, and Masulipatam. They can scarcely be termed collections, but are interesting and useful and deserve Mention here. The jury are aware that little time was allowed to the Local Committees for the collection of specimens, and even that little was not exclusively available for any one of the important subjects which the Exhibition embraces. The Jury regret that they are compelled to pass, almost without remark, a large collection from Ganjam. It has evidently been collected with much labour, but as the specimens consist chiefly of young sapwood, and moreover sustained injury in transit, the Jury are unable to form a judgment of its value. The tract of country which this collection embraces, is known to be rich in woods, and as the province has a long Sea coast, with facilities of water carriage from the interior, the expense of transit would probably not be such, as to throw its resources out of the market. The Jury here had the advantage of referring to the valuable collection of woods, made many years ago, by the late Colonel Frith, and now exhibited by the Military Board. A duplicate of this collection is lodged in the United Service Museum, London, and a list of the specimens is given in the Jury Reports of the London Exhibition of 1851. The Jury would submit with reference to this well known collection, that as many of the specimens are of sapwood, it does not in all cases furnish a fair criterion, whereby to test, and identify subsequent collections. The Jury would in conclusion, briefly notice some single specimens of peculiar merit.

The first is a very large plank contributed by Capt. Cunningham of the Mysore Commission, obtained from *Michelia Rheedii* (Sumpaghy). The extraordinary di-

mensions, (length 11½ feet, breadth 4½ feet, thickness 3 inches,) which the tree assumes, though rarely, and the ornamental character of the wood, are well shown in this specimen, which may with justice be declared *unique*. The Jury considering the rarity of such specimen, together with the expense and difficulty of its preparation and transmission, beg to recommend that a Second Class Medal be awarded to Captain Cunningham. The second specimen referred to, is a large and well seasoned plank of Moulmein Teak contributed by H. W. Porteous, Esq. (Dimensions 10½ feet in length 3¾ in breath, 1½ inch thick) to whom the Jury feel greatly indebted for one of the finest individual specimens contributed to the Collection. It must not be supposed, that timber of such dimensions as the two above mentioned is often procurable, but the specimens are valuable, as showing what magnitude these trees can attain under favorable circumstances.

Another specimen which the Jury would notice is a slab of Kyabooca wood, imported from Singapore and exhibited by J. Sanderson, Esq. A small portion is polished, and shows well the highly ornamental appearance of the timber in its marking. The specimen exhibits the very knotty character and curly fibres of the wood, from which pieces of even a foot square free from flaws, can rarely be obtained. The Botanical name of the tree has not yet been determined with certainty, although it is generally believed to be "*Pterospermum Indicum.*" The Jury remark also two specimens of a somewhat rare wood. "Sassafras" both from Mergui. The wood is very fragrant, and contains an essential oil of value in medicine.

Another fragrant wood the "aguil," contributed by M. Nursing Row of Shemogah, also deserves mention. The Jury understand that the wood is sold by weight, and is prized next to Sandalwood by Natives. There is reason to believe, that this is the "Aloexylon Agallocha" the Lign Aloes of Scripture. The habitat of the tree has not been ascertained although it is supposed to have been brought from the Malayan Peninsula. The Jury beg to recommend a 2d Class Medal.

The Jury have looked in vain for any wood likely to answer the purposes of English or Turkish box, the most generally useful in Europe of all the hard woods. It is more than probable that its equal for many, if not all the purposes, to which it is applied, is to be found among the less known shrubs or small trees of our jungles, and it appears to the Jury, worthy of consideration whether a Medal or Prize should not be specially offered to any one, who shall exhibit and prove to the satisfaction of competent persons, the like properties in any abundant Indian tree. To prevent misapprehension, it may be desirable to state, that uniformity of structure and considerable toughness, hardness and retention of any sharp angles to which it may be cut, (whether on the end or on the side,) are essential properties; colour, except for certain purposes, is of little consequence.

The Jury must not omit to acknowledge the valuable aid cheerfully accorded to them, by Mr. Rohde, Lieut. French, Monsieur Deshamps, and Mr. Williams, in all matters requiring special practical knowledge and experience. They have also availed themselves of the very useful treatise on "Turning and Mechanical Manipulation" by Mr. Holtzapfell of Long Acre, with botanical notes by Dr. Royle, and "Observations on the Forest trees of S. India" by Dr. R. Wight, with practical notes by Mr. Rohde; these are the most reliable works for reference on this most important subject.

The Jury regard the subject of the Woods of India, as in all respects so highly important, that they venture to make a few suggestions regarding the collection, &c. of specimens, in the hope, that the deficiencies of the present Exhibition, may be remedied, and the labour and expense which many of the contributors have incurred, may not again be neutralized by the want of some particular information, or the neglect of some little precaution.

The Jury have endeavoured to make the most of the materials at their command, and have spared no pains to obtain the most authentic information within their reach, upon a subject confessedly difficult, but a comparison of their report with the numerical lists of specimens, will show how large a number of the samples are of little practical value, from the causes above noticed. They will now briefly mention the points to which contributors should pay special attention.

Nomenclature. Most of the woods, in general use, have a variety of names, and much confusion arises from this circumstance. There is first the *local* name, varying often in the same district. This should always be given, in the native character, whether Tamil, Teloogoo, Hindustanee, &c. Many woods have also a *commercial* name, by which they are known in the Market, as "Trincomallee" wood, "Coromandel" wood, &c. These names are sometimes derived from the place of export, but often it is impossible to trace their derivation. If this name is known, it should also be given, as it is very desirable to identify some valuable woods known in Europe, only by their commercial name. Lastly, there is the *Botanical* name, the sure determination of which is a matter of the first importance, for if this be known the tree can be identified with certainty, all over the world. It is very necessary, therefore, that the means of determining this should be furnished with each specimen. A small shoot bearing flowers, fruit and full grown leaves, either together or separately, pressed flat and dried, so as to be fixed on a sheet of paper, is such a specimen as is required, and if it comprehends all these parts, is a representation of the largest tree, in the forest, and gives a sufficient idea of the plant to the Botanist, to enable him to find its place in the

Systema Vegetabilium. The fruit and seeds sometimes, will not bear compression, in that case, they should be sent separately. Succulent fruits are best preserved in a strong solution of salt. It is important to observe how the specimens should be marked. Paper labels are unsafe, writing on cadjan leaves is less liable to be defaced, but the woods should in addition to a label be cut or branded with a number. The Botanical specimens should be securely sewn up or pasted in a paper bag with a corresponding number.

Size, &c. of the Specimens.

For a complete collection, there should be several of each wood from various localities. 1st. A horizontal section of the tree with the bark complete, and about 3 inches thick. 2d. A plank about 3 inches thick, and about 3 feet long, cut from the log about half way between the pith and heart, the bark, sapwood, &c. being retained. 3d. Two or three bars about 2 feet 6 inches long, 2¼ inches square (if the plant grows so much) cut from the sound wood. 4th. A turned cylinder of hard or ornamental woods, 1 foot long and 3 inches in diameter.

The use of the above specimens is obvious, the first shows the character of the entire timber, having sufficient to illustrate this, the 2d shows the value of the wood for carpentry, &c., the 3d enables trials to be made of the strength of the wood, its power of supporting weight, its deflection, &c., the 4th shows its ornamental nature and suitability for turnery. These specimens should be planed smooth at each extremity, but neither varnished nor polished.

But the value of wood depends much on its age, the young tree possesses strength and elasticity in the greater degree; when mature, i. e. when it would shortly cease to increase in diameter, as it increases in age it acquires its maximum of stiffness and durability, in its aged state, it will also probably best suit the purposes of the Cabinet Maker. The grain of the wood depends also greatly on the nature of the soil, being generally straight and open in a tree growing rapidly, on a rich, and the reverse in a poor soil. In some cases, specimens of the root of the same tree in different stages of growth, would be very serviceable as affording wood of great resisting power for furniture, thus the root of a healthy Oak is prepared for spokes of wheels, while veneers from the root of an aged specimen, often bear a high value for Cabinet purposes. The objects for which the wood seems adapted must be a guide to the collector in the choice of these forms.

The Jury need scarcely remark that specimens in the above forms are not required of all woods, but only of new, little known or valuable species. It would be a waste of time, labour and expense to have specimens in these forms, sent from every district, of the Tamarind, the Mango, or other such trees of common occurrence every where, but new species or those little known or little used, should be thus sent, and then all that is required, can once for all be ascertained with certainty and precision.

General Information.

As the specimens above recommended will sufficiently show the character of the wood, little information is requisite on that point, but there are others to which attention should be directed.

I. The uses to which the several parts of the tree is applied, and those for which experienced Natives consider it especially adapted.

II. Its distribution in the District, the localities where the best is procurable with the nature of the subsoil, the distance from the nearest seaport, or town of any size, whether water carriage is available?

III. The extent of supply, whether this is increasing by self sown seedlings or fresh plantations, &c. or decreasing? the average size in height, and circumference of the mature tree, its character, whether straight or crooked, the average length, &c. of the logs or planks the time required for seasoning, and the amount of seasoned timber generally procurable.

IV. The age at which the tree reaches maturity, i. e. when increasing age brings no further increase of diameter. This is a point of great importance, though hitherto quite neglected in this country, for on it depends the relative value of trees for planting. Thus, supposing there are two species of trees, of equal value as regards timber, &c., but one attains maturity in 25, while the other requires 35 years, it is obvious that the first is much the more valuable of the two: its money value being realised 10 years sooner. The Jury would lastly remark that, in every case, the information given should be precise. If any doubt attaches to any point, let that be fairly stated, for it is undeniable that much of the confusion now existing owes its origin to doubtful information, being given without any indication of its real value, and being too readily assumed to be an ascertained fact, whereas had the doubt been mentioned, enquiry might have been made, and the error, if it were one, detected at the outset. In all cases, therefore, writers ought to state whence the information has been obtained? and how far it can be depended upon?

Every effort should at the same time be made to test the intelligence given by one individual, by enquiries from others, &c.

The Jury trust that their remarks will not deter parties from sending good specimens merely because all the information above required, cannot be furnished. Their intention in giving these hints, will be quite misunderstood, if such is the case, for these remarks owe their origin to the fact, that above 200 specimens now before them, collected with much labor, time and expense are practically useless, to the disappointment equally of the disinterested contributors and the public.

The Jury beg to append a List of Woods authorized to be used as Railway sleepers, and now under trial on the Madras Line.

1—Teak . . . . . Tectona grandis.
2—Saul . . . . . Vatica robusta.
3—Sissoo . . . . . Dalbergia sissoo.
4—Pedawk . . . . . Pterocarpus Indicus.
5—Kurkuttah . . . . . Zizyphus glabrata.
6—Kurrah Murdah . . . . . Terminalia glabra.
7—Maroothy Marum . . . . Terminalia alata.
8—Aucha Marum . . . . . Bauhinia diphylla.
9—Vangay Marum . . . . . Pterocarpus marsupium.
10—Kadookay Marum . . . . Terminalia chebula.
11—Neenec Marum . . . . . .
12—Myladee Marum . . . . .
13—Sem Marum . . . . . Soymida Febrifuga.
14—Curroo Vangay or Chella Woongah Marum } Acacia odoratissima.
15—Perumbay Marum . . . . Prosopis spicigera.
16—Erroovaloo Marum . . . . Inga Xylocarpa.
17—Vel Vangay Marum . . . . Acacia speciosa.
18—Peela Marum . . . . . Artocarpus integrifolia.
19—Dud Eloopa Marum . . Bassia longifolia.
20—Karvalum Marum . . . . . Acacia arabica.
21—Coombadree . . . . . .
22—Katoovoye Marum . . . . . .

JURY AWARDS.

Class IV.

1st Class Medal.

Progressive. No.	Catalogue. No.	Names of Exhibitors.	Object rewarded.
CCXXI	289 to 451	Local Committee Travancore	Collection of Woods.

2nd Class Medals.

XIV	7 to 94	Mr. A. T. Jaffrey	Collection of woods.
CLXXIII	240	Capt. Cunningham	Sumpagay wood.
CXCVII		M. P. Nursing Row (Shemogah.)	Aguil wood.

Honorable Mention.

LXIII		Local Committee, Tinnevelly	Collection of woods.
CLXXX	122 to 188	Capt. Miller, Assistant Commissary General.	Do.
CLXXIII	233 to 287	Mr. Xavier	Do.

Classified List of Woods, native, or grown in the Madras Presidency.

1. Acacia arabica, Babool, *Eng.* Baboola, *Hind.* Curvala, *Tam.* Nulla toomma curra, *Tel.*—This very hard tough wood is extensively used, but cannot be obtained of large size, and is generally very crooked. It is used for plough shares, naves of wheels, &c., and generally for all purposes, for which a bent hard wood is required. It makes excellent tent pegs.

The tree is found in every district, and is worthy of cultivation on account of its gum, timber, and its seeds, a favorite food of sheep, &c. It is of rapid growth, and requires no water, flourishing in dry arid plains, and especially in black cotton soil, where other trees are rarely met with. The bark is extensively used for tanning, and gives a reddish tinge to the leather. Wight No. 19, Coimbatore, Bangalore, 2,310, Paulghaut, 5, Madras, 2, Masulipatam, Canara, Hyderabad.

2. Acacia catechu, Khcir, *Hind.* Wodahalay, *Tam.*—The wood of this tree is less hard and durable than that of the other *Acacias*. The tree is small, and occurs more frequently in the Deccan than in the Carnatic. The watery extract (kut) is largely manufactured. Wight No. 124, Coimbatore, Travancore 371, Canara.

3. Acacia leucophlœa, Velvaila, *Tam.* Tella toomma, *Tel.* Kikar, *Hind.*—A good dark coloured wood, but generally small. The specific name is given from the whitish colour of the bark, which is used in distilling arrack. This Acacia is easily distinguished by its panicled globular inflorescence and stipulary thorns. Wight No. 115, Tinnevelly 3.

4. Acacia odoratissima, Caroovangay *Tam.* A strong and heavy wood of rapid growth attaining considerable size, and well suited for naves and fellows of wheels. The tree is abundant, and grows in almost any soil. The grain is ornamental but rather open. Wight No. 18,89, Coimbatore, Travancore 283,783, Paulghaut, 32, Palamcottah, 230,231,251, Bellary, 239.

5. Acacia speciosa, Dirisana, *Tel.* Velvangay, *Tam.* A very serviceable timber, easily procured at Madras, this is the A. *sirissa*, which is extensively planted along the Ganges Canal. The tree is of large size and rapid growth, the wood of light colour, durable and very hard. Wight No. 116, Coimbatore, Tinnevelly 1? Guntoor, Hyderabad.

6. Acacia sundra, Currangally, *Tam.*—A very hard, heavy and durable wood, used for posts and rice pestles. The tree is rather large and abundant, but the wood is not generally to be obtained in the market in planks of any size. At Guntoor, Mr. Rohde states that posts 5 feet long, are procurable, at 12 Rs. per 100, these are well suited for fencing, though the non-elastic nature of the wood is unfavorable to the holding of nails driven into it. The natives regard it as the most durable wood for posts in house building. Wight No.

13, Coimbatore, Travancore 260, Paulghaut 1, Hyderabad.

7. Adansonia digitata, Baobab-tree.—Papara poolimarum, *Tam.*—A tree of immense girth, introduced from Africa, but now found all over the Presidency, the leaves are eaten, and the fruit is used as a float, but the wood is useless, being light, open and perishable. Hort. Garden 1.

8. Adenanthera pavonina. Wood hard, durable, red, yielding a dye, not procurable generally in any quantity. The tree is of handsome appearance. Hort. Garden 2.

9. Agati grandiflora, Agathy *Tam.* Avisi or Agisi *Tel.*—A very common tree of rapid growth, cultivated for the sake of its flowers and pods, both of which are eaten by the natives. Wood quite worthless. Hort. Garden No. 77.

10. Ailanthus excelsa, Peddu man *Tel.* Peru marum *Tam.* A large tree, resembling the ash in general appearance, wood light and white, used for making sword handles, &c. Wight No. 71, Travancore 375.

11. Alangium decapetalum, Alinjee Marum *Tam.*—Anisarooly Mara *Can.* Akola, *Hind.* The wood is said by Roxburgh to be "beautiful," and Wight found it to sustain a weight of 310 lbs. but he had never seen a ten *inch* plank. The jury have no means of verifying these statements, only one specimen having been forwarded to them. Wight No. 3, Coimbatore, Mysore 20-42.

12. Anacardium Occidentale, Cashewnut tree, Cajoo—*Hind.* Jidi memidi *Tel.*—A small handsome tree, a native of the W. Indies, yields a large quantity of transparent gum, which with the nuts is an article of trade, wood said to be useless. Frith Coll.

13. Anona muricata, Sour sop. A fruit tree—wood inferior, Hort. Garden 61.

14. Anona reticulata, Bullock's Heart, Rama Seeta marum *Tam.*—A fruit tree. Idem, Hort. Garden 62.

15. Aquilaria Agallocha—Eagle wood or Aloes wood. Aglay marum *Tam.*—Agar, *Hind.* Contains a fragrant resinous substance. The specimen from Shemogah is green and old, (the two others are yellow, and appear to have been obtained from a different tree.) It remains to identify the tree yielding this odoriferous wood, which is sold by weight, and is reported to have been brought from the Malayan Peninsula. Wight No. 2, Travancore 63, 192, 289, 339, Tinnevelly 42, Shemogah.

16. Areca catechu—Betel nut palm, Sooparee *Hind.* Camoogoo *Tam.*—A palm of remarkably perpendicular growth, attaining a height of 30 or 40 feet with a tuft of feathery leaves at the extreme top, the trunk is only a few inches in diameter, the structure of the wood is like that of palms in general, and might be used in turnery for small objects. The nut is used by the natives with the betel leaf. It is hard and peculiarly streaked, and is used in turnery for small ornamental work. Used in Travancore for spear handles and bows, for which it is well suited being very elastic. Travancore 327.

17. Artocarpus hirsuta—Angelie marum *Tam.*—A large tree used in Travancore for making canoes, &c., the trunk being hollowed out. Rheede figures the tree and praises the timber. It is, the jury understand, confined to the Western Coast. Wight, No. 4, Travancore 197, Mulliatoor 48, Mysore 36, Coorg 12, Cleghorn (Mysore.)

18. Artocarpus incisa—Bread fruit tree. A tree of slow growth, not uncommon in Gardens about Madras. Hort. Garden 15.

19. Artocarpus integrifolia—Jack tree, Pillah *Tam.*—Panasa *Tel.* Alasegana mara *Can.*—Excellent timber, at first yellow, changing to brown, much used for furniture in Ceylon, somewhat resembling Mahogany in colour and appearance, but does not bear great alternations of dryness and moisture, suitable for house carpentry in general. The tree grows rapidly, and the fruit is prized. A very brittle wood when dry. Wight No. 64, Mysore 3, Bangalore 25, Tinnevelly 43, Paulghaut 9, Travancore 200, 256, 287, Coorg 10, Rajahmundry 7-20, Hort. Garden 14, Penang 169, Canara 235, Cleghorn (Mysore.)

20. Atalantia monophylla, Caatyaloo micha marum *Tam.*—A small tree, wood close grained, hard and heavy. It is pale yellow, and if procurable of sufficient size, would be very valuable for cabinet purposes. Wight No. 28 Hort. Garden 47.

21. Averhoa Bilimbi, Bilimbi marum *Tam.*—A small fruit tree, of little value as timber. Hort. Garden 10.

22. Averhoa Carambola, Thamartha marum *Tam.*—A small fruit tree, of little value as timber. Hort. Garden 11.

23. Azadirachta Indica, Neem tree, Vaypum Marum *Tam.*—Vepa Mannoo, *Tel.*—Hard heavy wood, when old, difficult to work, but *beautifully* mottled, as in Mr. Rohde's Specimen. The seed affords a valuable bitter oil. The tree is found every where, attaining a large size in some localities, deserving of attention for ornamental work. Wight No. 108, Coimbatore, Palamcottah 125-6, 255. Mysore 10-11-12, Bangalore 30-3-11 Travancore 90, Guntoor, Paulghaut 12, Masulipatam.

24. Bassia longifolia—Mohwa. *Hind.*—Elooppa Marum *Tam.*—Hippa Mannoo *Tel.*—Good wood for trenails, it is comparatively free from the attacks of the *Teredo navalis*—it is procurable among the logs brought down the Godavery. It is valued for all purposes, in situations where it is not exposed to air, as planking of ships below the water line, frames on which well walls are built &c., (J. R.) Nearly equal to teak but smaller. Much used for construction of Carts at Coimbatore, and in Malabar, where it attains a large size, it is used for spars. (R. W.) A valuable fatty oil is obtained from the

seed. Wight No. 24, Mysore 4-31 Bangalore 23, Palamcottah 259, Travancore, 316 Cleghorn 20.

25. Bauhinia Richardiana—Introduced from Madagascar, of this wood we have no knowledge. The trees in the country being still young. Hort. Garden 58.

26. Bauhinia tomentosa—Caat Attie *Tam.*—A tree of small size, the wood dark brown and hard—not much in use. Bark used as Cordage. Several of the Bauhinias yield dark coloured heavy and durable timber. B. diphylla is the *Yepi* of Nellore, Guntoor and Masulipatam. Wight No. 9, Hort. Garden 59.

27. Bauhinia Variegata—Irkumbalitha mara *Can.*—A beautiful tree with variegated flowers, wood of little use. Mysore 34.

28. Berrya Ammonilla—Trincomallee wood, *Eng.*—Tircanamalay marum, *Tam.*—Introduced from Ceylon, the wood is annually imported from Trincomallee, by which appellation it is known in the market. It is highly esteemed for its lightness and strength, is straight grained—slightly pliant, tough and little affected by the atmosphere, employed in the construction of the Massoola boats of Madras (Wight.)

Used for spokes of Wheels, helves, handles, planes, frames, poles and shafts of Carriages, it is inferior to *Saul* for spokes, and to the Babool for some other purposes, but it is comparatively light and easily worked (Rohde.) The market is still dependent on importation from Ceylon. Hort. Garden 12, Ceylon, Frith Coll.

29. Bignonia suberosa—A very handsome tree with fragrant flowers and spongy bark, which is a very inferior kind of Cork. Hort. Garden 82.

30. Blighia sapida—A native of Guinea, fruit the size of a pear. Wood light and useless. Hort. Garden 38.

31. Borassus flabelliformis—Palmyrah—Panna marum, *Tam.* Tatti chettoo, *Tel.* This tree is very abundant, especially in sandy tracts near the Sea. It is used chiefly for rafters, joists and reapers, when of good age, the timber is very valuable for this purpose, the trunk is split into 4 for rafters, into 8 for reapers, these are dressed with an adze. Jaffna Palmyrahs are famous, and were largely imported in former times. From the structure of the fibres, it splits easily in the direction of its length, but supports a greater cross strain than any other wood : iron nails however, rust rapidly in it.

The fruit and the fusiform roots of the young trees (in the Northern Circars) are used as an article of food by the poorer classes. The leaves are used for thatching and coarse fibre. Jaggery and Toddy are extracted from the Tree, the former is extensively used in the manufacture of Sugar in Vizianagrum and Rajahmundry.

Very neat baskets of Palmyrah leaf are exhibited from Tinnevelly. Wight No. 69, Hort. Garden 73, Travancore 324, Masulipatam.

32. Briedelia spinosa ? Moolloo vangay *Tam.*—Wood not known in Madras, the tree is not uncommon, and attains a considerable size in the alpine jungles. Wight No. 46. Travancore 182.

33. Butea frondosa, Palas, *Sans.*—Dhāk, *Hind.*—Porasum *Tam.*—Thorus mara *Can.*—Moduga chettoo *Tel.*—A common tree thriving well in many parts of the country; flower deep red used as a dye. Many esteem the wood for Gunpowder Charcoal. The field of Plassey took its name from this tree. Wight No. 82, Coimbatore Hort. Gardens 67, Bangalore 62, Paulghaut 35.

34. Cœsalpinia coriaria, the Dibi dibi. The tree was introduced from seed supplied by Dr. Wallich, about 20 years ago, the pods are collected with care, being valuable for tanning purposes. Hort. Gardens 26.

35. Cœsalpinia sappan. The Sappan tree, Puttungay. *Hind.* Isiapangum, Vuttunghy, *Tam.* Used for dyeing, cultivated in Paulghaut for the purpose of dyeing the straw used in mat making (Wight) from its high price for this purpose, not used for Carpentry. Wight No. 104, Coimbatore, Travancore 271 and 157, Tanjore 68, Cuddapah 48, Goa.

36. Calophyllum Inophyllum. Alexandrian Laurel *Eng.* Pinnay marum *Tam.* Wooma mara *Can.* Ponna chettoo *Tel.* A beautiful tree with an appropriate name, very common; a good lamp oil obtained from the seeds, wood coarse grained, strong, durable and ornamental. The tree is worthy of attention, as it grows well in sandy tracts close to the Sea, where few others thrive. Wight No. 73, Bangalore 51, Travancore 72-317, Palamcottah 84, Coorg 9, Hyderabad.

37. Careya arborea. Pailæ marum *Tam.* Budadanedi *Tel.* Cumbia *Can.* Wood useless, the bark serves as cordage, and is used as slow match for guns in N. Circars. Wight No. 65, Hort. Garden 23, Coimbatore.

38. Careya sphœrica. Wood useless, the bark serves as cordage, and is used as slow match for guns in N. Circars. Hort. Garden 22.

39. Caryota urens. Bastard Sago Palm. Ootaly pana *Tam.* Bhynee *Can.* A very ornamental palm, furnishes an inferior kind of Sago and also toddy. Is extensively used under the name of Napiera in Ceylon for rafters which are exceedingly hard and durable. Travancore 325.

40. Casuarina equisitifolia. This tree was introduced about 50 years ago, and is now well established, growing freely and ripening seed in great abundance. In general appearance, it much resembles the Larch Fir,—it grows in 10 years to the height of about 30 feet. It generally grows very straight, and where the main shoot is broken or lopped off, throws out secondary shoots readily and these are usually straight and erect. It thrives best in sandy tracts along the Sea

shore, and it would be desirable to plant it largely on the sand Hills, North and South of Madras where some numbers have already been grown. The wood is reddish in colour, in density and appearance it somewhat resembles Trineomallee. It bears a great strain, is well adapted for posts, and is said to bear submersion in water very well. The bark contains tannin, and a brown dye has lately been extracted from it by M. Jules L'Epine of Pondicherry. On the whole, this tree well deserves extensive cultivation on the sandy tracts, where it grows so readily. Hort. Garden, 13, Frith Col.

41, Cathartocarpus fistula, Koannay marum *Tam.* Rellie *Tel.* A tree of great beauty, when in flower, but generally too small and crooked to yield valuable timber; wood close grained and used for tomtoms, &c. In the Malabar forests, it attains sufficient size for spars of Native vessels (Wight.) The Bark is one of the best for tanning. Wight No. 31, Coimbatore, Hort. Garden, 27, Guntoor.

42. Cathartocarpus Roxbürghii. A highly ornamental tree, in form much resembling the weeping ash. It is at present only to be found in gardens, but the wood is hard and handsomely marked, and may hereafter prove a valuable addition to the timbers of India. Hort. Garden 28.

43. Cedrela Toona, the Toon tree, Toon marum, *Tam.* Toona *Hind.*—Tundu *Can.*—A valuable tree of large size, wood reddish coloured, used all over India in cabinet making, scarcely inferior to mahogany, but lighter and not so close in the grain, often sold here under the general name of "Chittagongwood." It is the most valuable of the woods known by that commercial name. It is said to be abundant in Travancore. It is very deserving of careful enquiry, as to locality, supply, &c. with a view to being brought into more extensive use in this Presidency. The specimen sent by General Cullen shows the grain and polish remarkably well: It is however of a brighter colour, and apparently a denser quality than any met with in the market, inducing a doubt as to its being of the same species. Found in the Mysore and Salem jungles in large quantities, also along the crest of the ghauts from Travancore to Goa. Wight No. 103,126, Travancore.

44. Chickrassa tabularis, Aglay marum. Wood extensively used in cabinet making, also coming under the denomination of "Chittagong wood" being imported from that province, but it is abundant in the mountainous parts of the Peninsula, it makes beautiful and light furniture, but is apt to warp during the season of hot land winds. The wood is well known and easily procured. Wight No. 2, Travancore 265, Cleghorn, Mysore.

45. Chloroxylon swietenia, Satin wood tree, Kodawah porsh *Tam.*—Billu kurra *Tel.*—This tree grows abundantly in the mountainous districts of the Presidency, but seldom attains a large size, occasionally planks of 10 to 15 inches in breadth may be procured. The wood is very close grained, hard and durable, of a light orange colour, takes a fine polish, and is suited for all kinds of ornamental purposes, but is somewhat apt to split. For picture frames, it is nearly equal to American maple. The timber bears submersion well, in some instances it is beautifully feathered. There is this peculiarity, satin wood loses its beauty by age, unless protected by a coat of fine varnish. Wight No. 34, Rajahmundry, Coimbatore, Cleghorn, Mysore.

46. Cicca disticha, Aranelly, Harfaroovri, *Hind.*—A small tree bearing a round acid fruit, the country gooseberry, wood inferior. Hort. Garden 31.

47. Citrus aurantium, Orange tree, Kolinjee marum *Tam.*—The well known orange tree, wood, hard, but not available of any size, or in any quantity. Hort. Garden 65.

48. Cluytia collina, Woadoogoo marum *Tam.*—Wodesha *Tel.*—A small tree, wood red colored, exceedingly hard and durable, but little is known of it. Wight No. 123, Paulghaut 34.

49. Cocos nucifera, Cocoanut tree Tenna marum *Tam.*—Narrel, *Hind.*—Tenkoi chettoo, *Tel.*—Kinghena *Canarese.* This tree thrives well on the sea coast, its uses and produce are well known, the wood is occasionally used for reapers, &c., for which purposes it is inferior to the palmyrah. In Ceylon, however, and on the Western Coast hard and durable rafters are procurable, the Cochin fibres were sent in a large box of this wood, the planks of which are prettily striped and of remarkable size. Hort. Garden 74, Travancore 326, Mysore 15, Penang 166.

50. Cordia latifolia. Wood very inferior, and of small size. Hort. Garden 51.

51. Cyathea arborea, Tree fern. The section of this tree fern displays well the structure of an Acrogenous stem, hollow in the centre, marked on the outside by the scars of the fallen leaves, and showing the elongation of the axis by the junction of the petioles. Wood quite worthless as timber. Hort. Garden 87.

52. Dalbergia latifolia, Blackwood, Eroopoottoo *Tam.*—Bitti *Can.*—A magnificent tree, from which the well known Malabar black wood is obtained, planks 4 feet broad are often procurable, after all the external white wood has been removed: it is heavy and close grained, admitting of fine polish, very much used for furniture. One of the most valuable woods of this Presidency.

Mr. Ouchterlony exhibits his prize coffee in a large box of fine black wood from his Neilgherry Estate. Wight No. 25, Travancore 257, Coorg 7, Paulghaut 24, Cannanore 743, Neilgherries.

53. Dalbergia sissoides, Bittymarum kar Itty or Blackwood. This is a smaller tree than D. latifolia, but more common in the forests, both yield a black wood, and in Madras are indiscriminately called "Rose wood." The wood contains much oil, which unfits it for receiv-

ing paint. Wight No. 21, Travancore 202, Paulghant 7, Canara 117.

54. Dalbergia sissoo, Sissu *Tel.*—Introduced from Bengal at the recommendation of Dr. Wallich, grows to a large size, has been planted on the banks of the Toomboodra, and is thriving wonderfully; it is growing extensively in the cantonment of Masulipatam, as an avenue tree, and has been planted in some places on the banks of the Kistnah Annicut. There are few trees which so much deserve attention, considering its rapid growth, its beauty and its usefulness. Wood hard, strong, tenacious, and compact, whilst its great durability combines to render it one of the most valuable Timbers known. The tree grows rapidly, is propagated and reared with facility, and it early attains a good working condition of timber. It is used in Bengal for Gun Carriages. Hort. Garden 39, Bengal 84.

55. Dillenia pentagyna. Pinnay Marum. *Tam.* A stately forest tree, common on the face of the W. Ghauts, The wood is said to be exceedingly strong and durable, even when buried under ground; this is believed to be the tree, which furnishes the *poon* spar, so valuable for shipping though *Calophyllum Inophyllum* has hitherto been so considered. Wight No. 74, Coimbatore, Travancore.

56. Diospyros cordifolia. Vuckana Marum. *Tam.* A hard heavy wood, colored dark brown; it is difficult to work. Wight No. 121, Travancore 348, Tinnevelly 30.

57. Diospyros ebenaster. Acha marum. *Tam.* Ebony of very superior quality is procurable in these districts as well as the Northern Circars. Mr. Rohde has received 16 inch planks of a fine uniform black. Ebony is much affected by the weather, on which account European cabinet makers seldom use it except in Veneer.

The tree bearing the name "Achay" at Madras is Bauhinia tomentosa. Wight No. 1, Travancore 258, Coorg 1.

58. Diospyros mabola, (often called "mangosteen") under which name it is cultivated extensively in gardens at Vizagapatam.

59. Diospyros Melanoxylon. Ebony, Toombie marum *Tam.*—The species of Diospyros have this peculiarity that the black heart wood is surrounded by white sapwood. There are several fine specimens of the genus, but the jury are unable to determine the species or verify the names. The subject is important and merits careful elucidation. Hort. Garden 88. Wight No. 102, Coimbatore, Cuddapah (Col.Pears) Hyderabad.

60. Ehretia lævis. Wood of very small size, the wood seems a good one, but the only specimen before the jury is from the Botanical Gardens and a safe judgment cannot be formed upon it. Hort. Gard. 66.

61. Elate sylvestris, Wild Date, Eajata *Can.*—Has the general characteristics of the family, but is inferior to the Palmyrah, Cocoanut, &c. Mysore 43.

62. Emblica officinalis, Emblic Myrabolan, Aoula, *Hind.* Nelly marum *Tam.*—Nelly mara Can. Usirika *Tel.*—A fruit tree, the wood of which would appear to be of service, for making boxes, &c. Travancore 280, Mysore 24-36, Palamcottah 264.

63. Embryopteris glutinifera, Coosharatha mara Toomei *Tel.*—A middling sized tree, the wood is of indifferent quality. The viscid juice of the fruit is used for paying boats, and strengthening fishing nets and lines. Bangalore 34.

64. Eriodendron anfractuosum, White cotton tree, Elava marum. A soft almost worthless wood used for toys, floats, &c. and such purposes. Wight No. 23, Travancore 360.

65. Erythrina indica, Indian Coral tree, Moorkoo marum *Tam.*—Badida chettoo *Tel.*—This is the "Moochee" wood of Madras, soft and only used for toys, light boxes, trays, &c. The varnished toys from the Northern Circars are made of this wood. Wight No. 48, Travancore 377.

66. Euphorbia tirucalli, Milk Hedge, Kulli *Tam.*—Wood light colored, the root of old shrubs is understood to be well adapted for gun stocks, but plants of sufficient age are seldom met with. Wight No. 27, Cowloor Humsagar 31.

67. Euphorbia Litchi. A fruit tree, introduced from China, the Litchi attains a height of 25 to 30 feet but does not ripen its fruit at Madras. Hort. Gard. 18.

68. Eurya longifolia. Hort. Gard. 86.

69. Feronia elephantum. Wood apple, Kait, *Hind.* Veela marum, *Tam.*—Bilvurthitha mara, *Can.*—Velluga Chettoo, *Tel.*—A large tree, widely diffused in India, yielding a hard strong heavy wood, much used at Vizagapatam in House building. Said to be not very durable. Wight No. 107, Mysore 41, Bangalore 58.

70. Ficus glomerata. Rulla kith mara, *Can.*—Mysore 39.

71. Ficus Indica. Banyan Tree, Ala marum, *Tam.*—Ahlada mara, *Canarese.*—Mysore 2, 3, 18, Bangalore 10 Hort. Gard. 4, Cleghorn (Mysore.)

72. Ficus infectoria. Bassari mara. Mysore 29.

73. Ficus nitida. Hort. Gard. 5.

74. Ficus racemosa. Atti mara. Mysore 19, Tinnevelly 52, Travancore 363.

75. Ficus religiosa. The Pippul Tree, Arasa marum, *Tam.*—Ranghy mara, *Can.* Ray aman *Tel.*—A very poor wood, Mysore 49, Bangalore 31.

76. Ficus virens. Goovce manneo, *Tel.*—Masulipatam.

These various species of Ficus are well known, and differ little from each other in their properties. The trees are large and of rapid growth, but the timber is of little value, being light, open and soft. The large drops of the Banyan after being well soaked in water to get rid of the viscid juice are used for Tent poles and such purposes, bird lime is prepared from the fresh juice.

77. Gmelina arborea. Coommy marum, *Tam.*—Goommedee ehettoo, *Tel.*—A large timber tree, growing in mountainous distriets. The wood is light, of a pale yellow eolour, easily worked, and does not shrink or warp, used for pieture frames, deeking small boats, for making venetian blinds, sounding boards, palankeen pannels, gram measures, &e. This tree deserves notiee, it is very eommonly used in the Vizagapatam distriet, for the foundation of wells and other purposes, whieh require it to be submerged in water, where it is remarkably durable. Wight No. 13, Masulipatam.

78. Gossypium aeuminatum. The Peruvian Cotton Plant, a biennial shrub, useless as timber. Hort. Gard. 8.

79. Grewia tiliœfolia. Chadachey marum, *Tam.*—A eonsiderable tree, wood soft, not known at Madras. Wight No. 86, Paulghaut 89.

80. Grewia Sp. Makes good walking stieks. The wood of Grewia salvifolia is also good for the same purpose, and the bark of many speeies yields good fibres. Hort. Gard. 44.

81. Guaiaeum offieiuale. Lignum Vitæ. This shrub has been lately introdueed, and is found to thrive remarkably well, readily flowering and fruiting. Its ehief value is for medieinal purposes, but the wood, about 4 inehes iu diameter, is very hard and elose grained, suited for turning. In time, a supply may be available. Hort. Gard. 9.

82. Guatteria longifolia. Thavatharoo, Asoka ehettoo, *Tel.*—A very handsome ereet growing tree, wood soft and useless. Bangalore 21.

83. Guazuma tomentosa. A tree, pretty eommon about Madras, evidently planted, the fruit is tubereled, about the size of a eherry, introdueed by Dr. Anderson about 70 years ago. Hort. Gard. 85.

83½. Hibiseus lampas, Hort. Gard. 42.

84. Hœmatoxylon Campeehianum, Logwood. This tree has been lately introdueed, the largest as yet much resemble a fine hawthorn tree in habit and size. It grows readily and seeds abundantly, but it remains to be seen whether it will attain a large size in this eountry. It is used only as a dye, and the bark is astringent in a eonsiderable degree. It is a promising tree and deserves attention. Hort. Gard. 71.

85. Hura erepitans. Sand box. A middle sized tree of rapid growth, the trunk is strongly armed, the wood light and useless. The seeds are poisonous. Hort. Gard. 80.

86. Hydnocarpus inebrians. Murravuttay *Tam.*—A large tree, little is known of the wood, the berry is used for poisoning fish. Wight No. 51, Tinnevelly, Travaneore 37.

88. Inga duleis. Sweet Inga or Manilla Tamarind. Seema ehinta *Tel.*—Coorkapooli maram *Tam.*—A most valuable hedge plant, is now used along the line of rail way, the wood is hard. Isolated trees of 12 to 18 inehes diameter are oeeasionally found, these resembles the hawthorn in general appearance. It is the *Pithecolobium dulce*, Benth.

The pulp of the fruit is eatable, the seed was brought from Manilla to Samuleottah, henee the name "Manilla tamarind." The Spaniards introduced the tree to the E. Indies from Mexieo. Masulipatam.

89. Inga xyloearpa, Tangedu mara. Jamboo, *Hind.*—This tree grows to a large size, and is mueh valued for house building, on aeeount of its strength and toughness. It is remarkable for its thiek woody legume, and is the *Xylia dolabriformis* of Benih. Hyderabad.

90. Jatropha multifida. Coralplant. A garden shrub. Hort. Gard. 79.

91. Jonesia asoea. A highly ornamental garden tree, timber not available. Hort. Gard. 3.

92. Kleinhovia hospita. A garden shrub. Hort. Gard. 70.

93. Kydia ealyeina. A middle sized tree, pretty common along the Western Ghauts. Hort. Gard. 69.

94. Lagerstræmia mieroearpa. Benteak. Ventakoo *Can.*—Cuteha eutta marum. *Tam.* A tree of large size with a long straight stem, the timber is of ordinary eharaeter, easily worked and suited for purposes where strength and beauty are not required. Wight No. 20-118, Cannanore 26, Tinnevelly 56, Coorg 2, Travaneore 269, Paulghaut 49.

95. Lawsonia inermis. Hennah. Mendee, *Hind.*—A hedge plant, resembling the English privet, the wood strong and suited for tool handles, tent pegs, &c., the leaves yield the dye used by the natives. Hort. Gard. 33.

96. Malphigia punieifolia. Barbadoes eherry. An ornamental shrub introdueed from the West Indies. Hort. Garden, 25.

97. Mangifera indiea, Mango Tree, Maah marum *Tam.*—Mamadi ehettoo *Tel.*—Mavena *Can.*—A tree of large growth, and generally diffused. The mature wood is dull grey, open, yet durable, if not exposed to wet, of the effeet of whieh it is very sensitive. It is the eheapest wood proeurable here, and used for packing eases, boarding, and rough work in general, Mr. Rohde says it holds a nail faster than any other wood known to him. Wight No. 39, Mysore 17, Bangalore 52, Hort. Garden 57, Cleghorn (Mysore.)

98. Melia azadirach. Margosa. Malay Vaimboo *Tam.*—Taruka vepa *Tel.*—A tree of moderate size and in some loealities of large size. The mature wood is hard, durable and handsomely marked. A valuable oil is made from the seed. Wight No. 41, Bangalore 311, Palameottah 125, 126.

99. Mimusops Elengi. Maghidam *Tam.*—Pogada mannoo *Tel.*—Moogali mara *Can.*—A tree of moderate size, eultivated for the oil obtained from its fragrant flowers. The wood is little known. Wight No. 40,

Mysore 23,33, Nellore 87, Travancore 209 Rajahmundry 54, Hort. Gard. 54.

100. Mimusops hexandra. Pala marum *Tam.*—Frith No. 3.

101. Michelia Rheedii, Sampanghy Marum. *Tam.* A large tree, the wood close grained and very handsomely marked in a mottled manner. It is, the Jury understand, being tried in Bombay for ship building purposes. A remarkably large specimen is exhibited by Captain Cunningham, its dimensions are $11\frac{1}{2}$ feet in length, $4\frac{1}{2}$ feet in breath, and 3 inches in thickness, and is apparently derived from a tree of very great age. The ornamental character of the wood is well shown in a small tablet (No. 38,) contributed by Dr. Cleghorn. Mysore 8, Coorg 5, Travancore 299.

102. Morinda citrifolia, Noana marum, or Munja pavettay. *Tam.* Maddichettoo *Tel.*—A small tree of common occurrence, the wood and root much used for dyeing red, the wood is deep yellow, easily worked and used for common purposes. Wight No. 50,58, Travancore 162,287, Hyderabad.

103. Nauclea Cadamba. Cuddum *Hin.* Vella Cadamba *Tam.*—Rudrakshakamba *Tel.*—A noble tree, wood yellow, used for furniture. Travancore 292, Bengal 16.

104. Nauclea cordifolia. Munja cadamba. *Tam.*—Daduga, *Tel.*—A large tree growing abundantly in the mountainous districts of the Peninsula—wood yellow, rather close grained. It is used for common purposes, and easily worked, but is best suited for work which is sheltered, bedsteads, &c., being much affected by alternation of dry and wet weather. N. parviflora, (neer cadamba) is also frequent in the Western Coast, and is valued for yielding flooring planks, packing boxes, &c. Wight No. 49, Travancore 66-223-288, Palamcottah 242, Bangalore 304.

105. Parkia biglobosa. A very elegant tree of large size, introduced from Africa, the legumes are filled with a farinaceous pulp, the wood is hard and promising, surrounded by an astringent bark. A watery extract has been prepared, but the value of which for tanning purposes has yet to be tested. A supply of timber is not yet procurable. Hort. garden 24.

106. Odina Wodier—Ooday marum *Tam.* Goompina, *Tel.* A large tree, native of mountainous districts, it is grown from cuttings, and planted in avenues, but it yields no shade in the hot weather, being without leaves till June. The wood is difficult to season, but when well seasoned, the central reddish portion is useful for many purposes. Wight No. 5.

107. Oegle marmelos, Bœl *Hind.* Vilva marum *Tam.* Maredu, *Tel.* A thorny tree with ternate leaves, the astringent pulp of the fruit is a valuable remedy in Diarrhœa; the wood is hard, but from the great medicinal value of the tree, the timber is not at present available. Wight No. 119, Mysore 25, Bangalore 41, Canara 23, Hort. Garden 78.

108. Pavetta indica—Pavetty marum, *Tam.* An ornamental shrub 4 or 5 feet high with white flowers, timber very small. Hort. garden.

109. Pimenta vulgaris. The "Allspice" tree, introduced from the West Indies. Several large trees are at Madras, but the climate of the Carnatic does not seem to suit them. Hort. Garden 46.

110. Poinciana regia. A large tree with showy coloured flowers. Introduced from Madagascar, and still confined to gardens. The wood seems good. Hort. Garden 21.

111. Pongamia glabra—Poonga marum *Tam.* This large tree attaining a height of 40 to 50 feet, is very common in S. India, flourishing equally well in the arid plains of the Carnatic, and on the Sub alpine tracts of Mysore.

Oil is made from the seeds. Roxburgh says the wood is light, white and fit for a variety of purposes, here it is used chiefly for fuel. The boughs and leaves are extensively used as manure. Wight No. 78, Travancore, 388, Bangalore, 55.

112. Premna tomentosa—Kolcuttay Teak. *Tam.* A small tree. Wood hard and close grained, of a brownish yellow colour, well fitted for ornamental purposes. Wight No. 35, Travancore 354.

113. Prosopis spicigera—Parumbay, *Tam.* A thorny tree, not uncommon in the black cotton soils, attaining a large size in Mysore. Wood strong, hard, straight grained, and easily worked. The foliage of the tree and the character of the wood, closely resembles that of its congener *Acacia sundra.* Wight No. 84.

114. Psidium pyriferum—Guava tree, Coaya marum, *Tam.* Sebe mara, *Canarese.* The common Guava found every where in gardens, which probably found its way to India from S. America through the Portuguese. Wood small, but very hard, used by Dr. Hunter for wood engraving, and commonly for pegs, mallets, handles of tools, &c. Hort. Garden 29, Mysore, 33, Bangalore, 54, Masulipatam.

115. Pterocarpus Indicus, *Wall.* Padouk, *Burmese.* The "padouk" is a handsome tree with long waving branches and clusters of yellow flowers, which scent the air. It produces very fine timber, and may be considered one of our most valuable forest trees. This species also yields Gum Kino. Hort. Garden 55, Frith.

116. Pterocarpus marsupium—Vangay marum, *Tam.* Whonay, *Can.* Yeangasa, *Tel.* A large handsome tree, widely diffused, yielding one of the most abundant and useful timbers of S. India—when wet, it gives a yellow stain. Mr. Rohde states, that it is better suited for weather boards, exposed venetians, &c., than any other wood he has tried. It is heavier than teak, and more difficult to work. This tree yields the gum kino of commerce which is exported from Malabar. The timber is now being tried for sleepers on the Railway.

Wight No. 117, Cauara 54, Tinnevelly 60, Coorg 4, Paulghaut 36, Coimbatore 16.

117. Pterocarpus santalinus, Red Sanders, Rutta Sandanum. *Hind.* Sevapoo Sandanum. *Tam.* This tree which grows abundantly in the Naggary Hills, yields the "Red Sandal wood" of commerce. It is sold by weight as a dyewood, and forms a regular article of export. It takes a beautiful polish, but the high price of the wood for dyeing purposes, precludes its use as a timber. Wight No. 88, Travancore 262, Canara, Naggary Hills, Mysore. 56, Hort. Gardens, Hyderabad, Cleghorn, (Mysore.)

118. Pterospermum Indicum—Kyabooca. This wood is obtained from the knotty excrescences or burrs of Pterospermum Indicum? it is sawn off in slabs—2 to 4 feet long and 2 to 8 inches thick. It resembles the hue of the yew, is very hard and full of curls—the colour being reddish brown, varying to orange. It is very ornamental, and much esteemed in China, India and England, where it is used for making small boxes, writing desks and other fancy ornamental work. The wood is brought to Singapore by Eastern traders, and is sold by weight. Singapore.

119. Rottlera tinctoria—Cupela, *Hind.* Sarnakasary mara, Chendurapa chettoo, *Tel.* A large tree common in the Deccan and the Northern Circars. The red mealy powder which covers the capsules is used in Mysore to dye silk. Wood soft and inferior. Mysore, 16-26.

120. Salmalia malabarica—Red Cotton tree, Poola marum, *Tam.* Moollelavoo, *Can.* Booraga *Tel.* A large common tree, flowers of a beautiful red colour, the wood light, and spongy used by Moochees in their work, but very inferior. Wight No. 76, Bangalore 16, Tinnevelly 34, Travancore 398, Masulipatam, Hort. Garden, Cleghorn, (Mysore.)

121. Santalum Album—Sandal wood, Shandanum, *Tam.* Gandaga mara, *Can.* This very valuable tree, yielding the sandal wood of commerce, is found in abundance in Coorg and Mysore, and sparingly in Canara. It is usually cut into billets, and disposed of by weight. The uses are well known. The scent is believed to be much modified by peculiarities of soil and elevation. Wight No. 94, Travancore 263, Mysore 1, Coorg 3, Masulipatam, Madras, Hort. Garden 75, Cleghorn, (Mysore.)

122. Sapindus emarginatus—Soap-nut tree, Poocheecottay, *Tam.* A tree met with about villages all over the country. The fruit used as indicated by the native name and sold in all bazaars. Wood white, only used for fuel. In many situations, this tree yields a more profitable return than any other fruit tree. Wight No. 75, Hort. Gardeu.

123. Schmidelia serrata. A straggling shrub, with ternate leaves. Timber very small. Hort. Garden 43.

124 Semicarpus anacardium—Marking-nut tree, Shayng eottay, *Tam.* Bhela, *Hind.* Jadi Chettoo, *Tel.* This common tree is of no value as timber. A considerable quantity of the nuts are exported from the Deccan, and Mysore, as a mordant. The juice is so acrid, that wood cutters are unwilling to cut the tree. Wight No. 95, Mysore 39, Bangalore 1-8, Tinnevelly 29, Travancore 403.

125. Sethia Indica—Thavadarum, *Tam.* When fully grown, it is still a small tree, the fruit yields an oil, and the wood is esteemed as a substitute for Sandal wood. Wight No. 92, Travancore 180, Tinnevelly 31.

127. Soymida febrifuga, Red wood, or Bastard Cedar, Shem Marum or Choar Kullie Marum, *Tam.*—Soymeda, *Tel.* A large tree, tolerably abundant, timber most durable and strong, yet light and easily worked, deserving of attention. Wight No. 1296, Travancore 261, Palameottah 261, Penang 162, Cuddapah 174, China 171, Mergui 105-106, Moulmein 107.

128. Spathodea adenophylla. A small introduced tree. Hort. Garden 53.

129. Spathodea Sp. Hort. Garden 52.

130. Sterculia fœtida. Peenary Marum, *Tam.*—Gurrapa Badum Chettoo, *Tel.* A large tree but chiefly found on the W. Coast and Mysore, where it is applied to a number of useful purposes. This is one of the trees which are believed to furnish the smaller "Poon spars," Hort. Garden 19.

131. Sterculia guttata. A large tree. Hort. Garden 20.

132. Stereospermum suaveolens, Padrie Marum, *Tam.*—Ooloonanthree Mara. *Can.* A middle sized tree with pinnate leaves, and panicled inflorescence, very fragrant wood (according to Wight,) strong and elastic, said to be fitted for making bows. Wight No. 63, Mysore 38.

133. Strychnos nux vomica, Nux Vomica Tree, Yetti Marum *Tam.*—Musidi *Tel.* This well known tree is small, wood white and very hard, used for plough shares. The poisonous fruits are the favorite food of the Buceros Malabaricus or Hornbill. Wight No. 128, Travancore 199,207, Bangalore 43.

134. Strychnos potatorum, Clearing Nut tree, Taita Marum, *Tam.*—Judapa chettoo *Tel.* A larger tree than the above, the fruit is well known as possessing the property of clearing water; wood hard and serviceable, though of small size. Wight No. 98, Bangalore 313.

135. Syzygium jambolanum, Jamoon, *Hind.*—Nawel Marum, *Tam.*—Nœrala Mara, *Can.*—Neradi, *Tel.* A fine large tree of common occurrence, suited for avenues; the fruit small, and somewhat astringent, sold in the bazaars. The wood is much used for ordinary purposes, but is of little value. Travancore 361, Mysore 21,22,37, Masulipatam, Palameottah 247, Bangalore 307, Hort. garden 45.

136. Tamarindus indica, Tamarind-tree, Poolia Marum *Tam.*—Chinta Chettoo, *Tel.*—Oonara Mara, *Can.* A large and very handsome tree, of slow growth; the wood hard, durable and fine veined, but apt to be faulty

in the Centre. The ornamental character of the wood is well shown in the handsome specimen contributed by Mr. Rohde. It is used in the manufacture of Oil and Sugar Mills, and is largely planted around villages for its fruit and shade. Wight No. 77, Mysore 55, Bangalore 7, Guntoor, Masulipatam, Palamcottah 67, 232, Hort. Garden 50.

137. Tecoma Stans. An ornamental garden Shrub. Hort. Garden 6.

138. Tectona grandis, Teak, *Eng.*—Taek marum *Tam.*—Tek Chettoo, *Tel.* A native of the mountainous parts of Malabar, and the country bordering the Godavery, the Moulmein and Rangoon forests. This well known and farfamed tree grows straight and lofty, with cross armed panicles of showy white flowers. It seems to require 80 years to attain perfection. The wood is very hard, but easily worked; it is soon seasoned, and being oily, does not injure iron; and shrinks little. It is probably the most durable timber known, hence its value in Ship-building. The Malabar teak is considered the *best*, and is always most valued in our Government dock yards. A valuable report by Dr. Falconer on the Teak forests of the Tenasserim Coast, was published lately among the selection of Records of the Bengal Government. The price of Teakwood at present is 3 Rs. per cubic foot, double the ordinary rate. It is matter of regret considering the vast importance of teak timber to England, as a maritime nation, that the preservation of the teak forests was so long disregarded. Wight No. 100, Mysore 2, Tinnevelly 2, 9, 63, 27, Coorg 11, Rajahmundry, Paulghaut 3,23, 30, Bangalore 4, Mangalore 15, Travancore 64, 70, 254, Penang 130, 165, Canara 55.

139. Terminalia alata, Marudum marum, *Tam.*—Kooramarthi mara, *Can.* A very large tree, used on the Western Coast for house building and making canoes. Wight No. 43, Bangalore 49, 312, Palamcottah 254, Mysore 48, Tinnevelly 32, Paulghaut 8, Travancore 314.

140. Terminalia belerica, Tanikoi or tandee marum, Cattoo eloopæ, *Tam.*—Tadi chettoo, *Tel.* A very large tree with a straight trunk and spreading head; wood white and soft, but not much used. The flowers have an offensive smell. The kernel of the fruit is eaten by the natives. Wight No. 11-99, Mysore 27, 18, Tinnevelly 47, Travancore 306, Cleghorn.

141. Terminalia Berryü, Vella murda, *Tam.* This tree also attains a large size, especially at the foot of the W. Ghauts, where it is used for canoes, &c. (Wight). Wight No. 111, Travancore 225, 320, Hort. Garden 64

142. Terminalia catappa, Natvadom cottay, *Tam.*—Badum, *Tel.* A beautiful large tree, found in gardens, &c., the kernels are eaten and are palatable, the wood is also useful. Wight No. 54, Hort. Garden 63.

143. Terminalia Chebula, Pilla murda or Kadookoy, *Tam.*—Alali mara, *Can.*—Heerda, *Duk.*—Karaka chettoo, *Tel.* A very large tree, fruit used by harness makers. The leaves are punctured by an insect, and hollow galls are developed, which are powerfully astringent, and answer well for making ink. They also yield chintz painters, and carpet weavers, their best and most durable yellow. (Roxb.) Wight No. 72, Mysore 30, Travancore 300, Bangalore 45.

144. Terminalia glabra, Curry murda, *Tam.* A large tree, wood dark coloured, very hard, heavy and strong, Dr. Wight speaks highly of this wood, and states that large beams are readily procurable at Coimbatore for house building purposes. It is very hard, heavy and durable under water. Wight No. 16, Travancore 78, 101, 383, Mysore 30, Paulghaut 21, Cleghorn.

145. Thespesia populnea, Poorsungkai, *Tam.*—Gungarani, *Tel.* A tree much used for avennes, of quick growth, and yielding good shade. This generally grows from the cuttings, and although the timber is strong, hard and durable, but rarely to be met with good, owing to the trees rotting at the heart. It is procurable, fit for chairs, &c. The tree abounds in old gardens, and about all European Stations, thriving best near the sea. Wight No. 79, Mysore 9, Palamcottah 252, Hort. Garden 30.

146. Thevetia nerüfolia. A garden shrub called the "Exile." The wood is worthless. Hort. Garden 17.

147. Vachellia farnesiana, Jali mara, *Can*—Veda vully, *Tam.* An armed shrub, very common in Mysore and Deccan, exuding much gum like the babool, which it greatly resembles in its timber, the size is very small. Wight No. 109, Mysore 24, Cleghorn.

148. Vatica robusta, Saul, *Hind.* Googilam, *Tel.*—A wood in great repute, belonging to the *Dipterocarpeæ;* it is most valuable for house and ship building, Vats for liquids, door frames, and the rails and battens of doors; it is not suited for planks, it twists, shrinks, and warps, whenever the surface is removed, even after many years seasoning. This wood is in general use for building purposes in the Ganjam and Vizagapatam Districts.

"From Colonel Baker's excellent experiments, it appears that, compared with Teak, its strength is about 1121 to 869. From Major H. Campbell's valuable experiments, unseasoned Saul broke with a weight of 1,308lbs., seasoned Saul with 1,319lbs., and teak wood with 1,091lbs. It is unquestionably the most useful known Indian timber for engineering purposes," (Jury Reports Great Exhibition.)

149. Visenia umbellata. A considerable tree of great beauty, with rose coloured flowers and velvetty leaves; introduced from Sumatra, the seeds having been sent to the Horticultural Society's Garden, by Dr. Wallich. Hort. Garden 36.

150. Vitex alata. A small tree found in the Naggary Hills, leaves ternate, petioles winged. Hort. Garden 32.

151. Vitex altissima. A large tree of great beauty, when in flower, frequent on the slopes of the Western Ghauts, reported to be fit for cabinet purposes. Wight No. 131, Travancore 338.

152. Wrightia antidysenterica. Veppaula, *Tam.*—Pâla chettoo, *Tel.* A small tree of common occurrence in Mysore and the Hilly parts; its medicinal virtues are worthy of attention, but the wood is of little value. The bark was formerly in request under the name of *Conessi* and is still esteemed a valuable drug by the natives. It appears to have lost its value in commerce, from not being distinguished from the bark of Wrightia tinctoria which grows in the same places. Travancore, 65.

153. Wrightia mollissima. Introduced from the Naggary Hills; the yellow juice might be turned to account, but the timber is of no value. Hort. Garden 68.

154. Wrightia tinctoria. Palay marum, *Tam.*—A small tree, the leaves of which yield an inferior kind of Indigo. Wood white and close grained, said to be suited for Turnery. Wight No. 66, Travancore 784, Bangalore 305, Palamcottah 250, Penang 158.

155. Zizyphus jujuba. Yellanday marum, *Tam.*—Elanjee mara, *Can.*—Gooly mara, *Can.*—Bèr, *Hind.*—Rega, *Tel.* The wild *Bèr* tree, common almost every where; wood hard and useful, but of small size. It is used for making sandals. Wight No. 127, Mysore 14, Bangalore 37.

Section VIII.

ANIMAL SUBSTANCES.

Sub Jury.

The Honorable Walter Elliot, Esq.—*Chairman.*

W. E. Underwood, Esq.

Alex. Hunter, Esq. M. D.

H. Cleghorn, Esq. M. D.—*Reporter.*

The subjects which fell under the consideration of the Jury in this section, are not so numerous as might have been expected.

The animal substance of most importance as a material for textile products is Wool, Export 79,072lbs. Rs. 8,559, of this an interesting series of specimens is exhibited from the table land of Mysore, by Mr. R. A. Fitzgibbon in charge of the Sheep Farm, Hargunhully.

Common black country wool.
Do. wool, half bred.
Do. wool, three-quarters bred.
Do. merino, $\frac{7}{8}$ bred.

Taking into consideration the Exhibitor's persevering endeavours to introduce the Merino breed of sheep, and that the samples transmitted present excellent qualities, the Jury consider Mr. Fitzgibbon entitled to a 2d Class Medal.

Several other specimens have been sent, but there are only two Exhibitors whom the Jury would notice. viz. Rajagopauloo, Bangalore, who sends two sorts of prepared wool, and Mr. Bowden of Guntoor who transmits three sorts of wool, carefully pulled and scoured.

These wools manifest qualities of fibre which deserve Honorable Mention.

Silk. Export 1,666lbs. Rs. 6,569. This product is the most costly of all materials for textile purposes. Very fine samples are shown from Mysore, the produce of *Bombyx Mori* (silk worm). It is probable that the culture may be successfully carried on in the valleys of Neilgherries. Indeed, for some years past, experiments have been energetically carried on by the late Mr. Casamajor, and at present by Major Minchin: specimens of silk from Italian worms reared at Katy have been sent. On the Bombay side, the culture of silk under an Italian, M. Mutti did not succeed, and has been abandoned for want of success.

Silk reeled by the children at the Chittoor School was also exhibited. The Jury regret to learn that the breeding has been in some measure neglected since the death of Mr. Groves. The Jury understand that the culture of Silk has been much promoted, and is being skilfully carried out by Monsr. Perrotet, Pondicherry.

Tussah Silk.—Cocoons, from which this description of silk is obtained, were exhibited from several localities. They are formed by caterpillars of several species of moth, belonging to the genus Saturnia. That which is most commonly met with in Southern India, appears to be S. Paphia. The caterpillar feeds on the leaves of the Country Almond tree *(Terminalia catappa)* whence it is often called the almond moth. It is also found on the leaves of the Bèr tree, *(Zizyphus jujuba,)* the Casuarina, &c. The cocoons are ingeniously attached to the twiggy branches of the Bèr, by a long stalk terminating in a ring, encircling the branch. In the thicker foliage of the Casuarina, the silk is woven among the leaves without the above provision. It does not appear, that silk in any quantity has been obtained from this source in the Madras Presidency. Considerable quantities of the small silk cloth worn by Brahmins at their meals are imported into the Northern Circars, from Cuttack. The only use to which the cocoons appear to be turned is that of a ligature for native matchlocks. They are cut spirally into long narrow bands, with which the barrels are tied to the stocks. Dr. Roxburgh. in the 7th vol. of the Linnean Transactions, has described the preparation of the Tussah silk of Bengal, which is derived from two different species of Saturnia. One called *bughy* by the natives of Beerbhoom, appears to be the same as our species, (S. Paphia,) and is stated to

feed on the Ber tree and on the Asana *(Pentaptera glabra)*. The other termed *jarroo* by the natives of the same province, is the S. Cynthia, and is domesticated. The caterpillars are fed on the leaves of the castor oil plant (Ricinus) whence it is called the Arrundy, or Arundi silk worm, but it also eats the leaves of the Bèr and Asana. Colonel Sykes has a paper in the 3d vol. Trans. Roy. As. Socy. Lond. on the cocoons of S. Paphia found by him in the Deckan under the designation of the *kaliswar* silk worm, which he states is met with on the Bèr tree, *(Pentaptera glabra)* Teak tree and common Mulberry. The Chinese Tussah is said to be obtained from Saturnia Atlas, which is also to be met with in Southern India.

Another species of Saturnia (*S. Selene*) the posterior wings of which are prolonged into a tail-like process is common in Southern India. The caterpillar may be observed, feeding in considerable numbers on the Odina Wodier, or Besharm tree in February and March. Its chrysalis is enveloped in a silky covering, so like that of S. Paphia that it would probably be found to yield a strong and useful thread.

It may be worth while to direct attention to the silk spun by several smaller specimens of Bombyx moths, found on different species of Cassia, Acacia and Phyllanthus. A gregarious caterpillar (a species of Lasiocampus) may be observed clustering in great numbers on the stem of the Guava, the Jamoon (Syzygium jambolanum,) and probably other trees; the silky covering of these also seems deserving of examination.

Lieut. Colonel F. Cotton sent some of the cocoons gathered by him when exploring the Godavery.

Horns and Antlers. Export No. 919839, cwt. 2189, Rs. 1,00,218, of these a great variety of handsome and illustrative specimens were exhibited. The collection of the Honorable W. Elliot merits the first place for the number and rarity of the specimens.

There are shown the dense Antlers of the "Samber" (Cervus hippelephas,) of the "barking deer" (Cervus muntjac,) of the "Axis" (Cervus axis,) the Neilghai (Damalis Rusa) and other species of Indian Deer—also horns of the Indian Buffalo, Ox, and Antelopes were exhibited.

From the Cape of Good Hope, a Rhinoceros Horn, the heads of the Giraffe, and Strepsiceros Capensis with other specimens of horns and antlers, belonging to the same collection.

There are interesting consignments of these productions from different districts, but as the functions of the Jury found no exercise in regard to this section, they limit themselves to the above notice of Mr. Elliot's collection, which is by far the most valuable, which has been transmitted.

Hairs and Bristles.—Bristles from the wild Boar and the Elephant, and quills of the Porcupine are exhibited.

Feathers and Down.—Peacocks' feathers are exhibited from several collectorates, and the Down of the young Adjutant Crane (Ciconia Argala) and of other cranes, these are made into Ladies' Boas and Victorines. The Adjutant is very rarely found so far South, but a kindred species, the Ciconia alba, (Jerdon) is pretty common, of this the under tail coverts are collected and sold in considerable quantity. Many are procured at Trichoor in Malabar. With reference to writing Quills, the Jury have nothing to say, as there did not seem to be any feather worthy of notice.

ANIMAL OILS.

The following were exhibited :—

Oil made of Peacock's fat	Tinnevelly.
Neat's foot Oil	Masulipatam.
Alligator's fat	Do.
Guana Oil, Mr. Bowden	Guntoor.

Ivory.—Export lbs. 4,310, Rs. 71507. Several specimens of fine Ivory were exhibited ; the largest pair of Elephants tusks sent to the Exhibition, were a pair weighing 130 pounds, obtained from a wild Elephant killed in the Travancore forests. One tusk weighed 71 pounds, the other 67 pounds, and showed a fine white compact kind of ivory ; of these two, one measured 6 feet 8 inches in length, and the other 6 feet 6 inches, the circumference at the base being 17 inches in each case.

It is a singular fact that the domestication of the Elephant is usually attended by deterioration of the length and quantity of the Ivory.

The Honorable Mr. Elliot exhibits the tusk of the Narwhal.

Tortoise Shell.—Export lbs. 308, Rs. 2,204. The epidermoid plates which overlap the back shell of the Marine Turtles (Chelone) were transmitted from Travancore, apparently fine plates. Another epidermal production, called Tortoise shell, from Madura and other inland localities was exhibited, but the specimens were of little value.

Shells.—A few shells are exhibited belonging to the Genera, *haliotis*, *turbo*, &c., which are useful in connection with the manufacture of mother of pearl buttons, likewise the *Chanks*, which the Hindoos use in their processions, the exportation of these is very great, chiefly to Calcutta, last year as follows. No. 15,15,495, Rs. 54,780.

Corals.—A small number of Corals and Madrepores including the Gorgonia were exhibited, these serve for various purposes of ornament.

Glue.—Of a superior kind derived from the waste residue of animal tissues, which had served the operation of tanning at the Government Tannery, Hoonsoor, is an illustration of the inventive skill of man, and deserves Honorable Mention. An equally good sample has been received from Ootacamund, prepared by Mr. Brophy, from bones and remnants of animals which have served as food, this specimen also appears to the Jury worthy of Honorable Mention.

Fish Maws—Specimens of the dried air bladder of at least two species of fishes were exhibited, but they were not well cleaned, if they had been carefully treated they promise to yield Isinglass of a superior description. The export of this is considerable, and has been noticed in the Report of Class III.

Bees' Wax—Export lbs. 297,609, Rs. 126,796, was exhibited from almost every District. The samples from Coorg and Travancore were considered the best.

JURY AWARDS.

2d Class Medal.

Progressive No.	Catalogue No.	Name of Exhibitor.	Object Rewarded.
		Mr. R. A. Fitzgibbon	Series of Wool.

Honorable Mention.

Progressive No.	Catalogue No.	Names of Exhibitors.	Objects Rewarded.
		RajagopaulooBangalore	Specimens of prepared wool.
		Mr. Bowden - - -	Do. do.
		Govt. Tannery, Hoonsoor - - - - -	Glue, of a superior kind.
		Mr. Brophy - - - -	Do. do.

CLASS V.

REPORT ON MACHINES FOR DIRECT USE, INCLUDING CARRIAGES, &c.

Jury.

Major J. Maitland, *Artillery, Superintendent Gun Carriage Manufactory.*

G. B. Bruce, Esq., *Chief Engineer, Madras Railway.*

Major Jenkins, *Agent, Madras Railway.*

Lt. Col. J. T. Smith, *Engineers, Mint Master, Madras Mint (Chairman.)*

Major W. K. Worster, *Artillery, Superintendent of Roads and Acting Astronomer.*

R. Kennedy, Esq., *Engineer, Madras Railway.*

Associate.

Lieut. H. P. Hawkes, *Sub Assistant Commissary General—Reporter.*

The manufacturing population of this country have hitherto been restricted to the application of manual power to the machines in use for the purposes of Industrial Art, and while their necessities have been thus supplied, and no extensive demand has arisen from without to call for more powerful aids to production, it can hardly excite surprise that this class should be so imperfectly represented.

Prejudice and other obstacles have also intervened to oppose a departure from long established custom.

It must be conceded, however, that rude as the mechanical contrivances of the natives appear, some of them are both simple in construction and effective in operation, and in their economical application are unsurpassed by the inventions of modern science. The common Picottah for instance, in simplicity of design and efficiency in action, remains without a substitute for the purpose to which it is applied.

Education and individual enterprise, it is hoped, may now gradually remove the barriers, which have hitherto retarded the introduction of modern appliances.

"*A Force Pump*" for raising heavy weights on the principle of Brahmah's Hydraulic press, a "*Brahmah's Press,*" a "*Force Pump*" and "*Common Pump,*" (Cl. v. c. Nos. 1, 2, 3 and 4.) made up in the Arsenal of Fort St. George—exhibited by Overseer W. H. Patterson are creditable illustrations of these well known machines.

"*A Lever Spanner*" (Cl. v. c. No. 5.) and "*Gearing Hammer*" (Cl. v. c. No. 7.) by the same exhibitor are very good specimens of workmanship, a "Lever spanner" (Cl. v. c. No. 6.) by supervisor S. Brookes of the Arsenal is also equally well executed.

The only object shown under the head of carriages is a *model of a Travelling Coach* on equirotal wheels (Cl. v. c. No. 10.) exhibited by the Inventor, Capt. G. Harvey, Mysore Commission, "the advantage in this vehicle over ordinary conveyances is said to consist in its turning in a space equal to its own length;" in its greater lightness, when compared with other carriages affording much less accommodation, and in its "fitness" for travelling over rough and uneven roads.

Concerning this model, the Jury observe that it is the only object in the class, which claims the merit of originality. It moreover exhibits considerable simplicity, as well as ingenuity in the arrangement of its parts. It has been in use for 8 or 10 years, and has been found to answer well for travelling or other carriages, and is therefore deserving of Honorable Mention.

A working model of a Windmill for raising water (Cl. v. No. 11.) contributed by Capt. McNeile, B. A., appears too complicated for general use.

Class V.

Honorable Mention.

Class.	No.	Name.	Object Rewarded.
V.		Harvey, Capt. G.	Travelling Coach.

CLASS VI.

MANUFACTURING MACHINES AND TOOLS.

Jury.

Major J. Maitland, *Superintendent Gun Carriage Manufactory.*

G. B. Bruce, Esq., *Chief Engineer, Madras Railway.*

Major Jenkins, *Agent Madras Railway.*

Lieut. Col. J. T. Smith, *Madras Engineers, Mint Master, (Chairman.)*

E. Kennedy, Esq., *Engineer, Madras Railway.*

Major W. K. Worster, *Artillery, Honorable Company's Astronomer.*

Associate.

Lieut. H. P. Hawkes, *Sub-Assistant Commissary General, (Reporter.)*

The primitive state of the Mechanical Arts in this country, would naturally lead to the conclusion that in the application of Machinery to facilitate manual labor, the deficiencies in this class would be very apparent.

Such is doubtless true, of the portion exhibited by Native contributors, but on the other hand, that supplied by European Agency, manifests so decided a tendency towards the adoption of more modern improvements that the Jury cannot but view this collection as one possessing considerable interest.

New wants may lead the Manufacturer to more strenuous endeavours to assimilate his operations to those adopted by other and more advanced nations, but the introduction of improved Machinery *generally* must be attended with such cost as to preclude its use among the mass of the people.

The Native contributions in illustration of the Machines and Tools in general use, appear rude and imperfect, but it must be remembered that the Artizans of this country attain a high degree of excellence in various manufactures, and so far compel an acknowledgment of the fitness of their implements for the purposes for which they are designed.

On the other hand, however, many of the objects in this class, emanating from the subordinate Officers in the several Institutions or Departments under Government, with few exceptions, although exhibiting but little novelty of design are of great excellence of workmanship. Their chief value consisting in the adaptation of European machines to native manufactures, amongst others, the machine for granulating gunpowder, displays considerable ingenuity, but must be much improved before it can be safely used for that purpose.

The advantages which have been reaped by those establishments, which have adopted the improved machinery of which this class contains many models, are doubtless great, both as regards a saving of money and in the superior excellence of the articles produced.

The improved Buffing mills, quick Tanning machines, &c. from Hoonsoor, may be mentioned as examples.

Of late also, on the Madras Railway, the Godavery Annicut, and other large engineering works, tools from England, or those made from English patterns, have been successfully introduced. With regard to the Railway more especially, the operations in connection with which are entirely new to this part of the country, all the implements supplied by the Company for workshops and Plate-laying are similar to those used for the same purposes in England. A very little practice on the part of the Natives enables them to use them successfully.

It is worthy of remark, however, that in all works executed by petty contractors, such as embankments and cuttings, the old established modes are entirely followed, owing doubtless to the cheapness of labour.

The difficulties which have been encountered by the Exhibitors, in preparing these illustrations of the application of machinery to practical purposes, and the manner in which they have been so successfully surmounted entitle the contributors to high commendation.

A complete Machine for the manufacture of Gold Thread (Class VI. No. 5) from Madura, exemplifies the art of wire drawing in India.

A working Model of a Weaving Loom (Class VI. No. 6.) deserves creditable notice for its excellence in execution and minuteness of detail.

Several sets of the *Tools in common use* by Potters, Carpenters, Iron Smith, Painters, Brass Smiths, Jewellers, Farriers, Masons and Druggists exhibited by His Excellency the Tondyman Rajah of Poodoocottah are interesting, as showing the extremely rude implements with which these trades are carried on.

A *Mill for winnowing Sesamum seeds* (Cl. VI. No. 29) exhibited by Monsieur Bulliard of Pondicherry is a very useful machine, and is said to have been used with great success in the Northern Circars in winnowing Gingeley seed and animal charcoal, the price of the present article however appears to be high.

A well constructed *Model of a quick Tanning machine* from Hoonsoor (Cl. VI. No. 39) exhibited by Staff Serjeant Gage through the Commissary General serves well to illustrate of the process. A Buffing mill also and other models by the same exhibitor deserve commendation. The Pearl Barley machine seems however to be slightly out of proportion in some of its parts and works stiffly. The Jury consider Staff Serjeant Gage entitled to "Honorable Mention."

The *Model of an addition to the Planing bench* (Class VI. No. 42) exhibited by Assist. Surgeon W. Hilbers of Hoonsoor is a very useful little contrivance.

A Model ($\frac{1}{8}$th size) of a Still from Pondicherry (Class VI. No. 44.) is exhibited by Monsieur A. Bulliard. The exhibitor omits to remark if the machine or any part of it is of his own invention, but considered merely as a specimen of manufacture in India, the Jury are of opinion that on account of its good workmanship and general excellence it is worthy of a Prize Medal.

The following Models made at the Gun Carriage Manufactory are all neat and good specimens of workmanship, and as such are deserving of special mention.

A *Model of an Oil Press* (Lieut. Hawkes' pattern,) exhibited by the Military Board, is exceedingly well made, the Jurors would observe that this machine which is likely to become extensively useful, would be enhanced in value by having the two screws of a different pitch. The first pressure being given by the coarser screw to save time when the further application of the finer screw will complete the process.

A *Break for crushing fibres*, (full size) Cl. VI. No. 46) worked by means of a *treddle*, and said to be effective. The manner in which power can be applied either by foot or hand, or both combined, is well deserving of attention.

An *Augur for boring square holes*, also made at the Gun Carriage Manufactory and exhibited by Overseer Curran (Cl. VI. No. 47) is an excellent and useful little machine.

A *Model of a Tilt Hammer*, worked by hand, exhibited by Major Maitland, may be practically useful, the arrangement of the canes however might be slightly improved.

As an illustration of the general principle of saw Mills a rough *Model of a Circular Saw* with under and over cut was exhibited by Overseer Curran. A *Slide Rest* for a turning lathe, exhibited by the Madura Local Committee and made by Anakapen of Dindigul. Considering the very great difficulties attending the construction of a tool of this description with the simple implements in use amongst Natives, is deserving of infinite credit. The Jury accordingly award him a Prize Medal, or its equivalent Rupees fifty.

A *Gunpowder granulating machine*, exhibited by Sub-Conductor W. Manning of the Powder Mills, is an ingenious adaptation of known principles to the manufacture of Gunpowder and creditable, but the workmanship and arrangement is doubtless susceptible of considerable improvement.

CLASS VI.

Prize Medal.

Pro. No.	Catal. No.	Names of Exhibitors.	Object Rewarded.
CCXLIII	44	Bulliard, Monsieur..	Distilling apparatus
LXXXIII	7	Anakapen.. Rs. 50	Slide rest for turning lathe.

Honorable Mention.

CCXXX	39	Gage, Staff Serjeant.	Model of tanning mill, &c., &c.
CCLIII	45	Gun Carriage Manufactory.	Model of Oil Press.
CCLIII	47	Curran, Overseer.	Augur for boring square holes.

H. P. Hawkes,
Reporter.

CLASS VII.

CIVIL ENGINEERING, ARCHITECTURAL AND BUILDING CONTRIVANCES.

Jury.

Lieut. Col. J. T. Smith, *Madras Engineers, Mint Master.*
Lieut. Col. Faber, *Chief Engineer—Chairman.*
Lieut. Col. F. A. Reid, C. B., *Quarter Master General, Madras Army.*
Major J. H. Bell, *Secretary Board of Revenue D. P. W.*
A. H. MacNair, Esq., *Engineer, Madras Railway.*

The objects for Exhibition in Class VII. to which the attention of the Jury has been directed, whilst by no means numerous, are far from being devoid of interest whether they be considered in respect to ingenuity of design or correctness and dexterity of modelling.

Of the eight or nine models exhibited, the Jury are of opinion that each entitles its exhibitor to a certain degree of credit.

The model of a *Mahomedan Dwelling House* transferred from the Paris Exhibition Committee (Class cx. No. 1) appears to be correctly though not very neatly executed.

Another model of a *Hindoo Dwelling House* made by Mooroogapah Achary is finished with the greatest care and exhibits a most faithful picture of Native domestic economy. It admits of dissection in every part, and the fidelity, skill and ingenuity of the modeller are only rendered more conspicuous by the closest inspection. The retired inner rectangle, the stairs, giving access to the platform of the roof, the enclosed well for household consumption, the carved doorway, and the pyals in front, are all found to have been rendered with scrupulous accuracy and with great excellence of workmanship. The Jury accordingly award the exhibitor a second Class Medal.

A *Mortar Mill* for the incorporation of lime and sand as used in Public works at Pondicherry by Mr. Guerre, Head of the Engineer Department, is both effective and economical and in particular cases might probably be introduced with advantage into the Engineer's Department at Madras. The contrivance differs so slightly from the common pug mill used in preparing clay for the brick maker that the Jury do not attach to it the merit of orginality.

Monsieur Carriol of Pondicherry exhibits a very near and exceedingly well joined model of a *Drawing Room Staircase* (Cl. VII. No. 4) concerning which the exhibitor observes that the opportunity of making in full size, a staircase similar to the one exhibited, has not yet been afforded me but two wooden staircases of very similar shape and on the same principles have been executed.

A faithful but somewhat rough model of a *Wooden-House*, similar to those which are to be found on the Western Coast is shown from Travancore, in which the chief point to be noticed is the prodigal use of timber which is so abundant there.

Store Serjeant Carr exhibits a model of a *Coffer Dam* or water-tight enclosure within which the construction of Hydraulic works can be securely carried on, the features of novelty that it presents are—1st, Screw piles at intervals take the place of ordinary piles. 2ndly—There is a contrivance meant to preserve these in a vertical position and at the proper distance apart whilst being screwed into the ground; and 3rdly the intermediate planking is framed into doors which move up and down between the grooves of the screw piles.

As a model, this is a very interesting contribution, its simple inspection conveys considerable instruction to those not conversant with contrivances for working in water and for the Lecturer this coffer dam would be very useful enabling him to bring the matter home to his pupils in a much more satisfactory manner than by drawings or mere verbal explanation.

The Jury consider the exhibitor deserving of a second Class Medal.

It is not easy for those who have already seen Railways in full use and activity in England to estimate the feelings of mingled interest and curiosity with which the model of the first *Railway Terminus* to be built in the Madras Presidency has been inspected. The officers of the Railway Company have not only modelled on a large scale (94 in. to 1 ft.) this imposing edifice (already under construction) but the adjoining sheds, sidings, rails, &c. are also shown, the roofs of which are of a pattern hitherto unused in India.

The terminus consists of one front 329 feet long and 45¼ feet high of the modern Ionic style of architecture.

Apart from the interest which this model commands as marking the commencement of a new localæra, the Jury consider the execution of this work to be very creditable and deserving of a second Class Medal.

The details of the roof which is a combination of teak and iron and the architectural ornaments are executed with a fidelity and put together with a degree of accuracy and neatness which are not surpassed by any other model in the Exhibition, and which are most creditable to the workmen who were employed and to the talent by which they were directed.

The last model in this class i that of the proposed *Madras University* made by Mr. Williams, Cabinet maker.

This object possesses strong claims on the interest of all those whose lot is cast in a land, the character and condition of which is likely to be much influenced by the several Institutions for which accommodation is to be permanently provided in this large building. Of much greater actual dimensions than the Railway terminus; it is not modelled on so large a scale being only one-sixtieth of the full size. But although this has much increased the difficulty of a minute and at the same time an accurate representation of the ornamental details of the building, the Jury observe that the ingenuity of the constructor Mr. Williams has successfully overcome this and numerous other difficulties.

The tools for making the cornices, mouldings, &c. were the unassisted efforts of the intelligent native artizans by whom the model was made from the mere ground plan and elevation of the work.

The building represents moreover what has been considered the most suitable form for the construction of all public edifices in an inter-tropical climate. The objects to be secured in the construction of this edifice were, that each apartment should be lofty and well ventilated and have the protection of an ample corridor on each side.

By this construction little more than one-third of the covered area is available for use, the remaining two-thirds consisting of verandas and balconies tending to the comfort of the occupied rooms.

The work has four stories, a basement of 9 feet high intended for workshops for the native artificers connected with the School of Industrial Arts and Government Museum.

The ground floor and first story are apportioned almost equally amongst the three departments now gathered under one roof.

The Museum occupies.....	42722	Square feet.
Industrial School.....	53553	
University.....	51835	
	148110	Square feet.

The eight rooms in the attic story having a clear height of 17 feet, will be inhabited by subordinate officials dwelling on the premises whilst they will also afford advantageous position for the large iron tanks which supplied by a steam force pump of 5 horse power placed in the basement story will admit of a water service being laid on to every portion of the building.

The estimated cost is Rupees 21,27,078-14-4. The Jury recognising the diligence of Mr. Williams in preparing so large a model in the space of a few weeks recommend him for a second Class Medal.

JURY AWARDS.

Class VII.

2d Class Medal.

Pro. No.	Catal. No.	Names of Makers.	Articles Rewarded.
cclviii	2	MooroogapahAchary.....	Model of Hindoo Dwelling House.
	1	Store Serjt. Carr..	Model of Cofferdam.
ccxcvi	1	Madras Railway Company	Model of the first RailwayTerminus.
ccxcvii	8	Mr. Williams	Model of proposed Madras University.

CLASS VIII.

NAVAL, ARCHITECTURAL AND MILITARY ENGINEERING, ORDNANCE, ARMOUR AND ACCOUTREMENTS.

JURY.

Licut. General J. S. Fraser, *Chairman.*
Major General F. Blundell, c. b., *Commandant of Artillery.*
His Excellency Lieut. General the Honorable George Anson, *Commander-in-Chief, Madras Army.*
Major W. K. Worster, *Barrack Master, Acting Honorable East India Company's Astronomer.*
Lieut. Colonel G. Balfour, c. b., *Member of the Military and Marine Boards.*
James Shaw, Esq., *Surgeon Madras Army, Oculist.*
A. Blacklock, Esq., *Professor of Surgery.*
H. D. E. Dalrymple, Esq., *Sheriff of Madras.*
Capt. Biden, *Master Attendant, Madras.*

Sub Committee.

Major Genl. F. Blundell, c. b.
Lieut. Colonel Balfour, c. b. } *Joint Reporters.*

There was a general deficiency of Naval, Architectural, and Military Engines, and the following report almost exclusively relates to the Ordnance Arms and Armour.

The Armour and Arms exhibited although forming a very extensive collection, are on the whole of inferior quality; a fact which seems to show either that the long peace in Southern India has caused the superior kinds to disappear, or that weapons in general use in this country have been always of an ordinary and inferior quality. Some few of the weapons however, are of great value, and there are also curious forms of arms quite unusual in European warfare, though seemingly long known in this country.

A detailed report on the arms, &c., will be found appended; and it will therefore be sufficient here to describe the more interesting and valuable pieces.

His Excellency Lieut. Genl. Anson, Exhibitor.

Amongst those may be noticed a *Coat of Mail of Steel*, the whole of which is rivetted together, with the exception of the collar which is composed of small brass and steel rings, merely looped one into the other; the helmet is also of steel inlaid with gold, surrounded with a curtain of brass and steel rings, of a sufficient depth to cover the back of the neck.

Also two sets of *Plate Armour*, composed of steel of the best description and beautifully inlaid with gold; the helmets are also surrounded with a beautiful fringe of steel and brass rings looped together, and the gauntlets fringed with gold lace. There is only one shield belonging to these two sets of plate armour, and that is composed of fine steel beautifully inlaid with gold.

There are amongst this collection a pair of *Two Edged Swords* from the North of India. The blade of one is beautifully wrought and inlaid with gold, and the other inlaid with silver; the scabbard of one is of soft wood covered with purple velvet and trimmed with gold lace, and that of the other is covered with embossed leather.

Two *Damascus Swords* may likewise be mentioned as they are of beautiful workmanship, the handle of one being of steel inlaid with gold, and that of the other of ivory mounted with steel inlaid with gold; the scabbards are both of wood, covered with embossed leather gilt, and the mountings are of steel inlaid with gold.

Amongst the *Daggers or Creeses*, there are a few deserving of remark. The handle of one dagger is all of steel, beautifully watered and inlaid with gold, the blade all fluted and chased; and the scabbard of wood covered with embossed leather and velvet.

An object of great interest was a *Sword of the Emperor Baber*, the blade of which is cut from the hilt to the tip nearly in the same manner as a common pit saw, and also divided in two for about 9 inches from the point, thus forming 2 swords from that length. The

handle is of wrought iron covered with silver, and the scabbard is of wood covered with canvas and quite plain.

His Highness the Rajah of Tanjore, Exhibitor.

As it is quite unusual now in Europe to see horse armour, *a set of Plate Armour for a Horse* sent to the Madras Exhibition, attracted attention. This set of armour is composed of small plates of wrought iron, intermixed with small iron rings linked and rivetted together; the whole of the set is lined with cotton cloth padded, and appears to be of recent manufacture.

A *Shield made of the Hide of the Rhinoceros*, and beautifully studded with gems set in gold, was deserving of notice.

Two Bows with Quivers and Arrows, &c., being weapons quite in disuse in Europe, were objects of much interest here; these are made of bamboo, gilt, and the quivers are of crimson velvet fringed with gold lace, and embroidered all over with gold; the arrows are of light bamboo, tipped with steel.

There are also three *Spears* deserving notice. The shafts are of wood, with the exception of about 18 inches from the bottom, which are of iron richly chased, and are covered with copper, curiously chased and perforated the whole length; the spear heads are of the best Indian steel, and the sockets are of iron welded to the steel, richly chased, and inlaid with silver.

Two Neerara Cheekrum or Iron Discs deserve notice as curious specimens of Indian weapons of war, more curious than useful. They are made to slip over the hand with a strap behind; in the centre is a steel knife projecting to the front, and round the edges are also placed a number of short knives.

A *set of Iron Claws* to fix on the fingers, are formed of separate iron rings made to fit each finger with a steel claw attached to each, and would prove most dangerous weapons in close quarters, but would be of no use in any other way.

A *Gopun or Sling*, is a curious specimen of ancient warfare weapons. It is made of red silk embroidered with gold; the stones belonging to the sling are fine white pebbles the size of a hen's egg.

A *pair of Steel Discs, Chirkhs or Quoits*, about 7 inches in diameter, made of the best steel the outer edge being very sharp attracted attention. These were formerly in much use amongst the Sikh soldiery; being thrown from the tip of the finger, after frequent revolutions to impart a momentum.

Nine War Knives must be noticed. Their blades are of very thin steel and in the shape of a bill hook; the handles are of ivory inlaid with brass.

Also *a suit of Steel Armour for an Elephant* made of the best steel plate intermixed with steel rings rivetted together. The whole of this suit is in excellent condition, and like the horse armour deserving attention.

Amongst the *Daggers* one was noticed with blade quite plain, but the handle of thin silver very prettily chased; and the scabbard of crimson velvet, tipped with silver richly chased.

A Spear with three points is a very curious specimen of Indian manufacture, the centre point being all of steel; the socket is of wrought iron very richly chased, and the shaft of wood painted green.

The most numerous and varied collection of arms was that exhibited by His Highness the Rajah of Tanjore; and as it contained a greater variety of instruments of offence and defence, the Jury have thought it advisable to award a second Class Medal.

His Excellency the Rajah Tondaman, Br., Exhibitor.

The collection which approached nearest to that of Tanjore was the one exhibited by *His Excellency* the Tondaman *Rajah*, containing a considerable variety of weapons; and this the Jury considers deserving of honorable mention.

The collections exhibited by the Local Committee of Salem, by Messrs. Conolly, Ratliff and the Collector of South Arcot, are all deserving commendation; but the best assorted collections belonging to private Exhibitors are those of the Honorable W. Elliot, and His Excellency Lieutenant General Anson. That of the former gentleman is superior in variety and extent, whilst the Arms in Lieutenant General Anson's collection are superior in workmanship and evidently of considerable value; and these having moreover been collected in the North West Provinces, they afford better illustrations of the excellence of the weapons which the practice of War may be expected to produce. The Jury therefore award a 2d Class Medal each to the Honorable W. Elliot, and His Excellency Lieutenant General Anson.

The collection of Arms contributed by the Local Committee from Malabar, consists of a portion of the War knives obtained from the Mopillays of that Collectorate in their recent disarming. The knife, resembling a Bill hook, is well suited for a jungly tract like Malabar, and is doubtless a powerful weapon in the hands of a determined man in close action; but the interest they possess in the Exhibition is the fact of their removal from their owners, who it is hoped will now settle down to those quiet habits of life which an efficient government must exact from their subjects.

The *Arms from Hyderabad* are of much interest, from the circumstance that the steel of which the well known Damascus blades is formed, is manufactured within the Hyderabad Territories.

It is commonly supposed that the *Wootz*, or Indian steel, is prepared by breaking up the iron ore and throwing it into a charcoal furnace, (blown by bellows, worked by men) from whence the iron is at once obtained in a malleable state, and being cut into pieces of about one pound in weight, is converted into steel by

Putting it into a crucible with the dried branches and green leaves of various shrubs.

Captain Campbell however who devoted much time to investigating this branch of manufacture, considers that the first product from the ore is not iron but steel.

The natives of India consider that the different kinds of woods employed in the first reduction of the ore, as well as in the subsequent conversion of the iron into steel, have a decided effect in producing different qualities of iron and steel. The wootz or steel being allowed to cool in the crucible, the particles have sufficient time to arrange themselves and form crystals: whence arise those beautiful combinations which when forged into sword blades, produce the Damascus figure or "Jowher."

Lieutenant General Fraser, Exhibitor.

Small Arms.

Under the head of *Small Arms* only one piece was exhibited, and that was a Rifle exhibited by General Fraser as taken from the Russians at Bomarsund; it was manufactured at Liege in Belgium, and shows the full excellence of the mechanical construction for which that great manufacturing town is celebrated. It has a strong but somewhat coarse and heavy appearance; and though not to be compared in finish to the English weapon, yet in all its parts it is in every respect a useful and complete weapon, in no way inferior to the English piece for the rough work of a campaign. The difference between that and the English two grooved rifles, is in the sight, which in the Russian piece is certainly a great improvement on that of the English rifle, being graduated and very easily shifted to any elevation; the other parts of the Rifle are the same as in the English pattern.

An ingenious mode of facilitating the loading of the piece was noticed; in order to prevent the ramrod falling out of the piping along the stock and barrel, there is a considerable degree of tightness in the loops whilst the ramrod is lodged; but to expedite the use of the ramrod, the leather bayonet or sword scabbard is supplied with a socket to receive the ramrod, from whence it is easily withdrawn in order to ram down the cartridge; an arrangement peculiarly deserving of attention. There was also noticed a useful lock-cover to protect the lock of the piece from wet, and attached to it is a leather nipple cover between the lock and nipple; thus effectually guarding from damp the part most liable to rust and corrode.

There is also a *Helmet* of the well-known pattern usually seen in all the drawings of the Russian Infantry, a neat, graceful, and warlike head-piece; well adapted for use, being light, yet ornamental, and sitting easily conveniently and closely upon the head. The double-headed Eagle is neatly stamped on a zinc plate, and with a large body of men, this when well cleaned, must produce a pleasing and martial effect. The crest of the helmet is evidently intended to receive a plume, the socket being at present neatly covered by a zinc tube.

On the whole, if the Russian Infantry be equipped in the efficient manner that this *Rifle* and *Head-piece* would denote, more advanced and more civilized Nations will do well to take care that they are not outstripped by Russia in the efficiency of their Military Equipments.

Models of Ordnance, Ordnance Carriages, &c.

The Exhibition presents a considerable variety of models of *Ordnance Carriages* and *Pieces of Ordnance;* but the majority being modelled on the patterns in use in the Artilleries of Europe, already discussed in the Report of the Juries of the Grand Exhibition, it will be sufficient to notice those that have peculiarities of Indian construction.

These are chiefly models of Ordnance, and Ordnance Carriages, that either have been or now are in use with the Madras Artillery; they are constructed by scale, and show the successive alterations and improvements that have been introduced from time to time. All are extremely well turned out, and evidence much care and an amount of skill in workmanship which are highly creditable to the Artificers of the Gun Carriage Manufactory, and Artillery Depôt of Instruction.

The marked peculiarity of the Indian Carriages is their adaptation for movement by means of Bullocks; being provided with yokes and chains for teams of cattle of from 12 to 60 strong, yoked sometimes in pairs, and with larger teams in quadruple yokes, so as to diminish the length of the team, and admit of the power of cattle being applied with greater facility to the heavy weight to be moved.

Various arrangements are made for facilitating the movement of those heavy cumbersome pieces; such as carrying back the trace chain to the Rear Axle-tree of the Rear Carriage, having separate Trunnion Boxes for moving the Gun forward, so as to place the weight of the piece more equally between the two Axletrees of the Limber and carriage; and also the application of wheels of 6 feet diameter to the Rear Axle, in order to increase the power of overcoming obstacles.

The construction of the Madras Carriages differs in several respects from that of Carriages used in the Royal Artillery. One is, that the Pintle loop of the Light Field Carriages which unites the Carriage with the limber, is made moveable, revolving on a ball and socket let into the trail of the Carriage, thereby preventing danger and risk to the limber when the Gun Carriage upsets on uneven ground; and as there seems no difficulty in adapting this improvement to the existing Carriages of the Royal Artillery, it is deserving of notice, the only thing requisite being to ensure good

iron work, which is essential where the iron loops are subjected to sudden wrenches in passing over bad ground.

All the *models of Madras Gun Carriages, Ammunition Waggons, and Ammunition Carts*, exhibit a peculiarity of construction not noticed in the European Artillery Services in having brass instead of wooden naves. The difficulty experienced in procuring proper wood for the naves, and in ensuring due seasoning without having a large per-centage destroyed, has always been considered in India as a serious drawback to the efficiency of Carriages furnished with wooden naves, and the simple plan of brass naves, is therefore commended to attention. These brass naves are said to last even longer than the Carriages, being hardly ever known to require renewal; and were it not for the expense of transporting Metal from the out-stations, it is believed that the same brass naves might answer for two sets of Carriages; thus offering the great advantage of diminishing the number of articles to be carried on Field service with an Artillery Train.

The metal naves are usually of the same weight as the wooden ones, and allow of the spokes being easily taken out and replaced by means of adjusting bolts and screws; and the box for the axle being of iron, the wear and tear is but slight, and even when worn out, the metal boxes can easily be replaced: thus ensuring the easy revolving of the axle arm.

The next marked feature presented by these models, is that some of the Gun Carriages and mortar beds are made of wrought iron (not cast iron) instead of wood; a plan often advocated but rarely tried in the different Artillery services, although the use of wrought iron appears to offer many facilities for the application of iron to the Ordnance service, ensuring lightness combined with strength, facility of repair, portability, and diminution of materials to be carried in the field. There is also less exposure to injury in action from the enemy's shot, and greater facility of stowage in garrison, since a light field wrought iron Gun Carriage can be taken to pieces and packed away in a long narrow case.

The Jury observe one *Iron Carriage*, constructed for an 18 pounder gun, proposed by Lieut. Col. Anstruther, C. B. Both the piece and carriage are deserving of commendation; for although the piece has at first sight an awkward appearance from the trunnions being so near the muzzle yet this trifling eye sore is insignificant in comparison with the great advantage of preponderance of weight at the breech, obtained by throwing the balance of the gun so far forward. This piece was a 12 pdr. iron gun reamed up to an 18 pdr. calibre; it is stated to throw its shot with great accuracy owing to the much diminished windage allowed, and although reduced in length from 20 to 10 calibre, yet by reason of the great steadiness in firing resulting from the preponderance of weight at the breech, it carries a charge sufficient with its existing Windage to propel the projectile with great velocity, thus ensuring a range nearly equal to that of the longer but far heavier 18 pdr. common gun. Both carriage and piece appear to be of a light and simple construction, easily handled and well adapted for batteries of position, and are therefore well deserving attention.

This carriage and gun have been tested both in travelling and in firing, and have been most favorably reported on in both respects by the Special Committee of Artillery Officers. Its advantages as respects weight will be seen by a comparison with a 12-pounder Carriage and Limber as below.

	Lieut Colonel Anstruther.			Common.		
	18-Pdr. Gun.			12-Pdr. Gun.		
	Cwt.	Qrs.	lbs.	Cwt.	Qrs.	lbs.
Weights of Gun	24	2	14	33	0	0
„ of Carriage	14	2	14	18	0	0
„ of Limber.....	12	0	22	15	0	0
Total	51	1	22	66	0	0
or lbs.	5,762			7,392		

And it was found that 30 bullocks instead of 50 (the allotment for an 18-pdr. gun and carriage) were sufficient for its efficient movement, along a route considered the most difficult in the Madras Presidency, viz. from Madras to Cuddapah.

Director Artillery Depot of Instruction, Exhibitor.

A model of a wrought Iron Light Field Carriage for a 9 pdr. brass gun—a wrought Iron Mortar Bed for a 5½-inch mortar—and a wrought Iron Carriage for an 8-inch Howitzer, are all deserving the attention of those interested in the construction of the pieces so essential for the operations of war.

Supt. Gun Carriage Manufactory, Exhibitor.

A model of an Iron Mortar Bed of a pattern, lately introduced into the Madras Artillery Service, which combines solidity with lightness. The workmanship of this model, both as regards Mortar and bed, are of a high order.

Director Artillery Depot of Instruction, Exhibitor.

A model of the Depression Carriage originally intended for the elevated Batteries on the Rocks of Gibraltar, deserves notice as being peculiarly well adapted for the Hill Forts of India; where it is often requisite to discharge pieces from a height, with a considerable depression of the muzzle. It also admits of a direct and easy recoil on a slide without risk of the piece being dismounted; and as this description of carriage may apparently be adapted for any

calibre, it is likely to be particularly useful for batteries in elevated positions.

The Jury also noticed the portability of the *Gun platform* in use with the Madras Artillery, which has recently been publicly condemned by a writer in the Quarterly Review for December 1854, Page 238 (in the following words) when writing on the operations carrying on against Sebastopol.

"The newly introduced *Madras Platform* for the "Siege Guns proved a failure; not only was it impos- "sible to traverse the Guns upon them, but they were "soon broken by the recoil. By the end of the second "day of the siege scarcely any remained entire; and the "Engineers were compelled to substitute for them such "planking as could be procured in the country."

It may be useful to give some details regarding the construction of this pattern of Platform thus stated to have failed in the Crimea, and to have thereby occasioned great injury to the Public Service, by stopping the fire of the batteries; and it will perhaps on explanation be admitted, that the failure may have arisen from other causes than defects in pattern or mode of construction.

The marked feature in this Platform is its portability, by reason of all unnecessary wood and Iron work being dispensed with. The wheels rest on two planks, and the Trail of the Carriage is guided in its recoil by an Iron guider passed through a Pintrail hole running in a groove on one plank, on which the Trail of the carriage recoils. The difficulties experienced in the use of these Platforms in the Crimea, probably arose from defective scantling in the wheel plank, and unsuitability in the kind of timber used.

Defective laying of the platforms may also have contributed to the failure; and the following remarks in Conolly's History of the Corps of Royal Sappers fully corroborates this opinion.

Conolly's History of the Corps of Royal Sappers and Miners, Page 244, Vol. II.

"It was not long before the Madras traversing plat- "form, considered to be the specific for a great siege, "was shown to be a failure. From the hard and uneven "bottom of the trench the platforms were, to save "them from injury and their efficiency, laid upon "sand-bags well tamped, but the violent and sud- "den action of the guns in their recoil shivered the "platforms to pieces. A rude substitute was expedi- "tiously furnished by tearing down some dilapidated "wooden houses in the neighbourhood of the Camp, "and resorting to the old expedient of sleepers and "floors, the platforms, so prepared by the Sapper "carpenters, were found to be far less liable to de- "rangement, than the engineering exotic from Ma- "dras."

A great difference is understood to exist between the practice of the Royal and Indian Services, viz., that in the Royal Army the Engineer Officers both construct the Batteries and lay the Platforms, whereas in the Indian service, the entire charge of the Platforms, as respects their custody, conveyance and use, rests with the Artillery themselves; whereby both men and officers are regularly trained in the laying of Platforms: a practice which commends itself as most useful in regard to so important a portion of equipment on which the efficiency and accuracy of fire mainly depend.

The Jury also noticed great care and finish in the construction of these Platforms; the bolts, screws, nuts, and planks, being all assimilated and carefully marked and numbered, so that even in the dark the articles required for laying the Platforms, may easily be found. Owing to the vast extent of country over which the ordnance of India has to travel, it will be admitted that it is of great importance to dispense with useless material in order to ensure lightness; and these considerations have doubtless led to the adoption of this kind of Platform for the Indian service, rather than Platforms of other patterns. No doubt this Platform could be improved upon, and made more perfect as far as respects stability; but only we believe at the cost of a considerable increase of weight, which in Indian marches of many hundreds of miles becomes a serious question for consideration; and in the Crimea where such great difficulties of transport have already been encountered as to prevent even a sufficient number of shot being brought up for the Pieces already in Battery, great weight of Platforms would be a serious and perhaps insurmountable obstacle. The failure of these Platforms in the Crimea, may therefore be attributed probably to defective application of the Madras Pattern. There may have been insufficient scantling to bear the weight of the Gun and Carriage mounted, and also defects in laying the Platform; judging from the remarks regarding the traversing.

The model of *Sick Carts* exhibited, may perhaps be well adapted for the transport of sick in India; but they appear to be very far inferior to the ambulances of the French Army, which afford so many conveniences for the movement of the sick Soldiers. The difference in the construction of the Indian sick carts may however be attributed to the different requirements of service in India, where Regiments march 600 or 800 miles; and even then the sick, lame, and those unfit for duty, must still accompany the corps. These sick carts may therefore be suitable for such long journeys, but for field operations so long as the British Army in the East is victorious, the ready and willing Dooly Bearers with Doolies, will always carry off the wounded from the Field of battle more promptly and comfortably than even the French ambulances.

The model of the *Field Medicine Chest*, is of a peculiarly neat construction, affording sufficient space for all the medicines required for some time; it admits of

easy access, and the lids when spread out, form a table for compounding medicines. It may be somewhat difficult of carriage except in the way at present planned, viz., by 4 beams with a pole projecting at the ends ; but with the existing means of carriage in India, this medicine chest is well suited for the purpose intended.

General Remarks.

Amongst the models exhibited there are none which can be considered deserving the award of medals ; but the Jury think that honorable mention may be made of the models constructed at the Gun Carriage Manufactory and Artillery Depôt of Instruction ; and accordingly recommend the Superintendent of the Gun Carriage Manufactory and the Director of the Artillery Depôt to receive honorable mention.

As noticed in the Grand Exhibition, so on this occasion, the Military implements and articles for war purposes are unusually few, as if the object of the exhibition, viz., to draw forth all those articles tending to advance civilization,were felt to be in opposition to the exhibition of articles employed in contravention of that repose and quiet so essential for the progress of scienee and knowledge ; but it is to be hoped that in the exhibition of 1857, Departments and individuals may be induced to exhibit all kinds of Military implements whether of offence or defence, so necessary even in civilized eommunities for maintaining freedom from aggressive attacks on the part of less civilized communities. And in India especially,where sueh great changes have yet to be effected before the people ean be brought to appreciate the advantages of peace and the consequent improvements in civilization and Arts, and where we are surrounded by numerous tribes of Asiatics who may at any moment be impelled on to plunder, it appears the more essential that the means of defence should not be omitted, any more than articles which whilst denoting progress, also point to the necessity of means of protection from enemies. We now furnish the following details of Armour exhibited.

Descriptive Catalogue of Arms and Armour, the property of Lieut. General Anson, Commander in Chief.

1 *Coat of Mail, Steel.*—The whole of this coat of Mail is rivetted together, with the exception of the collar which is eomposed of small brass and steel rings, merely looped one into the other ; the Helmet of this is also steel, inlaid with gold, surmounted with a curtain of brass and steel rings of a sufficient depth to cover the back of the neek.

2 *Sets of plate Armour.*—These two sets of plate armour are beautifully inlaid with gold,and are composed of steel of the best description ; the helmets are also surmounted with a beautiful fringe of steel and brass rings looped together and the gauntlets are fringed with gold lace. There is only one shield belonging to these two sets of plate armour and that is eomposed of fine steel beautifully inlaid with gold.

2 *Coats of Mail.*—The whole of these two eoats of mail are of Steel, they are both rivetted and welded together, and appear to have been made a number of years ; the collars are of velvet dotted with small brass spangles.

1 *Suit of Chain Armour.*—This Suit of Armour is composed of brass and steel rings 3-16ths of an inch in diameter ; linked together but not rivetted.

1 *Steel Chain Headpiece.*—This headpiece is composed of small rings 3-8ths of an inch in diameter,and all rivetted together ; the top of it is of wrought iron tinned.

1 *Pair of Two Edged Swords.*—These pair of swords are from the South of India, the blade of one is beautifully wrought and inlaid with gold, and the other with silver ; the scabbard of one is of soft wood eovered with purple velvet and trimmed with gold laee, and the other is covered with embossed leather.

2 *Damascus Swords.*—These two Damascus swords are of beautiful workmanship, the handle of one is steel, inlaid with gold ; and the other is of Ivory mounted with steel inlaid with gold ; the scabbards are of wood, covered with embossed leather, gilt, and the mountings are of steel, inlaid with gold.

1 *Battle-Axe.*—The handle of this axe is composed of wrought iron covered with silver, beautifully chased and gilt ; the axe itself is of Damascus manufacture, fluted and perforated ; the sheath is of crimson velvet trimmed with gold.

5 *Daggers.*—These Daggers are of Damaseus manufacture with Ivory handles ; the blades are beautifully watered and the edges are bevelled off about $\frac{1}{4}$ ineh in depth, and beautifully polished : the scabbards are of light wood covered with red and green velvet, tipped with gold.

2 *Daggers.*—These two Daggers are also of Damascus manufacture, the blades are watered and levelled at the edges, and along the back of them, near the handle, is a groove in which is placed a number of small shot. The handles are of Ivory, and the scabbards are of wood covered with green velvet, trimmed with gold.

1 *Dagger.*—The handle of this Dagger is beautifully inlaid with torquoise and rubies, and the scabbard is of green velvet, tipped with gilt copper, inlaid also with torquoise and rubies ; the blade itself is of the best description.

1 *Damascus Dagger.*—The handle of this dagger is of steel, richly inlaid with gold ; and the scabbard is of soft wood covered with erimson velvet, tipped with steel richly inlaid with gold.

3 *Damascus Daggers fitting one into the other.*—These Daggers are very curious pieces of workmanship,

two of them have steel case handles richly inlaid with gold, and the other is of Ivory. These three daggers fit one in to the other, so that when all together they have the appearance of one dagger only ; the scabbard of the outer one is of wood covered with green velvet, tipped with silver.

1 *Dagger of Cashmere.*—The blade of this Dagger is inlaid with gold near the handle, and the handle is of blue quartz mounted with steel richly inlaid with gold ; the scabbard is of purple velvet, tipped with silver.

2 *Small Daggers.*—The blades of these Daggers are quite plain and the handles are of yellow crystal ; the scabbards are of purple velvet tipped with silver.

5 *Daggers or Creeses* —The handles of these are all of steel, beautifully watered and inlaid with gold ; the blades are all fluted and chased, and the scabbards are of wood covered with embossed leather and crimson velvet.

1 *Pair of Damascus Swords.*—The blades of these swords are in excellent condition, the handles are of Ivory, one mounted with steel and the other with brass ; the scabbards are of soft wood, covered with embossed leather and mounted with steel and brass.

1 *Damascus Sword.*—The blade of this sword is beautifully watered, and the handle is of steel richly inlaid with gold ; the scabbard is of wood covered with embossed leather tipped with brass.

1 *Peon's Sword.*—The blade of this sword is quite plain, but the handle is of steel beautifully inlaid with gold ; the scabbard is of wood covered with invisible green velvet, tipped with gold.

1 *Sword of the Emperor Baber.*—The blade of this sword is cut from the hilt to the tip nearly in the same manner as a common pitsaw ; it is also divided in two for about 9 inches from the point, so as to form 2 swords from that distance. The handle is of wrought iron covered with silver, and the scabbard is of wood covered with canvas and quite plain.

1 *Straight Sword.*—This sword has three flutes running along the blade ; the handle is of wrought iron perforated and inlaid with silver, and the scabbard of soft wood covered with plain leather.

1 *Pair of Steel Gauntlets.*—This pair of gauntlets are chased, and appear to have been made many years since, as the inside of them is very much corroded.

Arms belonging to His Highness the Rajah of Tanjore.

1 *Complete set of plate Armour for an Elephant.*—The whole of this set of Plate Armour is composed of iron plates intermixed with rings of the same material, the plates are rivetted, but the rings are only linked together.

1 *Set of Plate Armour for a horse.*—This set of Armour is composed of small plates of wrought Iron, intermixed with small iron rings linked and rivetted together ; the whole of this set is lined with cotton cloth padded, and appears to be of recent manufacture.

2 *Sets of Iron Chain Armour.*—These sets of Armour are composed of small iron rings $\frac{2}{3}$ths of an inch in diameter rivetted together. The turban of one of these suits is made of long strips of sheet iron rivetted and brazed together, and in front of the turban is a plate of iron which projects down as far as the mouth, (intended to protect the face from the cut of a sword) and this piece of iron is richly chased. The other head piece is made of plates of iron and small rings of the same material rivetted together.

1 *Set of Plate Armour.*—This set of Armour is of plate iron with the exception of the joints, which are of small iron rings rivetted together ; the Helmet is of sheet iron studded with small brass buttons, and the gauntlets are of iron elegantly chased.

1 *Set of Iron chain armour, with Head piece.*—The whole of this suit is composed entirely of Iron rings rivetted together, the head piece is also made of Iron rings rivetted together and appears to have been made long ago.

1 *Gooptee or sword stick.*—The blade of this is two-edged, about 3 feet in length and quite plain ; the handle is of ebony, and the stick also of ebony tipped with silver.

2 *Gooptees or sword sticks.*—The blade of one of these sticks is diamond shaped or four square, and the other two-edged ; the handles are of carved wood, richly gilt, and the sticks of ebony tipped with silver.

1 *Gooptee or sword stick.*—This stick is only two feet in length, and the blade is four square ; the handle is carved representing 2 parrots gilt, the stick of beech tipped with silver.

1 *Shield of Rhinoceros Hide.*—This shield is made of the hide of the Rhinoceros, beautifully studded with gems set in gold.

2 *Bows with quivers, arrows, &c.*—These bows are made of bamboo, " gilt, and the quivers of crimson velvet fringed with gold lace" and embroidered all over with gold ; the arrows are of light Bamboo, tipped with steel.

1 *Pair of Gauntlets.*—This pair of Gauntlets is made of copper richly chased and perforated ; they are also gilt and fringed with gold lace.

3 *Spears.*—The shafts of these spears are of wood, with the exception of about 18 inches from the bottom which is of iron richly chased ; the shaft itself is covered with copper, curiously chased and perforated the whole length ; the spear heads are of the best Indian steel, and the sockets are of Iron welded to the steel richly chased and inlaid with silver.

6 *Spears.*—The shafts of these spears are of bamboo, but the spear heads are of a very inferior material, be-

ing made of iron and steel combined together and quite soft, and are scarcely worth noticing.

1 *Spear.*—The head of this spear is of the best Indian Steel and is fluted all over ; the socket is of iron very richly finished, but the shaft is only of bamboo.

1 *Spear.*—The shaft of this spear is about 14 feet in length ; and at about 3 feet from the bottom is a large ornament decorated with silk tassels. The spear head is only of iron, and quite plain.

The shaft of this rocket is of bamboo about 12 feet in length ; and the socket itself is of wrought iron weighing about 30 lbs. and fastened to the shaft with thongs of green hide.

4 *Straight feneing Swords.*—These swords are of excellent steel and fluted ; the handles are of Iron inlaid with gold, and the seabbards of silver richly chased.

1 *Pair of Curved Swords* —This pair of swords are quite plain,the handles are of wrought iron gilt, and the scabbards of silver chased.

2 *Puttahs or Basket hilted swords.*—These swords are two edged and about 3 feet 6 inches in length : perfectly straight and very thin. The steel is of the very best description, the hilts of wrought iron chased and gilt, and the scabbards of silver quite plain.

6 *Puttahs or Basket hilted swords.*—The blades of these are the same as the former, and the hilts of iron gilt ; the scabbards being of red and green velvet fringed with gold lace.

1 *Bichoor or Dagger with* 3 *blades.*—The blades of this dagger are of Indian steel, and the handle of iron chased, representing 2 griffins' heads.

1 *Bichoor with* 2 *blades to be used by the Right hand.* —The blades of these are the same make as the former, but the handle is of copper.

1 *Bichoor with* 2 *blades to be used by the Left hand.*— The blades are of steel but very much worn ; and the handle is of wrought iron curiously chased.

11 *Kuttars.*—The blades of these are all of steel quite plain ; and the handles of wrought iron beautifully chased and perforated so as to resemble birds and fish.

5 *Kuttars or Daggers.*—The blades of these daggers are all fluted and very nicely finished ; the handles of iron, chased and inlaid with gold.

1 *Kuttar of Berhampore.*

2 *Bhallaparasa or Battle-axes.*—The heads of these are of steel and the handles of wrought iron and quite plain.

6 *Bhallaparasas or Battle-axes.*—The whole of these axes are of steel, and the handles of iron curiously chased.

2 *Bhallaparasas or Battle-axes.*—The heads of these are of steel, and the handles of black wood and quite plain.

1 *Ankoose or Elephant drivers' weapon.*—The handle of this weapon is of wrought iron beautifully chased and inlaid with gold ; it has a spear head and hook, both of which are richly chased and fluted.

6 *Ankoose or Elephant drivers weapon.*—These weapons are of the same make as the former but not quite so large ; and the handles of two are quite plain.

2 *Neeraracheekrum or Iron discs.*—These weapons are rather curious specimens of Indian war instruments ; they are made to slip over the hand with a strap behind, in the centre is a steel knife projecting to the front, and round the edges are also placed a number of short knives. These discs are more curious than useful.

1 *Set of Iron claw Nails.*—This set is made to fix on the fingers ; they are formed of separate iron rings made to fit each finger with a steel claw attached to each, and would prove most dangerous weapons in close quarters though of no use in any other way.

2 *Sets of Tigers claws.*—These set of claws are made to fit on the hand, and would prove rather disagreeable instruments to come in contact with.

5 *Shields of sorts.*—These are not very interesting, with the exception of one from Hyderabad. This shield is made of dark colored brass and is very nicely finished ; in the centre are four brass bosses and a half moon. The other shields are all quite plain.

1 *Great Gingal.*—This gingal is about 10 feet in length and made of wrought iron, the stock being of Trincomallee wood and very coarsely finished. There is no lock, but it is intended to be fired with a slow match.

2 *Small Gingals.*—These 2 Gingals are of the same make as the former but only about 6 feet in length ; the stocks are of common jungle wood. These are also made to be fired with the slow match.

1 *Carnatie Musket.*—The barrel of this musket is very old and appears to have been made very many years ; the stock is of black wood ornamented with brass, it has a common flint lock, and the ramrod is of wrought iron.

6 *Spears.*—The heads of these spears are all made of Indian steel and the sockets of wrought iron ; some of them are beautifully chased and inlaid with gold and silver, and the shafts of Trincomallee wood.

1 *set of Vazramootees.*—These are to be fixed on the knuckles when boxing, they are made of hard-woods and gilt.

1 *set of Vazramootees with steel spikes.*—This set is made of black wood, and along the back a row of steel spikes which would make a very dangerous wound if driven into the face.

5 *Rockets.*—These rockets are all of wrought iron, but the shafts are of bamboo. Two are decorated with flags of red cloth ornamented with gold, but the others are quite plain.

1 *Mardoo.*—This instrument is made of 2 deers' horns tipped with steel spikes; they are fastened together with the points projecting outwards, and there is a short dagger in the centre.

1 *Mardoo with Shield.*—This instrument is made in the same manner as the former, but in the centre is a small iron shield with a dagger attached.

1 *Mardoo.*—This mardoo is made of 2 deers' horns rivetted together, not tipped with steel like the former, but quite plain.

1 *Pair of Mugdars.*—These are nothing more than a large pair of clubs or dumb bells, fluted from top to bottom and very much resembling those used by recruits at drill.

1 *Gudgah.*—This is nothing more than a gilt stick with an iron handle plated with silver, and decorated with a lot of silk tassels.

1 *Gudgah.*—This gudgah is of bamboo painted green, with a handle of wood, gilt, and decorated with gold lace.

1 *Chilta.*—This instrument is nothing more than an iron club, the head is slightly curved, and surrounded with iron spikes.

Chilta in the form of a screw.—The shafts are of wrought iron very curiously worked, and the head consists of steel plates placed together in the form of a screw.

1 *Sangandha.*—This instrument is a long bar of wrought iron about 3 feet in length; the handle consists of 2 discs of wrought iron about 8 inches in diameter, with the rod running right through. It is intended as an instrument for exercise.

1 *Goda.*—This is an iron mace, the shaft being of iron about 2 feet in length; very curiously worked; and the head also chased.

1 *Gossum or sling.*—This curious specimen of ancient days is made of red silk embroidered with gold; the stones belonging to the sling are very nice white pebbles, the size of a hen's egg.

1 *Pair of Steel Quoits.*—This pair of quoits are about 7 inches in diameter and made of the best steel, the outer edge being very sharp. They are intended to be thrown from the tip of the finger.

1 *Pair ditto double edged.*—This pair are also of steel with the inner and outer edges both made sharp and are intended to be thrown or pitched from the hand, instead of the tip of the finger.

WAR KNIVES FROM CALICUT, BY H. CONOLLY, ESQ.

9 *War knives.*—The blades of these knives are of very thin steel formed in the shape of a bill hook; and the handles of ivory inlaid with brass.

81 *War knives.*—The blades of these knives are the same make as the former, but the handles are of wood inlaid with brass.

ARMS AND ARMOUR, THE PROPERTY OF HIS HIGHNESS THE TONDIMAN RAJAH.

1 *Suit of Steel Armour for a Horse.*—This suit of steel armour is composed of small plates of steel intermixed with rings of the same metal, rivetted together.

1 *Suit of Steel Armour for an Elephant.*—This suit of armour is made of the best steel plate intermixed with steel rings rivetted together; the whole of this suit is in excellent condition.

1 *Dagger with gilt Handle.*—This dagger is made of steel of the best description, the handle of copper gilt, and the scabbard of red velvet tipped with silver.

1 *Dagger.*—The blade of this dagger is quite plain, but the handle is of thin silver very nicely chased. The scabbard of crimson velvet tipped with silver richly chased.

3 *Hog Spears.*—The heads of these spears are of steel, and the sockets of iron brazed at the spear head and very nicely finished; the shafts of Trincomallee wood painted green.

1 *Spear with* 3 *points.*—This is a very curious specimen of Indian manufacture; the centre points are all of steel, and the socket of wrought iron very richly chased; the shaft being of wood painted green.

1 *Ankoose.*—This instrument is intended for the use of an Elephant driver; it is all made of iron excepting the point and hook which are of steel curiously chased.

1 *Long sword or Puttah.*—This sword is quite plain, but the handle is curiously carved,

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JURY AWARDS.

CLASS VIII.

2ND CLASS MEDALS.

Pro. No.	Catal. No.	Names of Exhibitors.	Object rewarded.
LXX	56 to 233	H. H. the Rajah of Tanjore	Arms of Offence & Defence.
CXCI	362 to 440	Honorable Walter Elliot, Esq.	Do. do.
CCCXXXIII	486 to 502	His Excellency Lieut. General Anson. . . .	Do. do.

HONORABLE MENTION.

CXV	275 to 300	His Highness the Tondiman Rajah. .	Arms of Offence and Defence.
CCLIII	455	Supt. of Gun Carriage Manufactory. . .	Model of a Mortar.
CCVII	330 to 361	Director of Artillery Depot	Model of Gun Carriage.

(Signed) F. BLUNDELL, MAJOR GENL.
(„) G. BALFOUR, LT. COL.

CLASS IX.

REPORT ON AGRICULTURAL AND HORTICULTURAL MACHINES AND IMPLEMENTS.

JURY.

Lieut. Colonel J. T. Smith, *Mint Master, Chairman.*

Lieut. Colonel C. E. Faber, *Chief Engineer.*

Major J. H. Bell, *Secy. Revenue Board, D. P. W.*

A. H. McNair, Esq., *Civil Engineer Madras Railway.*

ASSOCIATE AND REPORTER.

H. P. Hawkes, Esq.

The objects in this Class contributed by native Exhibitors are without exception, the mere models of those rude implements of husbandry which have been used from time immemorial in the cultivation of the soil.

A *few garden and farming tools* exhibited by the European Subordinates in the Arsenal of Fort St. George are very creditable specimens of workmanship. His Excellency Rajah the Tondiman Bahadoor contributes a complete and interesting set of the Agricultural implements in general use.

From Mysore also, Captain Harvey forwards neatly executed models of similar objects.

A completc set of cutting Instruments employed in husbandry, comprising hatchets, sickles, axes, &c. &c. from the Salem Local Committee are of a much superior finish to those ordinarily procurable.

Amongst some well made models of ploughs, harrows, &c. &c. contributed by Captain Blagrave (Cl. IX No. 51) from Masulipatam is one of the common drill which although generally known seems to merit a short notice, and similar drill for sowing raggy is exhibited by Mooneapah Maistry. It consists of a long and heavy rake to which is fixed a beam and yoke for bullock draught. The teeth of this rake are made of hollow bamboos considerably bevelled off at the back to permit the escape of the seed into the drill which the teeth make in passing over the ground. These teeth are severally connected by long hollow bamboos with a large bowl or reservoir in which the seed to be sown is placed. The action of the machine is obvious, the bowl being filled, the seed descends through these bamboo cylinders and makes its exit through the teeth of the machine into the drill prepared to receive it. The teeth thus act the double purpose of making the groove and depositing the seed.

The trowels, hoes, potatoe forks, &c. &c. of the usual European patterns, contributed by supervisor S. Brooks and Sub Conductor C. Smart are very well turned out and 2nd Class Medals are awarded for each of them.

JURY AWARDS.

Class IX.

2nd Class Medals.

CCLVII	52 to 63	Brooks, S. Supervisor..	Agricultural & Horticultural Implements.
CCLVII	64 & 65	Smart, C. Sub-Condr..	Agricultural Implements.

Honorable Mention.

CCXX		Captain Blagrave.....	Drill for sowing grain.

(Signed) H. P. Hawkes,

Reporter.

CLASS X.

REPORT ON PHILOSOPHICAL, MUSICAL AND SURGICAL INSTRUMENTS.

JURY.

Lieut. General J. S. Fraser, *Chairman.*

James Shaw, Esq., *Madras Army, H. E. I. Co.'s Oculist.*

Dr. A. Blacklock, „ *Professor of Surgery.*

Captain W. K. Worster, Artillery, *Reporter.*

In a country where science is but little cultivated, and the demand for Philosophical Instruments is so very limited, it can scarcely be expected that much inducement would be held out to Native Artificers to direct their attention to this branch of manufacture.

This Class is in consequence indifferently represented in the Exhibition. The specimens moreover, are by no means an average indication of skill. This may be attributed in a great degree to the productions being generally the work of artizans who have little access to good European models.

It is to be regretted, that the state of the art at Madras was not represented.

I.—*An abacus* for the blind (Class X. No. 1) for performing arithmetical operations invented by Mr. W. Cruickshanks, (who is himself blind) is very creditable to the ingenuity of the inventor.

II.—*Two Letter-balances with* "spring lifts" from Tanjore, exhibited by H. Forbes, Esq., (Cl. 4 and 5) are neat specimens of Native workmanship.

Other Balances for the same purpose, of rougher make were exhibited, but call for no particular notice.

An universal Sun-dial, made by Mootoosawmy of Tanjore (Cl. and No. 6), is the best production in the class, and is considered a very creditable display of skill. The usual form of this instrument has been preserved though the graduation is capable of improvement.

The Jury however, recognizing the difficulty attending the execution of an instrument of this description without adequate means, award the Exhibitor a 2nd Class Medal.

A Tourniquet for the cure of aneurism exhibited by Overseer Patterson, is a very creditable specimen of work in steel, and although the principle of limited local pressure has long been recognised, and the usual form of the Instrument has not been departed from, the Jury consider the exhibitor is entitled to honorable mention.

A Cavalry Trumpet exhibited by Aurokeum Brass founder and instrument maker at Bangalore, is a highly creditable specimen of native workmanship and deserving of Honorable mention.

A complete collection of Native musical instruments both for a band and for accompanying the voice exhibited by His Excellency the Rajah Tondiman Bahadoor are interesting.

JURY AWARDS.

Class X.

2d Class Medal.

Pro. No.	Catal. No.	Name of Exhibitor.	Article Awarded.
lxviii	216	Mootoosawmy of Tanjore.	An Universal Sun-dial.

Honorable Mention.

lxiii	175	Mr. Cruickshanks	Abacus for the blind.
cclviii	2	Overseer Patterson ...	Tourniquet.
cclxxiv	38	Aurokeum	Cavalry Trumpet.

CLASS XI.

MANUFACTURES IN COTTON.

AND

CLASS XVIII.

WOVEN, SPUN, FELTED AND LAID FABRICS, WHEN SHOWN AS SPECIMENS OF PRINTING OR DYEING.

JURY.

W. E. Underwood, Esq., *Chairman and Reporter*,

W. U. Arbuthnot, Esq.,

B. Lecot, Esq.,

T. Tawse, Esq.,

N. C. Mooroogasem Moodelly,

Azeez Ool Moolk Bahadoor,

Major General J. S. Fraser,

E. Maltby, Esq.

Major J. McDougall,

Captain G. B. Roberts,

The Cotton Manufactures of India are of ancient origin, they are mentioned by Herodotus, and the lightness and delicacy of the manufacture attained has not been exceeded even by the industry and skill of the West, but, the momentous discoveries of Arkwright and others, have enabled Great Britain to manufacture certain kinds of Cotton Piece Goods at a cheaper rate than is practicable even with the low rate of wages prevailing in India. For instance, the Export-trade of the Madras Presidency in Madapollams and Long Cloths has been annihilated by the British Manufacturer, and these goods laid down by him in all the Bazaars of India. The Export-trade of what were denominated Madapollams and Punjums for the 10 years from 1815-16 to 1824-25 was as follows.

	Bales	Value Rs.
1815-16	11,925	37,82,859
1816-17	10,243	33,53,243
1817-18	9,905	32,78,330
1818-19	7,715	24,00,543
1819-20	5,903	19,64,006
1820-21	5,149	16,81,551
1821-22	2,915	12,53,383

	Pieces		
1822-23	541	53220	409,337
1823-24	,,	..	142,470..793,208
1824-25	,,	..	128,400..802,600

This description of Goods is not now made, and the three beautiful pieces of Punjum in the Exhibition, are highly interesting as specimens of that important manufacture which formerly was to be found in bales in the Bazaar and in the Custom House for shipment.

The same causes which contributes to so great a falling off in the Cotton Manufactures of this Presidency produce a like effect upon the yarns spun by hand, the change may be perceived by referring to cotton twist imported from the United Kingdom in the years from 1826 to 1830 compared with the last 10 years.

1826-27	13,296
1827-28	17,573
1828-29	96,517
1829-30	49,110
1830-31	10,549
Total...	187,045

1844-45	1,178,618
1845-46	755,464
1846-47	953,477
1847-48	517,067
1848-49	375,250
1849-50	673,387
1850-51	786,544
1851-52	10,62,223
1852-53	10,16,703
1853-54	11,05,181
Total	84,23,944

It is worthy of remark that even the skill and capital of England has not been able to compete in a certain class of fabrics with the manufactures of this Presidency in the home market, or even to exclude them from the Foreign. This does not arise from any distaste upon the part of natives to wear articles of European manufacture, but consequent upon Europe not being able to supply a white or dyed article, usually worn by natives, as cheap as it can be manufactured in the country; proving that there are bounds even to the power loom, and that fabrics coarse in quality can still be made by the hand at a profit, for, after a fair trial, the weavers of Europe have given up competition in this description (Native Cloths) of fabrics finding their exportation to India not remunerative. It is generally supposed that the power looms of England have destroyed the export Trade of Madras but the annexed Table demonstrates that such is not really the case for though a certain description of Goods have ceased to be exported yet on the whole there is no very extraordinary difference in value between the Export of Cotton Piece Goods, in what were considered the palmy days of the Export Trade, compared with those of the last ten years.

Compared with statement at Para 1.

1844-45.....	3,841,982
1845-46.....	3,926,438
1846-47.....	4,,86,921
1847-48.....	3,736,055
1848-49	2,843,425
1849-50.....	3,097,558
1850-51.....	2,942,874
1851-52.....	2,908,934
1852-53	3,521,516
1353-54.....	3,141,024

The Cotton Twist imported from the United Kingdom may in round numbers be taken at 400 bales per annum, each bale will make about 3000 yards of the native cloths usually worn which would give 12,000,000 twelve million yards annually manufactured, irrespective of goods made by yarn spun by the hand. The amount thus given is an estimate that approximates to the truth with sufficient accuracy to exhibit the great extent to which handloom weaving is still carried on in this Presidency.

The Cotton Piece Goods submitted for the consideration to the jury comprised only a portion of the varieties of this great staple of the Madras Presidency, some however were very remarkable not only in quality and finish but also in the style in which they were got up; these latter remarks refer more particularly to the Cotton Manufactures of Pondicherry and Mangalore. The jury after careful examination with the Assistance of Native Associates accorded awards as follows.

The jury consider the Arnee muslin (white) exhibited by I. Gooroomoorthy Chetty to be an excellent specimen, fine in quality, soft to the touch, even in the thread, which is country made and of good color and texture, and award the exhibitor a 2d Class Medal.

The Arnee colored muslins for ladies dresses exhibited by the same manufacturer are deserving of commendation and are of a quality very far superior to that which is generally made for sale. They appear to have been manufactured expressly for the exhibition. The muslin next in quality was exhibited by Ruthnum Moodely and deserves commendation.

The Table cloths and Napkins from Pondicherry from the works of Monsieur R. Godfroy are numerous, very good in quality, varying in size from the ordinary table cloth to those of dimensions suited to public entertainments. The jury express their unqualified approbation of this Fabric, made with thread and wove, with machinery set up by the enterprising firm connected with this manufacture in this country. The design, now commonly called the Damask pattern, and imitated in various parts of this Presidency, was introduced at these works. The jury desire to bring this manufacture to the especial notice of the Committee of the Madras Exhibition and award a 1st Class Medal.

The Cotton Cloths exhibited from Nellore deserve marked commendation both as to variety and excellency in quality, the more so as they consist of manufactured Articles which find a ready sale in the markets of this Presidency. The Punjum Cloth, unbleached, is of excellent quality regularly wove throughout, fine in texture, very strong and such as would do credit to any European Manufactory.

The Cambric Muslin bleached and the Isree exhibited by Veerabomma Kristnama Chetty are of very superior quality and the Jury consider the Manufacturer entitled to a reward of a 2nd Class Medal.

Puteha Ramalinga Chetty has sent from Nellore Handkerchiefs (pocket) Jean Cambric Muslins, *watered*, (Rajabudar) and what is called unbleached Drill, but it is good Jean. These manufactures deserved unqualified approbation, especially the watered Cambric which is exceedingly well done, a 2nd Class Medal is awarded. The Cotton Fabrics of Nellore are most interesting, excellent in quality and of great variety from the coarsest material to that which is very superior, and deserve in the opinion of the Jury marked notice.

The Cotton Manufactures sent by the German Mission at Mangalore were very neatly got up, the Checks and Ginghams were good but not equal to some exhited, made in Madras. The Jury noticed especially a white fabric flowered, it being the only piece in the Ex-

hibition made with the Jacquard loom, and this loom the only one it is believed to be found in this Presidency. The Jury therefore consider it worthy of especial notice and award a 2nd Class Medal.

Conjetty Arjapah Chetty exhibits excellent unbleached Isree to which a prize of 50 Rupees is awarded.

The Blue Cloth made by the Societ's desguinees at Pondicherry is a manufacture of much interest, the thread is dyed wove and spun in the town and the dye excellent, the Jury award Honorable Mention.

To Polar Chetty for the finest quality of wove Table Cloths and Napkins in the Exhibition, made at Madras, the Jury award a 2nd Class Medal.

Also a 2nd Class Medal to Cassava Doss, for the best Trowser Cloth from Rajahmundry.

Also a 2nd Class Medal to P. Chengalroy Chetty for Gown Cloth.

Shot Diaper from Masulipatam (CXLII-455) so made that it was difficult to ascertain whether it was not shot with silk. After a most rigid examination it was ascertained to be a Cotton Fabric, excellent in quality and color, and being the only piece in the Exhibition the Jury consider it entitled to a 2d Class Medal.

Baloo Chetty manufactured some imitation English Check fit for children's dresses and gown pieces. They were of great variety, the quality very good the color tastefully distributed and the dyes excellent. Among them was a NEW violet dye, likely to be extensively used, the Jury award a 2d Class Medal.

The Chintzes from Masulipatam were of great variety as to color, size, quality of the dye and price, the whole collection the Jury consider is interesting, they are very well colored and the dyes good, on this ground and further that among them there is a Palempore by Aga Ismail of Masulipatam embroidered in gold of a chaste and elegant Pattern, the Jury award to the whole Honorable Mention.

To Coop Chund for Nankeen LXIII-151 the only specimen in the Exhibition, of good quality and colar the Jury consider worthy of credit. It is from Tinnevelly.

The best Muslins for Native apparel are exhibited from Hyderabad they are unequivocally the best, whether white or colored, for these the Jury award a second class Medal.

To Narsimoloo a 2d Class Medal for the best Native Cloth white with gold borders and silk fringe.

To Chengalroya Chetty for the best Towels from Cuddalore the Jury award a prize of Rupees 50.

Ajee Maundee Saib and Aga Ismail have each exhibited excellent Chintzes, in quality, and dye, from Masulipatam. The Jury consider the specimens equal and award a prize of Rupees 50 to each. The Jury consider it advisable to notice how largely the Cotton Manufactures contribute to the wealth and prosperity of this Presidency both from the sale in the Home market and the Export Trade in them. They therefore trust that the Committee will not deem they have been too lavish in awarding Medals, especially as the number of Exhibitors was large and the goods filled a large space in the Exhibition. At a future Exhibition the Jury beg leave to suggest that prizes or Medals be not granted except for some new manufacture, or a very superior sample of the ordinary manufactures. The grant of the Medals and prizes, at this Exhibition, will probably lead to decidedly beneficial results, and induce a spirit of emulation which cannot fail to be highly advantageous to individuals and the country at large; tending as it generally does to the two main points which affect commerce, viz., excellence of quality and a diminution in price.

The undermentioned articles are worthy of Honorable Mention.

Goa Local Committee..... Stamped Dimity.
Paremcottiah Naidoo..... VentapollamNeck Handkerchiefs.
Rev. W. Groney..... Damask.
Yullamparoo..... Handkerchief.
Basavalingum(Rajahmundry)... Penelope Canvass for Berlin wool work.
Baloo Chetty, (Cuddalore) .... Colored Doyleys.
Kotha Sooba Chetty, (Salem) .. Native Cloths.
RajahmundryLocalCommittee.. Woman's Cloth.
Moosany Lutchmen Chetty (Salem)..... Native Cloths.
Cuddapah Local Committee... Check Trowser Cloth.
Iyah Chetty, Guntoor.... .... Cottons of sorts.

The Madras Tariff exhibited a very complete collection of every sort of piece goods manufactured through the Presidency most of them of excellent quality, and when added to those in the Exhibition, will form a perfect representation of the Cotton manufactures of this Presidency. The Jury having carefully examined them, assisted by Native associates, deem the following worthy of special commendation.

The Arnee Muslin (No. 1) priced Rupees 122½ attracted much attention and praise. The fineness and delicacy of its texture are clear proofs of what the Native workman can achieve under adequate inducement.

No. 30 a counterpane of Coimbatore manufacture, is a pretty article, well and tastefully got up.

No. 31 Vizagapatam Isree; No. 32 Nellore white Percalah, and No. 63 Jyempettah Soocey, are all specimens of accurate workmanship, evincing much pains and skill.

The Handkerchiefs, viz. No. 53, colored Madras; No. 58 red Sydapet; and No. 59 Ventapollam, were much admired for the harmony and richness of the colors, and the superiority of texture.

The woman's cloths of Tanjore and Madura manufacture, and men's head cloth, also from Madura, are good articles, and will compete with the production of any other Loom in the world.

In short the whole collection of Cotton piece goods is a very valuable and perfect representation of this branch of Industry.

JURY AWARDS.

Classes XI and XVIII.

First Class Medal.

Pro. No.	Catal. No.	Name of Exhibitor	Object Rewarded.
civ.	446 to 448	Godefroy, Monsr.	Damask table linen &c. &c.

2nd Class Medal.

cclix	384 ..	Rajahmundry Local Committee..	52 punjum cloth.
clxx	98....	I. Gooroomoorthy Chetty.....	Arnee Muslin, white.
cxxix	400 & 401 ..	V. KristnamaChty.	Cambric muslin & bleached Isree.
cxxviii	394 & 395 ..	Butcha Ramalinga Chetty.....	Jean and watered cambric.
	470	German Mission..	Table cloths woven in the Jacquord loom.
		Palar Chetty	Table cloths and napkins.
		Cassava Doss	Rajmdry. trouser cloth.
lxxvii	330 to 344 & 432 ..	Chengalroy Chetty	Gown cloth and towels from S. Arcot.
cxlii	455 ..	Masulipatam Local Committee	Short diaper.
		Nawab Salar Jung Bahadoor.....	Hyderabad muslins.
clxix	314 ..	Narasimloo Chetty	Native cloth with gold border.

PECUNIARY AWARDS.

			Amount. Rs	
cxlii	176 to 179..	Ajee Manndee Saib	50	46 chintzes of sorts.
cxlii cccxxxv	27.. 57..	Aga Ismail Saib	50 50	36 chintzes of sorts & a gold flowered palampore
		Conjetty Arjapa Chetty.....	50	Unblchd. Isree.

Honorable Mention.

cxlviii	1 ..	Ruthnum Moodely	Muslin.
lxiii	151 ..	Coopchund	Nankeen.
cxlii	2 & 3..	Pillarysethee Barthasaradee Naidoo.....	Palampores.
cxxxvi	7 to 21 53 to 56	Rajamundry Local Committee	Chintzes of sorts
ci	24....	Balakiroochna Parasoorama & Co.	Blue cloth from Pondicherry.
		Goa Local Committee	Stamped dimity.
	234 .	Paremcottiah Naidoo	Ventapollum neckerchiefs.
	469 ..	Groney, Rev. W.	Damask napkins.
xc	345 ..	Basavalingum.....	Penelope canvas for Berlin work.
lxi	290 ..	KothaSoobaChetty	Native cloths.
lxi	291 to 294...	MoosanyLuchmen Chetty.....	Native cloths.
ccxi	.....	Cuddapah Local Committee....	Trouser cloths.
cclxxxiv	224 ..	Iyah Chitty.	Cottons of sorts.

CLASS XII.

WOOLLEN AND WORSTED MANUFACTURE.

JURY.

W. E. Underwood, Esq.—*Chairman and Reporter.*

H. A. Murray, Esq.

J. Kellie, Esq.

Veera Permal Pillay.

Sirdar Jung Bahadoor.

Very few specimens of Woollen Manufactures were laid before the Jury. The most remarkable were those from Hoonsoor comprising white and colored blankets of various textures made in the Native loom, some being imitation English Articles, they are a decided improvement upon the country cumbly, and are cheap in price. Among them was the description of blanket furnished to Invalids and time expired men proceeding to England. These are not manufactured for the European Troops being too thick, heavy and unsuited to the climate. English blankets are therefore provided instead ; the comparative cost is as follows :

1 Hoonsoor Blanket.	1	12	0
1 Europe do. red	4	8	0
1 Do. do. white....	5	8	0

The Jury consider this manufacture worthy of encouragement. They deem it proper to observe, that means should be devised to improve the Manufacture especially as wool is abundant. It is desirable to diminish the quantity very considerably with a view to the manufacture of a thinner article. The Jury award a Second Class Medal to Captain Loudon.

The description of wool from which these were manufactured is of recent introduction. In the Mysore country "Sheep thrive well, but the wool is coarse, " and little used except for the manufacture of Native " Blankets. About 10 years ago, General Cubbon took " charge of a flock from the Madras Government, " which had been collected the year previously for the " purpose of introducting Merino's wool into the coun- " try ; but that flock was useless, it having been attack- " ed with rott. He then collected Ore at a farm about " 60 Miles West of Bangalore, and imported 3 or 4 " Rams annually from Sydney, these amalgamate so " well with the country sheep, both in figure and size, " that in the 4th cross it is not possible to distinguish " farm bred from the imported Ram. There are now " about 6000 sheep in Mysore, with merino blood in " them. Rams from the farm have been distributed " to the Collectorates of North Arcot, Bellary, Salem " and Coimbatore. During last year 25 Rams were " sent to the Punjaub, by order of the Government of " India. The wool has been very highly reported on by " Messrs. Southey and Son, and several parcels have " been sold in London as high as 1 shilling 6 pence "per lb. while the country wool, and that imported "from Bombay, averages only 4*d.* to 5*d.* per lb. There "can be no doubt that when the Merino sheep is natu- "ralized, wool will become a valuable article of Ex- "port. A mercantile firm in Bangalore, has recently "exported the wool of the country to England, in con- " siderable quantity, and has realized a very fair pro- " fit. Eventually the Merino will be produced as " cheaply as ordinary wool." The quantity and value of wool annually exported is lb. 1,28413, Rupees 15,816.

A very large black cumbly from Kurnool was considered an excellent specimen closely woven, fine and soft in texture, and to this the Jury are disposed to award, as the best specimen of the ordinary woollen, manufacture of the country a second Class Medal.

A check Cumbly, from Chittledroog is deserving of honorable mention. The best specimen of woollens is to be found in the Tariff, being a blanket made of corded wool of excellent quality and reasonable in price.

The red cumbly of Mysore, was exhibited in this collection and is of good quality.

(Sd.) W. E. Underwood,
Reporter.

JURY AWARDS.

Class XII.

2d Class Medals.

Pro. No.	Catal. No.	Names of Exhibitors	Objects Rewarded.
ccxxx	12 to 16..	Captain Loudon...	Blankets.
xliv	1.....	Captain Gill.....	Black Cumbly.

Honorable Mention.

clxxiii	10.....	Captain Dobbs. ..	Check Cumbly.

CLASS XIII.

SILK AND VELVET.

The Honorable Sir Christopher Rawlinson, Kt.

J. D. Bourdillon, Esq.

W. E. Cochrane, Esq.

Hajee Agha Mahomed Bakir Namazee.

S. D. Birch, Esq.

T. Pycroft, Esq., *Chairman.*

R. H. Williamson, Esq.

Lutchmenarasoo Chettyar.

ASSOCIATE.

Lieut. J. Nicholas, *Reporter.*

The manufactured Silks sent to the Exhibition represented in a very partial degree the resources of the country in this useful as well as ornamental branch of Industry. It is to be regretted that the whole of the products in this class were not exhibited. The finest specimens of silk manufacture, namely, the Shawls of Bangalore and the silk carpets of Tanjore and elsewhere appear in other Classes and have very deservedly been awarded Medals. The Bangalore Shawls are very creditable from the harmony of colors and elegance of design. They have been much improved of late years both in quality of material and in beauty of pattern ; white silk pocket handkerchiefs rivalling the China silk in softness and richness are also manufactured at Bangalore, these however have not been represented.

The rearing of silk worms is carried on in all parts of the Mysore country, and great improvement has taken place in the quality of the silk at Bangalore, owing to the establishment, under the Mysore Government, of a farm, where mulberry trees from China and other countries have been introduced and where greater attention has been paid to feeding the worms, &c. Still the state of the trade compared with that of the Bengal Presidency shows that much is yet to be done, in 1841 1,175,308 lbs. of raw and waste silk were exported from the East Indies and Ceylon, of which nearly the whole was from Bengal. The exports from the Madras Presidency were, in 1853-4, 10,478 lbs. of raw silk and 1688 pieces of piece goods. Where the rearing of silk worms is so general all over the country, it cannot be doubted that the exports might be largely increased, if the natives could be prevailed on to take more eare in the culture of the worm, and in unwinding the silk from the eocoons.

In addition to the exports of this material a great quantity is used in the manufactures of the country. The Native cloths owe their beauty in a great degree to the richness of the silk borders. These do not appear in this class, but amongst mixed fabrics, &c. and have been well represented. The satins, kincobs, &c. of Hyderabad are well adapted to Native costume, but hitherto little progress has been made in manufacturing articles for European costume, except the Bangalore articles. The silk of Tanjore and the lesser but elegant articles such as gimp, fringe, cords and tassels, braid for carriages, &c., which appear in the Madras Tariff are of every variety and of great excellence.

(Signed) J. Nicholas.

The Jury award 2nd Class Medals to the following :

Pro. No.	Catal. No.	Names of Exhibitors.	Objects Rewarded.
cclxxxviii	178	Mrs. James Fraser, Ganjam	Silk scarfs.
cclvii	87	Hyderabad	Figured satin.

Honorable Mention.

lxvii	5-6	Madras Tariff ..	Tanjore silks.
cxcviii	38 to 42	Trichinopoly ...	Kincobs.
lxi	3	Botha Sooba Chetty Salem	Nafermanee silk handkerchief.
cxv	81	Poodoocottah	White Doovettie.
cxxxi	7 to 21	Hyderabad	Satins Nos. 47, 59, 84, 86.
cclxxii	171	Sooboo Pillay	Benares laced kincob.
cxlv		Soojan Mul Lala...	Ditto ditto.

CLASS XIV.

MANUFACTURES FROM FLAX AND HEMP.

JURY.

The Honorable Sir Christopher Rawlinson, Kt.

J. D. Bourdillon, Esq.,

W. E. Cochrane, Esq.,

Colonel Cameron, c. b. k. c. t. & s. and k. c.

Hajee Agha Mahomed Bakir Namazee,

S. D. Birch, Esq.,

T. Pycroft, Esq.,

R. H. Williamson, Esq.,

Lutchmenarasoo, Chettyar.

ASSOCIATES.

Lieutenant Colonel Pears, c. b., *Chairman.*

Dr. Alex Hunter, *Reporter.*

Among the Manufactures from Flax, Hemp and their substitutes are a few novel and interesting fabrics some of which have been made expressly for this Exhibition. The finest of these are Cambric made from the fibres of the Yercum or Calotropis gigantea exhibited by Mr. Underwood. This cambric is of very fine quality and suited for pocket handkerchiefs or collars. A prize was awarded in another class to the maker of a ladies' embroidered handkerchief manufactured from yercum fibre, these specimens were sent to the Paris Exhibition. Mr. Underwood also exhibits a variety of yarns of different qualities made from the same substance and others from the Palay or Cryptostegia grandiflora. These are suited to the weaving of different qualities of cloths. The Palay seems to be a good substitute for flax as it is soft, pliant and susceptible of being split into the finest threads. The stalk contains a large percentage of fibre, besides yielding a milky juice which solidifies into a gum elastic of the nature of India rubber. This appears to be one of the most promising fibres brought to the notice of the Jury. Mr. Underwood also exhibits fibres of the Agave Americana in a number of different stages of preparation, as in dressed fibre, plain and colored yarns, cloth, and damask, checked, colored, and striped canvas, imitation horse hair cloth and tabaret, all made from the same fibres. The Jury award to Mr. Underwood a first class medal for the above interesting additions to the manufactures of India.

Dr. Riddell exhibits some good plain and penelope canvas, colored cloth, brushes, white and colored ladies' shoes made from the fibres of the Agave Americana. The canvas and ladies shoes are of excellent quality, and the cloth of brilliant colors. A second class medal is awarded for these contributions.

Some neat crochet cuffs and collars of the fibres of the Agave and Marool are exhibited in another class.

Linum Usitatissimum.—Several specimens of true Flax from the Linum Usitatissimum are exhibited from Tanjore, Ganjam and the Nizam's Territories but none of them are clean or of good quality all having been stained by rotting. This is to be regretted as the fibre is of good length and is said to be procurable in large quantities in Goomsoor and the Nizam's territories if previous notice be given to the cultivators.

Calotropis Gigantea.—Very fine dressed and corded Flax from the fibres of the Yercum or Calotropis Gigantea are exhibited by Mr. F. Crampton, Madras, and by the Madras School of Industrial Arts. The Cuddapah Local Committee also contribute very clean white and strong fibres, thread and cloth from the same fibre.

Pala Chetty of Madras exhibits fine spun yarns and a good large bale of the fibre is exhibited from South Arcot. This appears to be a very good substitute for Flax and is abundant all over Southern India having been contributed from almost every district. It has been long known as one of the strongest fibres, but most of the specimens exhibited are dirty and coarse from careless preparation. It is used for bow-strings, traps and fishing lines, but the process for preparing it from the bark is either too tedious or too slovenly to permit of a large quantity being manufactured for export.

The ropes from Tanjore, Tranquebar, Masulipatam, Bangalore and Cocanada are all white and strong. As it can be made into the finest thread and cambric and would probably answer for making lace, it might be turned to more profitable account in these manufactures than in making coarse rope.

Ananassa Sativa.—Another good substitute for Flax appears to be the fibre of the Pine Apple formerly called Bromelia Ananas now Ananassa sativa, this is a fine white, strong fibre of considerable length, very silky and susceptible of being split into the finest threads : very fine specimens of this are exhibited by the Madras School of Arts as tow, Hackled Flax, and refuse for making string. Also as thread, string, and line, clean specimens of the fibre are also contributed from Cocanada, South Arcot, Tanjore, Dr. Riddell, Bolarum, and Dr. Nott, Tranquebar. This is the material from which the celebrated Pina cloth of Singapore and the Tenasserim Provinces, is made.

An embroidered handkerchief of this material and embroidered dresses are exhibited amongst the articles of the Madras Tariff.

Tylophora Asthmatica.—Another good substitute or flax is the Koorinja fibre of Tanjore *prepared* from the Tylophora asthmatica : this is of fine quality, white, strong and silky. The plant grows abundantly in Southern India, and is used medicinally—see Report, Class II. The specimen sent is small, but the Jury consider it deserving of Honorable Mention, as a new discovery.

Damia Extensa,—The Ootrum fibre of the Nizam's Territories appears to be another good substitute for flax. It is soft, white, silky, and strong, it can be procured in considerable quantities in Southern India, from the Damia extensa, a common creeper belonging to the Asclepiadaceæ. Capt. Meadows Taylor, exhibits good specimens of this and of six other fibres suited for cordage and weaving. The Jury award a 2nd Class Medal for these specimens.

The only other novelties in this class are samples of coarse yarn and colored cloth from the Northern Circars called Pedda Ankadu and Brahmamedi, contributed by the Honorable W. Elliot. These cloths are worn by the Natives and appear to be strong and durable, but the plants from which they are obtained have not yet been identified.

JURY AWARDS.

Class XIV.

1st Class Medal.

Pro. No.	Catal. No.	Name of Exhibitor.	Object Rewarded.
cccxlv	97 to 100	W. E. Underwood, Esq.	Manufacture from the fibres of the Agave Americana.

2nd Class Medal.

Pro. No.	Catal. No.	Name of Exhibitor.	Object Rewarded.
cccix	83 to 86	Dr. Riddell.....	Plain and Penelope canvas, colored cloth, brushes, white & colored ladies' shoes, &c.
		Capt. Meadows Taylor	Prepared fibres of the Ootrum or Damia Extensa and six other plants.

Honorable Mention.

cccxv	235	Mr. Kohlhoff, Tanjore	Koorinja fibre or Tylophora Asthmatica.

Alex. Hunter,

Reporter.

CLASS XV.

MIXED FABRICS INCLUDING SHAWLS, BUT EXCLUSIVE OF WORSTED GOODS.

JURY.

The Honorable Sir William Burton, Kt., *Chairman.*

W. E. Underwood, Esq.

Colonel G. Poulet Cameron, C. B., K. C. T. & S. & K. C. *(Reporter)*

J. Kellie, Esq.

H. A. Murray, Esq.

Veera Permall Pillay.

Sirdar Jung Bahadoor.

This Class, which includes within its limits the shawls of Cashmere, the Magnificent gold and silver Cloths of Tanjore, the much prized Silk shawls of Bangalore and a variety of other objects more or less valuable, contains many of those manufactures for which the East has been so long celebrated, and which are inseparably connected with the usual ideas of Eastern magnificience.

Cashmere Shawls.—The Cashmere Shawls are usually divided into three groups, the "Border Shawl;" the Rizayee or shawl of the finest texture, and the ordinary Cashmere Shawl.

Each of these Classes, are found to be well represented in the Exhibition and in order to facilitate a fair comparison of the various articles exhibited, the standard of price has been adopted and the whole of the Cashmere Shawls have been sub-divided into the following sections.

Section 1. Comprising Cashmere Shawls of the three varieties priced 500 Rupees and upwards.

Section 2. Cashmere Shawls varying in price from Rs. 100 to Rs. 500.

Section 4. Cashmere Shawls and scarfs priced from 50 Rs. to Rs. 100.

Section 5. All Cashmere Shawls and Scarfs below Rs. 50.

In the first section many valuable shawls varying in price from 500 Rs. to 1000 Rs. and upwards, are exhibited. The sums demanded however appear to be considerably above the market price, and the Exhibitors would seem to have but little idea of the first maxim in all commercial tranactions which goes to prove that the tradesman best consults his own interests by producing the best article at the lowest remunerative price.

The objects more particularly meriting observation both from their superiority of workmanship and from the reasonable prices affixed are as follows.

A black border Shawl (CXLIII 58) elaborately worked showing but little more than twelve inches of unembroidered surface—in the centre, priced at Rs. 1050, and exhibited by Girder Doss, Vullaba Doss: for this a first Class Medal is awarded.

A Red Shawl seven feet square of very fine texture (CCXX 120) priced at 700 Rs. and exhibited by H. Balamoocoonda Doss: for this is awarded a second Class Medal.

A Pair of White Rizayee Shawls (CXLIII 7) also exhibited by Girdar Doss and priced 1000 Rs.

And a White Rizayee Shawl of particularly fine texture (No. 490) from the Madras Tariff.

Section Two contains a large number of Shawls and Scarfs of all colours and qualities varying in price from Rs. 100 to 500.

Of these the two best in the estimation of the Jury are a *Scarf* valued at 425 Rupees, contributed byGirdar Doss and *a Shawl* priced 400 Rs. by H. Balamoocoonda Doss.

Amongst the richly embroidered Cashmere Shawls and scarfs contained in Section 3 the following exhibited by Girdar Doss Vullaba Doss deserve especial notice.

A pair of Red Cashmere Shawls richly embroidered with gold. *A pair of green Shawls* similarly worked, and *a pair of Cashmere Shawls* with rich Benares embroidery.

Balamoocoonda Doss exhibits also a pair *of very handsome Cashmere Shawls* with gold embroidered Benares work.

And Mahommed Salah Ebramjee contributes a pair of *Embroidered Shawls* the manufacture of Cashmere.

Of the numerous scarfs contained in Section 4, the jury give the preference to *an Orange Colored Scarf* valued at Rs. 100 exhibited by Balamoocoonda Doss.

Section 5. In this class the article most worthy of notice is a *Scarf exhibited by Soojanmul Lalah* and price 28 Rs. for which Honorable mention is awarded.

Two pieces of very rich Silk worked in imitation of the Cashmere shawl are exhibited by Girdar Doss (CXLII Nos. 52 and 53). These handsome and interesting fabrics are supposed to be the manufacture of the province of Gilhan in Persia on the borders of the Caspian Sea. The most extensive manufactures of this fabric are contained in the city of Resht the capital of the District. From the enormous expense attending their transit by land, whether by the route of Trebisond on the Black Sea, or the port of Bushire in the Persian Gulf, and the disturbed state of the countries through which they must necessarily pass, these manufactures are very rarely met with either in Europe or Asia, beyond the confines of the Northern Provinces of Persia.

From their value and singularity of workmanship they are well worthy of notice.

Bangalore Silk Shawls.—Two Bangalore *Silk Bed Quilts* exhibited by Moonshee Nunjapah (CLXXIV 147) Dondala Esmursan (CLXXIV 158) are good specimens of this description of native manufacture, and the jury would have assigned a prize to the first as being the superior article of the two, had not both been priced so much above their real value as to prevent their being brought into general use.

A Bangalore Silk Shawl by Moonshee Nunjapah (CLXXIV 153) weighing lbs. 2 B. 3 oz. 5½dr. price 125 Rs. is the best woven fabric of this description and the jury award him a 2nd Class Medal.

Mixed Fabrics.—1 *Silk* interwoven with gold or silver or both.

2 *Muslin* do. do. do.

Section 1.—Several very beautiful articles of silk interwoven with gold and silver from all parts of India are exhibited. The most remarkable of these are *fine Magnificent Dresses* forwarded by His Highness the Rajah of Tanjore (LXVII) for which a 1st Class Medal is awarded.

In Section 2 which comprises chiefly the superior native cloths richly interwoven with the precious metals the best specimens exhibited are those from Benares and a rich cloth of crimson and gold, shown by H. Balamoocoonda Doss deserves especial notice.

Of the manufactures of this Presidency the preference is given to *a Crimson and Gold Cloth* from Madura, (251) exhibited by Narasimloo Chetty for which a 2nd Class Medal is awarded.

JURY AWARDS.

1ST CLASS MEDALS.

Pro. No.	Catal No.	Names of Exhibitors.	Objects Rewarded.
CXLIII	58	Girder Doss Vullaba Doss.	Cashmere Shawl
LXVII	....	H. H. the Rajah of Tanjore	Richly laced fabrics.

2ND CLASS MEDALS.

Pro. No.	Catal No.	Names of Exhibitors.	Objects Rewarded.
CCXX	120	H. Balamoocoonda Doss	Red Cashmere Shawl.
CLXXIV	153	Moonshee Nunjapah.	Silk Shawl.
CLXIX	251	Narasimloo Chetty ..	Crimson and Gold fabric.

HONORABLE MENTION.

CXLV	68	Soojanmul Lallah ..	Scarf.

(Signed) P. PAULET CAMERON, *Reporter.*

CLASS XVI.

REPORT ON LEATHER, INCLUDING SADDLERY, AND HARNESS, SKINS, FUR, FEATHERS, AND HAIR.

JURY.

His Excellency Lieut. General The Honorable George Anson, *Chairman.*

Sir Henry Montgomery, Bart.

W. A. Morehead, Esq.

Lieut. General Tulloch.

Lieut. Colonel A. McCally.

Lieut. Colonel J. Hill.

Captain A. H. Hope.

C. V. Cunniah Chettyar.

ASSOCIATES.

H. D. E. Dalrymple, Esq.
A. Blacklock, Esq. } *Reporters.*

Tanned Hides and Skins.

The Tanned hides and skins exhibited are nearly all of excellent quality and will bear comparison satisfactorily with the same kinds of leather prepared in Europe. They have been thoroughly saturated with the tanning materials, are free from animal odour, and their sections do not shew the white line between the outer and inner surface, indicative in bad leathers of a hasty and inperfect inhibition of the tan liquor. The collection comprises the tanned hides of the Bison, Sambre, Bullock, Horse, Cow, Sheep, Goat, Kid, Dog, and Iguana. The last is the only kind requiring any special mention here, as all the others are well known articles of trade and commerce. The Iguana skins which have been tanned and dyed black, or left of their natural color are thin, even, soft, tough, elastic and granular, or shagreen-like in external appearance. From the absence of gloss, the appearance of this leather is not much in its favour, but it bids fair to be a durable article for light slippers, and a good covering for the commoner kinds of instrument boxes, such as are still done over with shagreen.

Tanned and Colored Skins—The skins colored and uncolored for book-binding purposes and boot-linings, are generally even, soft and pliant, and very suitable for their intended uses. Some of these colored leathers are very brilliant.

Sheep and kid skins tanned white, are exhibited here in much perfection—none of the specimens are fine enough for the better kinds of gloves, but they are all as well-suited as European skins of the kind for the purpose of the Apothecary.

Parchment Skins—The parchment skins take ink very well, but are not in every respect satisfactory. Their texture is uneven, and they have an odour quite distinct enough to lead the Jury to infer that they would be very liable to putrefactive changes on the accession of damp weather.

Wash Leather—The skins prepared with oil, in imitation of chamois or wash leather, are all excellent specimens of the kind, so far as thickness, softness pliancy and color, are concerned. In all these respects they will bear comparison with the Enropean article. But has every one of these leathers is tainted with the odour of the Fish Oil employed in their preparation, they cannot be recommended for household purposes, such as cleaning plate, though they will be found very suitable for cleaning brasses and harness.

As Potass, Soda, and dry pure deodorizing air are abundant in this country, a very little additional care would ensure the production of a perfectly inodorous chamois leather.

Buff leather.—The Buff leathers for accoutrements are nearly all extremely good in quality and have an evenness and equality in thickness which must render

them very economical leathers for manufacturing purposes.

The best tanned leather from Buffalo, Bullock, and Cow hides, has been contributed by Colonel Sheriff and Lieut. and Qr. Mr. Grant from the Horse Artillery Tannery at Bangalore. They have also exhibited specimens of leather prepared from the Hog, Calf, Goat, and Sheep skins which are of unexceptionable quality. The Jury consider these gentlemen as deserving of a 2d Class Medal for the best tanned leather of all kinds.

Captain Loudon of Hoonsoor, exhibits leather of all descriptions, buff, block tanned &c. for these the Jury award a 2d Class Medal. A Somerset saddle exhibited in this Department is well worthy of attention. The leather and construction are good and the workmanship superior to that of any other specimen of Native Saddlery the Jury have ever seen, they accordingly recommend that a 2d Class Medal be awarded to the maker Peeragee of Bangalore.

The other specimens of Native horse trappings and accoutrements exhibited by H. H. The Rajah Tondaman, Bahadoor, are of good quality, creditable workmanship and worthy of Honorable Mention.

The Jury regret to find that in this Class, there is but a meagre display of Native Saddlery, horse furniture and manufactured articles in leather, but hope the prizes awarded will encourage future competition in this important branch of industry.

The Jury consider that the *skins tanned with the fur or hair* on by Mr. P. Bowden of Guntoor are the best and recommend him for a 2d Class Medal. In addition to these Mr. Bowden exhibits excellent specimens of *Oil or Chamois leather*, sheep skins tanned white for Apothecaries use &c. &c. some *tanned Sheep and Goat skins* exhibited by Mr. Kohlhoff are deserving of Honorable mention.

The great majority of the skins with hair on having been prepared in a manner which is highly commendable, the Jury desire to make Honorable Mention of the other exhibitors in this Department, as a recognition of the general equality and excellence of their contributions. The Jury regret that they cannot commend any of the feathers or dressed skins of birds as the articles exhibited are few and very inferior in quality when contrasted with those prepared in Bengal.

Class XVI.

2nd Class Medals.

Pro. No.	Catal. No.	Names of Exhibitors.	Objects Rewarded.
CLXXVIII	149 to 162	Colonel Sherriff and Lieut. Grant.....	Leather of sorts.
CLXXVIII	163	Peerajee	Saddle & bridle.
CCLXXIII	197 to 236	Mr. Bowden, ...	Leather of sorts.
CCXXX	227 to 262	Captain Loudon..	Leather of sorts.

Honorable Mention.

XCIV	84 & 85	H. E. The Rajah Tondiman, Bahadoor - - - -	Native Saddlery
LXV	21 & 22	Mr. Kohlhoff - -	Sheep and goat skins.
XXIII	6	Rajah of Kalastry	Collection of skins.
LXIII	10 to 20	Meeranjee Meah -	Skins.
CXXXI	25 to 31	Nawab Salar Jung Bahadoor - - -	Skins. raw and tanned.
LXXXV	43 to 50	J. Ratliff, Esq. - -	Skins raw and dressed.
CCV	117 to 126	H. H. the Maha Rajah of Cochin	Skins raw and tanned.
CXCI	127 to 134	Hon. W. Elliot Esq.	Skins.
....	146	Captain Miller - -	Sambre and deer & cheeta skins
CCXXI	165 to 189	Travancore Local Committee - - -	Skins of sorts.
CCXXXII	192	H. V. Conolly, Esq	Variegated Panther skins.
CXX	194 to 196	J. Rhode, Esq. - -	Skins.
CCXI	125 to 142	Cuddapah Local Committee - - -	Skins, &c.

(Signed) H. D. E. Dalrymple,
A. Blacklock,
Associates Reporters.

CLASS XVII.

REPORT ON PAPER AND STATIONERY, PRINTING AND BOOK-BINDING.

JURY.

Sir Henry C. Montgomery, Bart.—*Chairman and Reporter.*

W. A. Morehead, Esq.

Lieut. Colonel McCally.

Lieut. Colonel J. Hill.

Captain A. H. Hope.

C. V. Cunniah Chettyar.

Book-binding.

Some very good specimens of Binding in morocco leather, calf, sheep's skin and cloth are exhibited by different parties: great improvements have lately been made in this department of industry, and the gilding, lettering and finish of some of the specimens are worthy of commendation.

The Jury award a 2nd Class Medal to the Wesleyan Mission Press of Bangalore, for the best specimens in leather and in cloth.

The Binding of the Books exhibited by the Christian Knowledge Society, the American Mission Press, Messrs. Pharoah and Co., and the Revd. C. Aroolapen, is considered by the Jury to merit honorable mention.

Sealing Wax.—The Jury award the Prize to the Manufacture of Guntoor—that of Cuddapah being nearly equally good.

Paper.—The Jury pronounce the various specimens produced by C. V. Cunniah Chettyar to be very superior and award to that Gentleman the Prize.

The paper manufactured in the Cuddapah Jail is also very good, and the Jury desire to mention as likely to become a useful material, the paper made from the fibres of the Screw Pine, Pandanus odoratissimus, exhibited by W. E. Underwood, Esq.

The Jury being informed by Dr. Hunter, the Director of Arrangements, that the duty of awarding a Prize, for the best specimen of Type Printing is to be performed by a separate Jury, they do not enter into any examination of this subject.

JURY AWARDS.

Class XVII.

2nd Class Medal.

Prog. No	Catal. No.	Name	Object Rewarded.
CXL	584 to 594	Wesleyan Mission Press of Bangalore.	Book binding in Morocco & Calf skin.
XLIII	——	C. V. Cunniah Chettyar..	Paper.

Pecuniary Award.

Prog. No.	Catal. No.	Name of Exhibitor		Object Rewarded.
CXX	744	Guntoor Local Committee for the Manufacturer	Rs 30	Sealing Wax.

JURY AWARDS.

Honorable Mention.

Prog. No.	Catal. No.	Name of Exhibitor	Object Rewarded.
cxxiii	367 to 487	Christian Knowledge Society ..	Book binding.
ccix	782 to 797	American Mission Press.	Do.
xi	34 to 98	Rev. C. Aroolapen.	Do.
		Messrs. Pharoah & Co,.....	Do.
ccxi	798	Cuddapah Local Committee.....	Sealing Wax.
cccxxxix	——	W.E. Underwood, Esq.....	Paper from the fibre of the screw pine pandanus odoratissimus.

CLASS XIX.

TAPESTRY, INCLUDING CARPETS AND FLOOR CLOTHS, LACE AND EMBROIDERY, FANCY AND INDUSTRIAL WORKS.

JURY.

The Right Honorable Lord Harris.

H. A. Murray, Esq.

The Honorable Sir W. W. Burton, Kt.

J. Kellie, Esq.

W. E. Underwood, Esq.

Veera Permall Pillay.

Sirdar Jung Bahadoor.

ASSOCIATE.

Alex. Hunter, Esq. M. D.—*Reporter.*

There is a large display of carpets and rugs in the exhibition, and the manufacture has been brought to considerable perfection in several parts of Southern India. There are four distinct branches, under which these contributions may be arranged.

1. The imitation axminister or close nap woven carpet.
2. The short velvet pile or tapestry carpet and woollen rug.
3. The long velvet pile or imitation Turkey carpet.
4. The silk or velvet pile carpet.

Axminister Carpet.—Some very good specimens of close nap carpets from Wurungul are exhibited by the Hyderabad Local Committee. The colors are clear and bright, but there is a sameness in the patterns. The carpets are strong, soft, and very close in the weaving, and the Jury consider the manufacturers Mahomed Hoossain (CXXX 239), and Peer Mahomed (CXXX 230) entitled to 2nd Class Medals.

Velvet Pile Carpets.—Some large and creditable specimens of this manufacture are exhibited from Ellore and Tanjore. The former are closely woven, bright, and harmonious in color, and the patterns more varied than those from any other locality. Some of the rugs from Tanjore, are also very tasteful. The Jury recommend a 2nd Class Medal to S. Nummiah Naidoo, for the Ellore carpets (CXLII 246) and Honorable Mention for the Tanjore rugs (LXVIII-227.)

The long velvet pile or Turkey carpet is but poorly imitated, the only exhibitors being Rajahgopaul of Bangalore and Gopaul Chetty of Trichinopoly. There is considerable variety and boldness in the patterns of these carpets, but the wool is dirty and coarsely dyed and the weaving loose. The carpets are cheap, but it is doubtful if they would wear well as the wool seems to be easily pulled out.

Silk Carpets.—Some very handsome specimens are contributed by the Tanjore and Hyderabad Local Committees, and His Highness the Rajah of Tanjore exhibits a very large silk carpet (No. 253) intended as a present for Her Majesty Queen Victoria. The colors are brilliant, the pile close and velvety, and the pattern harmonious. The Jury consider His Highness entitled to a 1st Class Medal.

Colored Mattings.—The manufacture of mattings from colored grass has long been carried on successfully in this Presidency, and those from Cochin, Paulghat, Tinnevelly, and Wandiwash, have been in considerable demand; the two former on account of their brilliance of colors, and fine quality, and the two latter from their extreme cheapness. Several species of grass appear to be employed for mats, some being broad, flat and soft, while others are round, fine and wiry; the mats of Cochin, Paulghat and the Western Coast are of the latter description, and are more durable in consequence. The chief defect in this manufacture was that the mats have hitherto been made in long strips which required to be

sewed together when a large surface of floor is to be covered. This defect was pointed out to the Local Committee of Cochin, who have contributed two large mats 12 feet × 12 (CCV 115 and 116) each woven in a single piece of good pattern and harmonious colors. The Jury consider this an important improvement in the manufacture, and recommend a 2nd Class Medal to the exhibitor; and that the two large mats be purchased for addition to the collection intended for the India house.

The mats from Tanjore, Tinnevelly and in the Tariff, are creditable.

Coir Matting.—Some good specimens of plain coir matting are exhibited from Malabar, and of colored red and black matting from Canara, the Jury recommend a prize of 20 Rs. to the maker of the former Mr. Haller, and a prize of 30 Rs. to the manufacturer of the latter.

A thick door mat made of Aloe fibres exhibited by the Coimbatore Local Committee, is deserving of attention, as a novel and useful manufacture, the Jury would point out that this substance is well suited to the manufacture of rugs and carpets, as it is cheap, strong and nearly white; it is exhibited in another class dyed of the most brilliant colors and manufactured into cloth, damask, and imitation horse hair cloth.

Crochet Net work and Lace.—(As the Jury did not feel competent to pronounce upon the relative merits of these contributions, it was resolved to invite Lady Montgomery, Mrs. Underwood and Mrs. Kellie as a Committee to assist in framing the report.)

Crochet.—The largest sample of Crochet is a counterpane for a four post bed (XLVII-1) worked by an Orphan girl of 12 years old, in Mrs. Addis' School at Coimbatore. The pattern is good and the work very creditable. A reward of 20 Rs. is recommended for this contribution. A great variety of neat crochet work is exhibited by the Mangalore German Mission School. A reward of 25 Rs. is recommended, and attention is drawn to the neat and attractive way in which the work is put up and carefully labelled for exhibition. Miss Hogg exhibits a variety of creditable crochet and Knitting from the Native Girl's School at John Pereira's and Miss Walton, a similar contribution from the Central Girl's School Madras. The finely knitted Children's stockings of this collection (CXXXVII-41) are considered worthy of Honorable Mention. Miss Urquhart and Miss Englefield have exhibited several neat specimens in the same class which have met with a ready sale.

Some good plain and useful under clothing was exhibited by the girls in the Female Orphan Asylum in Black Town, but this having been made to order could not be left till the close of the exhibition. It is to be regretted that none of the fine work from the Ladies' Institution or the Military Female Asylum was exhibited.

Lace.—Some very fine thread lace is contributed by the Edeyengoody Mission School Tinnevelly, (LXXXVIII. 11 to 22) and by the Nagercoil Mission School Travancore, (CCLIV. 160.) These are considered so nearly equal in merit that a second class medal is awarded for each. The patterns of both are varied and tasteful, but it is remarked that the prices are too high, being above those of European lace. The Cochin Local Committee exhibit some very creditable specimens of lace insertion and edging. There are no contributions of black lace. Miss Gregory exhibits some neat cuffs and collars made from the Fibres of the Aloe and Marool in imitation of lace.

Embroidery.—Under this head may be classed a variety of fancy articles of great merit particularly pocket handkerchiefs, and worked muslin dresses, and scarfs which show great taste in the patterns and beautiful finish. The pocket handkerchief in Pine apple and Yercum Fibre have been considered deserving of a 2nd Class Medal which was awarded in CL. XIV and a dress worked in feather stitch by Lingarajoo is commended. A white net scarf ornamented with Betel wings is also considered tasteful.

It is regretted that there are no scarfs of black net ornamented in this way. The worked Tussa silk dresses in the Tariff are indifferent.

Embroidery in Gold.—This department of the exhibition contains some of the most gorgeous and expensive manufactures for which India has been long celebrated. The taste and judgment evinced in the blending of brilliant colors and contrasting them with gold and silver on grounds of velvet, satin, silk, or muslin, proves that in this manufacture India stands unrivalled.

The Jury have selected as the most tasteful and best worked article in this class a velvet embroidered Rug made by Lingarajoo and they recommend a 1st Class Medal for this article which was ordered for the Paris Exhibition.

Some very gorgeous Shamianahs and Elephant saddle cloths are exhibited by Girder Doss, Vullaba Doss of Madras and others. The Jury consider the Shamianah from Bangalore (CCLXXIV. 186) as the most tasteful and deserving of a 2nd Class Medal.

One of the largest contributors of Gold embroidery on silk and muslin is Oodagheer Mahomed Saib, (CXLIV) and the Jury consider several of his manufactures so good as to entitle him to a 2nd Class Medal. Boojah Roy also exhibits some handsome embroidery in gold and silk for which a 2nd Class Medal is awarded.

Some excellent specimens of *Gold Lace, Cord Sashes and Sword Knots* are exhibited by the Madras Local Committee. These are considered deserving of Honorable mention.

The best specimens of *Embroidery* in *Silver* (Class XV) are exhibited by the Hyderabad Local Committee. Honorable mention is recommended for this manufacture. The *Gold and Silver Fancy Fringes of Hyderabad* are also deserving of Honorable mention. The fringes exhibited by other contributors are indifferent. Some small samples of *Solid Silver wire Fringes and Ornaments* exhibited by the Madura Local Committee, are deserving of notice but they are surpassed by the silver thread of Hyderabad.

Class XIX.

1st Class Medals.

Pro. No.	Catal. No.	Names of Exhibitors.	Objects Rewarded.
LXVII	29	H. H. the Rajah of Tanjore.	Silk carpet for presentation to H. M. Queen Victoria.
.....		Linga Rajoo.	Embroidered rug.

2nd Class Medals.

Pro. No.	Catal. No.	Names of Exhibitors.	Objects Rewarded.
CXXX	239	Mahomed Hoossain....	Wurrungul carpets
CXXX	230	Peer Mahommed..	Do.
CXLII	246	S. Nummiah Naidoo	Ellore carpets.
CCV	115 & 116	Cochin Local Committee	Grass mats.
CXLIV	.....	Oodagheer Mahd. Saib.....	Embroidery.
.....	.....	Boojah Row.	Embroidery.
LXXXVIII	11 to 22	Edeyengoody Mission School....	Lace.
CCLIV	160	Nagercoil Mission School	Lace.
CCLXXIV	186	Munjoo Shaw, Shaca Row.., Chenanjee Row ...., Ausagee Row	Embroidered shamianah.

Honorable Mention.

LXVIII	227	H. Forbes, Esq...	Tanjore rugs.
CXXXVII	41	Miss Walton	Crochet stockings
CCLXXIX	188 to 194	Madras Local Committee	Gold lace, &c.
.....	.....	Hyderabad Local Committee.. ..	Cloth of silver (Cl. xv).

Pecuniary Awards.

			Rs	
.....	18	Mangalore German Mission..	35	Crochet work.
XLVII	1	Miss Addis	20	Crochet counterpane.
.....	.....	Mr. Haller ..	20	Coir matting.
			20	Do.

CLASS XX.

REPORT ON ARTICLES OF CLOTHING FOR IMMEDIATE PERSONAL OR DOMESTIC USE.

JURY.

Lieut. General Fraser, *Chairman.*

E. Maltby, Esq.

Major MacDougall.

Lieut. H. P. Hawkes.

Salar-ool-Moolk.

ASSOCIATES.

Captain R. Roberts.

Lieut. J. Nicholas, *Reporter.*

The articles submitted for the inspection of this Jury are but few and trifling. The costume of the Natives of the country gives but little scope for the display of skill, or novelty of design. Among the wealthy and middle classes, each caste has its peculiar dress, which but seldom varies, and among the lower classes the garments in general use are of the simplest description, often nothing more than a cloth for the head and another for the body. Silk, cotton, and embroidered cloths for men and women are exhibited in great abundance and of excellent quality but they do not appear in this Class.

With respect to the working up of both Native and imported material for articles of (immediate) personal and domestic use, such as upper and under clothing, boots, shoes, hose, &c., for the European portion of the community, a large number of persons are employed. It is to be regretted that so few exhibitors have come forwarded to display articles of this description. There would probably have been no novelty in design, as the European fashions prevail, still specimens would have been interesting, as showing how correctly, cheaply and at the same time creditably, articles are imitated.

The *Boots exhibited from Hoonsoor*, as specimens of what are usually supplied to the European Troops, are of very good material and workmanship. The *Ladies' Shoes from Hyderabad* are worthy of remark—chiefly on account of the material (aloe fibre) employed in their manufacture.

The *Guana-Skin Slippers* exhibited by Mr. Bowden, are well tanned, soft, and the workmanship creditable. They are said to be exceedingly durable. The *Cashmere Gloves and Socks* exhibit no novelty being of the description worn by the wealthy natives of Hyderabad and other parts.

The *Gloves and Hosiery from Canara* are fair specimens of this manufacture.

The introduction of stocking frames or machinery for the manufacture of hosiery would doubtless be very beneficial to this branch of trade. The preparation of kid skins is receiving some attention and it is to be hoped that ere long some steps may be taken towards introducing the manufacture of kid gloves.

JURY AWARDS.

None.

CLASS XXI.

REPORT ON CUTLERY AND EDGE TOOLS.

JURY.

Major J. Maitland, *Artillery, (Chairman.)*
Captain R. R. Little, *Artillery.*
R. Kennedy, Esq.
P. Veeraragavooloo Chettyar.
Major W. K. Worster, *Artillery.*

ASSOCIATES.

Lieut. H. P. Hawkes.
Mr. Wallace.

The rude and simple implements and tools, which ordinarily supply the wants of the natives of this country, the little requirement for cutting Instruments as articles for domestic use, and the cheap and abundant imports of the several articles included in this class, all tend most materially to depress the local manufacture; yet among the present contributions there are some samples deserving of notice. The Salem and Trichinopoly collections, for which prizes have been awarded, afford abundant evidence of the skill with which this description of manufacture can be carried on.

The knives exhibited No. 161 (or more strictly Daggers) from the Northern Division, though only incidentally coming under the notice of the Jury, cannot be passed over without a remark, both as to the great excellence displayed in the workmanship, and as to the beauty and delicacy of the damasked surfaces between the highly polished and keen edges of the blade. They exhibit in a high degree the proficiency of the operatives in that part of the Presidency, and offer a striking contrast to the rude and inferior implements around them. The latter however are not without interest both as indications of the industrial wants of the people, and the cheap and simple manner in which they can be supplied.

The *articles of Cutlery exhibited by Arnachellum Achary* (Cl. XXI Nos. 1 to 11) a well known Cutler at Salem are in every respect worthy of his long established reputation. As regards manufacture these articles may probably compete with those of Europe, though the prices are considered comparatively high.

The spear heads also (Cl. XXI No. 11) by the same maker, are neatly executed and the finish is far superior to articles of this description ordinarily obtainable in this country.

The Jury in order to mark their sense of this exhibitor's care and skill in production, propose that a First Class Medal should be awarded him.

A Clasp Knife with style forwarded by the Local Committee of Tinnevelly (Cl. XXI No. 12) is only remarkable for its cheapness, and appears to resemble the rude productions in use amongst the peasantry of France.

The *articles sent to the Exhibition from Austin* (Cl. XXI No. 16 to 19 and 29) a cutler of Trichinopoly, altho' exhibiting considerable skill in manufacture, are inferior in workmanship to those from Salem. They are however much more moderately priced. The silver ornamental handled knives especially, are considered cheap and very good specimens of an art peculiarly Indian.

It has been pointed out to the Jury that there is a defect in the manufacture of all the blades of this exhibitor which no doubt could be easily remedied;—at the part where strength is most essential, a shoulder piece has been fitted (neatly enough) instead of being welded to the tong, which appears to be merely a continuation of the steel blade itself: it should be of iron to resist fracture. Irregularities of workmanship (though in no way affecting the utility of the knives) have also been brought out by too high a polish. Where perfection of surface is not essential, the work is usually "left in the grain" to hide defects, which it is not necessary in the ordinary course of manufacture to obliterate.

The Jury however consider the exhibitor is entitled to a 2nd Class Medal.

Rose Clippers, of the usual form, by supervisor Brookes are specimens of substantial workmanship.

Four Daggers or as they are called by the exhibitor *Knives of Sorts* "with damascened blades" from Masulipatam are excellent specimens of manufacture. The ivory handles being neatly finished.

Two Dirks of the same description as those above mentioned but more highly finished exhibited by A. Robertson, Esq. (Cl. XXI No. 26) are excellent specimens of workmanship.

JURY AWARDS.

Class XXI.

1st Class Medal.

Prog. No	Catal. No.	Name of Exhibitor.	Object Rewarded.
LIX	1 to 11	Arnachellum of Salem	Cutlery.

2nd Class Medal.

Prog. No.	Catal. No.	Name of Exhibitor	Object Rewarded.
CXCVIII	16 to 19	Austin of Trichinopoly..... ..	Cutlery.

CLASS XXII.

IRON AND GENERAL HARDWARE.

JURY.

Major J. Maitland.

Captain R. R. Little.

R. Kennedy, Esq.

P. Veeraragavaloo Chettyar.

Major Worster.

ASSOCIATE.

Lieut. H. P. Hawkes, *Reporter.*

Manufactures in Brass, Copper, and Tutenague have long held a place amongst the most important of the Industrial Arts of India.

Articles formed of these metals assume the place of those which in more advanced countries are made of iron, tin, stoneware, or porcelain, and form a large proportion of the utensils used in Native domestic economy.

Brass and copper work may be divided into two Sections "*Cast* and *Hammered work.*"

Articles which are cast in a mould admit of being turned in the lathe, and are susceptible of a high polish. They are however heavy, expensive, and liable to fracture. For these reasons, vessels made from sheet brass or of copper welded and beaten into shape with a hammer, are generally preferred. They are not however usually finished off so well, nor are they so regular in outline as those which are cast. This manufacture is perhaps more generally diffused throughout the country than most of the other Industrial Arts.

Judging from the specimens exhibited, the workmen of Tanjore are perhaps the best, but those of Tinnevelly, Travancore, Madura and Chicacole, contribute specimens but little inferior in polish and finish.

The bells of Tanjore are excellent in tone, superior in finish, and very moderately priced. The Jury consider them worthy of Honorable Mention.

An excellent specimen of *casting in brass* is exhibited by J. Rohde, Esq. of Guntoor (cxx No. 67) a description of which is thus given by the Exhibitor.

"The casting is in loam, 5 days are allowed at 10 Rs. per mensem, for pickling (in tamarind leaf and water), scraping, filing, chasing, drilling, turning the cup and lastly annealing. The finished articles are then boiled in *sowdoo* (or wood ashes) and water, to free them from all grease, then set up and kept moist by dabbing with corrosive sublimate 1 oz. dissolved in *slightly* diluted vinegar 1 pint, till the desired tint is obtained, which may take $\frac{1}{4}$ hour or 20 minutes, they are then plunged and well rinsed in clean water *without friction* and dried in sawdust. Blacklead moistened with spirits of turpentine is then applied with a brush as in blacking a stone, when polished the article is heated a little above what the hand can bear and lacquered with shell-lac varnish. The only nicety required is in getting the articles perfectly free from all grease, even finger marks, and in checking the bronzing at a proper period, if carried too far, it will scale off, if not far enough or irregularly the color after rinsing will be varied. If the annealing has been irregular, the same will appear."

For this specimen the Jury award a 2nd Class Medal.

Two Metallic Mirrors from Cochin (ccv 80) and some of a similar description from Travancore (ccxxi. 117) are considered worthy of Honorable Mention. Also hand cuffs with spring locks (cclviii 126) from *W. Patterson* of the Arsenal.

Specimens of Cast Iron Railings (xccii 44) exhibited by Mr. DeClosets of Pondicherry are considered very superior specimens of workmanship and deserving of a 2nd Class Medal.

A series of Iron Cots, Chairs, Garden Seats, &c. (cii 48 to 53) from Mr. Bulliard of Pondicherry are the only specimens of this branch of hardware in the Exhibition. Most of these are very well made and all at reasonable prices. The Jury award a 2nd Class Medal.

The steel wire of Chinnapatam in Mysore, has long been known: a specimen exhibited by the Superintendent Bangalore Division is worthy of Honorable Mention.

JURY AWARDS.

Class XXII.

2nd Class Medals.

Pro. No.	Catal No.	Names of Exhibitors.	Objects Rewarded.
cxx	67	J. Rohde, Esq.	For wall shade bracket.
xcii	44	M. DeClosets.	For cast iron railings.
cii	48 to 53	Mr. Bulliard	Iron cots, &c.

Honorable Mention.

ccv	80	H. H. the Maha Rajah of Cochin. .	Metallic mirrors.
ccxxi	117	Travancore Local Committee	Do.
cclviii	126	W. Patterson	Hand cuffs.
cclxxiv	132	Haines, Capt., Supt. Bangalore Division	Wire steel.

(Signed) H. P. Hawkes, *Associate and Reporter.*

CLASS XXIII.

WORKING IN PRECIOUS METALS, JEWELRY AND ARTICLES OF VIRTU AND LUXURY, NOT INCLUDED IN OTHER CLASSES.

JURY.

The Right Honorable Lord Harris, *Chairman and Reporter.*

His Excellency Lieut. General The Honorale George Anson.

General J. S. Fraser.

W. A. Morehead, Esq.

H. A. Murray, Esq.

W. E. Underwood, Esq.

J. B. Norton, Esq.

Lt.-Col. McDonald.

J. Arathoon, Esq.

Nana Thakoor.

Vencatachella Chettyar.

Hajee Agha Mahomed Bakhir Namazee.

The articles comprised in this Class were divided under seven heads.

1. Gold and Silver Plate.
2. Do. Filigree Work.
3. Do. Chased Work
4. Electro-plate.
5. Jewels.
6. Enamelling.
7. Inlaid work in Gold and Silver.

The specimens of silver plate exhibited were not very numerous. Neither were they remarkable for finish of workmanship or elegance of design.

Still they possessed sufficient merit to show that with encouragement this manufacture would attain a fair degree of perfection in Madras.

A 2nd Class Medal was awarded to Mr. Orr for *a Vase*, which excelled in originality of design and in workmanship.

Honorable Mention was given to *three Vases*, exhibited by Messrs. Scriven.

Also to *several Pieces of Plate* shown by Mr. Orr amongst which *a Goblet* with figures in relief was found deserving of credit.

Some *Silver Articles from Hyderabad* were considered worthy of commendation for the elegance of their forms.

There were two collections of *Silver Filigree work.* One from Travancore and Cochin, and the other from Cuttack, exhibited by Messrs. Scriven and Co. Many of the samples of this beautiful manufacture were of very great merit. A 2nd Class Medal was awarded to the articles exhibited from Travancore.

Those from Cuttack were deemed worthy of Honorable mention.

In chased Jewelry there were but few articles. Some of these were curious as manifesting the taste peculiar to India—the workmanship was elaborate—and the tracing and design displayed in some of the bangles were graceful and original.

A 2nd Class Medal was awarded to Jugganad Butten of Madras for the best specimens.

Others from Travancore and Goa, were worthy of Honorable Mention.

4. The show in Electro-plate was very small—comprising only a few articles sent by Serjeant Wallace which were considered of creditable performance.

5. The collections of precious stones exhibited by Mr. Arathoon and Mrs. Taylor were, though not very numerous, of the choicest description and were well worthy of careful examination. Amongst these might be seen specimens of the finest quality of each sort of precious stone.

A 1st Class Medal was awarded to Mr. Arathoon. A 2nd Class Medal to Mrs. Taylor. Mention should also be made of two very rare and beautiful works of Art exhibited by Mrs. Taylor. The one, a large Cameo

with the head of Medusa carved on it and set in a bracelet, is both for the fineness and spirit of the cutting, and for the beauty of the pebble quite unique. The second Cleopatra carved on a large amethyst and set as a broach is also remarkable.

There were several specimens of jewels set in the Native style which were curious, but none of them were worthy of distinction either for taste or for the value of the stones.

6. In enamelling *a pair of Bracelets* of curious and elegant workmanship from Jeypoor were alone worthy of mention: they were exhibited by Bala Mooconda Doss to whom a 2nd Class Medal was awarded.

7. The only articles of inlaid work were a few of the *Beder ware* from Hyderabad. A large vase belonging to General Fraser was greatly admired, and a 2nd Class Medal was awarded.

On the whole, the articles exhibited in this class were not (the precious stones, &c. of Mr. Arathoon and Mrs. Taylor excepted) either as numerous or as valuable as might have been expected.

The Jury was called on to give its opinion on the merits of some articles which had either been received at a late date, or had not come within the scope of any of the other classes.

Drawings and Paintings.—There were very few of these and none of particular merit with exception of *the Etchings by Kasava Doss* which were remarkable for the minuteness of detail with which they were finished and for the spirited manner with which prints, the subject of which were various English sports, had been copied. Class XXX No. CXLVI 597 to 599. A second Class Medal was awarded to him.

A water colour drawing by Mr. Just Gantz, exhibited by Dr. Kelly, was considered worthy of mention.

Some drawings of Arms and ancient Pottery from old Tombs by T. Chengulroy were considered deserving of Honorable Mention.

The paintings in oil by Mr. Foncecca were deserving of credit but were considered to require finish and taste.

Some photographs executed by Mr. Underwood and placed by him in the Exhibition, subsequently to the decision of the Jury to which these articles had been submitted, were superior specimens of the Art: and would, it is thought, have been entitled to a 2nd Class Medal, had they been submitted prior to the assembling of the Jury Class XXX.

A set of Lithographic Books with drawings in arabesque, published by Dr. Balfour, were remarkably good, and a 2nd Class Medal was awarded to the exhibitor.

A set of Tools and other articles in Iron and Steel by Churdriah of Vellore were of excellent manufacture apparently equal to European, a 2nd Class Medal was awarded to him.

JURY AWARDS.

Class XXIII.

1st Class Medal.

Pro. No.	Catal. No.	Name of Exhibitor.	Object Rewarded.
CCLXIX	155 to 199	A. Arathoon, Esq..	Precious stones.

2nd Class Medals.

.....	.....	Mr. P. Orr	Silver vase.
CCXXI	99 to 125	Travancore...	Silver filigree work
CCXXXVII	127	Jugganad Butten..	Chased jewelry and bangles.
CCLXIX	.....	Mrs. Taylor	Precious stones.
CCLXX	.....	Bala Mooconda Doss.....	A pair of enamelled bracelets.
.....	.....	General Fraser ..	A large vase of Beder ware.
CXLVI	597 to 599	Kasava Doss	Drawings & etchings (Class xxx)
XLVII	.....	Edw. Balfour, Esq.	Lithograph books in arabesque.
.....	.....	Churdriah of Nellore..	Iron and steel.

Honorable Mention.

CLXXI	30	Messrs. Scriven ...	3 vases and silver filigree work from Cuttack.
CCXXI	99 to 125	Travancore & Goa.	Chased jewelry and bangles.
.....	.....	Mr. Just Gantz ...	Water color drawing.
.....	.....	T. Chengulroy ..	Drawings of arms and ancient pottery.
.....	.....	W. E. Underwood, Esq...	Photographs.

CLASS XXIV.

GLASS.

JURY.

Lt. Col. J. T. Smith, *Chairman and Reporter.*

Dr. A. Hunter.

Captain Rawlins.

Captain Hitchins.

Captain Lake.

Allan Wilson, Esq.

This department of manufacture is but imperfectly represented, and the specimens exhibited from various parts of the Presidency prove that very little advance has been as yet made in acquiring a knowledge of it. This is the more to be regretted because India seems upon enquiry to possess no slight advantages for the manufacture of the best qualities of Glass. As is well known the basis of all glass is Silica and Alkali of which the former in the shape of common sand is to be met with almost every where, the latter is to be had cheaply and in abundance in most parts of Southern India. In the neighbourhood of Madras as well as in many other localities, the secondary materials also, indirectly essential to the manufacture of the best quality of glass, namely the fire clays used in the construction of the furnaces, are abundant and of very superior descriptions. Yet with all these advantages the natives do not appear to have advanced in the manufacture beyond the first and very rudest stages, and although it is one which if successfully prosecuted would probably meet with very extended encouragement, the manufacture of the commonest bottles has not yet been achieved.

With the exception of two little phials of doubtful origin, there is hardly a single specimen of glass sufficiently clean even for the purpose above referred to, and none of sufficient bulk, to indicate manufactures on a sufficiently large scale.

The chief defects of the native manufacture are the use of too large a quantity of alkali. In fact, in some cases, it is so much in excess that it might be tasted by applying the tongue to the article.

The fault now remarked upon is probably connected with, and caused by another, that of the material being melted at too low a temperature and in too small bulk, and these again probably arise from the use of an improper furnace and an unsuitable kind of fuel.

The native furnace is usually a rude hole dug in the ground coated with ferruginous clay which tends to discolour the glass, and the heat is raised by the use of a bellows blast. Hence the temperature is confined to one point of the mass and is insufficiently diffused, while the body of metal under fusion being small, and the dome and sides above ground being thin, the heat is dissipated from them, and never attains body and elevation sufficient to admit of the mass settling and purifying itself, or of its being freed from air bubbles by the addition of the proper proportion of silica.

What is required, is the preparation of the glass in larger quantities at a time, and with this view larger and more carefully constructed furnaces, on the reverberating principle, to be heated by coal ; after this, that the process should be attended to more scrupulously, and the materials mixed by weight, instead of being thrown together by measure, as is too commonly the case at present.

Country glass is usually made of Dhoby's earth a crude carb of soda with a mixture of a little potass and lime 60 to 70 parts, and yellowish white sand 30 to 40 parts composed of small fragments of quartz, felspar, iron and a trace of lime.

The good bottle glass of Europe is made of

Sand	58	per cent
Sulphate of Soda	29	
Lime	11½	
Charcoal	1½	

Sulphate of soda only contains 45 per cent of alkali so that 29 parts contain 13, while the carbonate of soda obtained from dhoby's earth, if we may judge from a specimen exhibited in another section, contains be-

tween 30 and 40 per cent of alkali, according to which the alkali used by the Natives would be to that employed in Europe in the proportion of 23 to 13.

The substances generally used by the Natives in colouring glass are as follows :—

Iron, which gives green, brown and black shades.
Manganese,.....pink, purple, and black.
Copper,.....blue, green, and deep red.
Arsenic,.....white
Chromate of Iron,.. ..... „ a dull green.

All these materials are used in a very crude state, and the proportions measured in a most imperfect manner.

In endeavouring to select the most deserving amongst the few specimens laid before them, the Committee have experienced some difficulty in distinguishing the several contributions. They however have resolved to recommend to the General Committee that a prize of 10 Rupees should be given for the Bangles marked No. 103 in the exhibition consecutive list from Madura—that a prize of 10 Rupees be bestowed upon the contributor of the Bangles marked No. 10, and the glass cups—marked No. 11 from Nellore and further, that a prize of 25 Rupees should be bestowed upon the manufacture of the two white glass bottles mentioned in the beginning of this report, and which were sent from Hyderabad,* provided it be ascertained after a due enquiry that they were manufactured in this country.

* Note this has since been assertained and the prize has been awarded.

JURY AWARDS.

Class XXIV.

Pro. No.	Catal. No.	Name of Exhibitor.		Object Rewarded.
LXXXIII	103	Madura.	Prize Rs. 10 ...	Bangles.

Pro. No.	Catal. No.	Name of Exhibitor.	Object Rewarded.
LXXXV	9 to 13	Nellore Local Committee ..... Prize Rs. 10.	Bangles and glass cups.

Pro. No.	Catal. No.	Name of Exhibitor.		Object Rewarded.
CXXXI	14	Hydera-bad ..	Prize Rs, 25. ..	White glass bottles

CLASS XXV.

CERAMIC MANUFACTURES, CHINA PORCELAIN, EARTHENWARE, &c.

JURY.

Lieut. Colonel J. T. Smith, *Chairman*.

Dr. A. Hunter, *Reporter*.

Captain Rawlins.

Captain Hitchins.

Captain Lake.

Allan Wilson, Esq.

There is a considerable display of Articles in this Class and the differences in their color and quality show that considerable efforts have been made to improve the manufacture and to perfect the glazing. The Art however may still be said to be in its infancy in India as no great perfection has been attained in any branch.

Earthenware or Common Pottery.—There are three distinct branches of this manufacture which though similar in their manipulation are different in their results. The most common kind is the red porous earthenware used for chatties and cooking vessels, the black used for similar purposes and the fine white which resembles some of the biscuit earthenware of Europe.

The red porous earthenware differs very materially in quality according to the locality from which the clay is selected—several of the specimens are made of a common coarse earthy loam which has very little tenacity, and yields a brittle kind of pottery neither susceptible of much finish nor of being glazed. Most of the Pottery of India is of this description, it is made on a curious principle which is unknown in other countries but which has probably been followed for many centuries in India. The vessels which are mostly of round form are thrown thick in the neck and upper parts or sides. They are cut off the wheel and left open in the bottom with vertical sides, they are then allowed to harden a little in the necks and as soon as they will bear to be handled the sides are thinned out by beating with a flat mallet upon a rounded stone or very hard round piece of wood held inside the vessel which is turned about and beaten till it is closed. This is a very tedious and unsatisfactory mode of working and the only recommendation is, that it makes a thin light vessel but at a great sacrifice of time ; from 18 to 20 of these is a good day's work, while a skilful European thrower will turn out 800 in the same time. Good samples of this quality of earthenware are exhibited from Travancore, they are made from a fine smooth Micaceous loam and the general forms are good though heavy. A finer description of this ware is exhibited foom Hyderabad it is made from a tough smooth plastic clay and the articles are remarkable for elegance of form and extreme lightness of throwing. Some of the vessels have been ornamented with gold leaf and colored lac varnishes ; others have been made in imitation of Bederie ware, some are painted white on a red ground ; a few appear to have been glazed and colored with a soft lead glaze —On the whole this collection exhibits a marked improvement on the ordinary manufactures of this class ; tasteful forms and light throwing being combined and a good effect having been produced with simple means. A prize of 50 Rupees is awarded.

The following Remarks upon the Pottery from Raichore sent to the Madras Exhibition, will be read with interest. There is but one family in Raichore which can make this description of pottery, they are christians long established here and the party to whom the amount of prize has been paid was by Rajah Chundulall presented (probably on account of his skill) with a small ruined hamlet in Mukta, and which has been contiuued to him by order of the Resident. A brother of his resides at the Beebee Chushma at the city, but the same quality of clay is not procurable there, and his work is stated to be inferior ; much of what he sells in the city, gilt chillums &c., he receives from his brother here.

How far his account of the composition of the glaze used can be depended on I cannot say, he states that no lac is used except in fixing the gold leaf, the following is the account given by him.

24 Parts Moordar Sing or Litharge.

3 do Gar ke Puttur, a stone resembling white quartz common here.

1 Part Copper.

Sendoor or the red oxide of lead may be substituted for the Litharge.

The Gar ke puttur, should be well burnt, slaked in cold water and afterwards reduced to a fine powder and mixed with the Litharge. The copper is mixed with its weight of finely powdered sulphur and heated in a crucible till a green scale has formed on it, it is then finely powdered and mixed with the Gar ke puttur and Litharge. The whole is again heated and reduced to a fine powder once more.

A small quantity of this powder is well mixed with wheat starch and kneadeel well for some time, water is then added and it is strained through a fine cloth, and the glaze is gently rubbed in with the hand, after which the pottery is baked.

(Signed) Ivie Campbell, Captain,
Offig. Deputy Commissioner,
E. Dn. R. Doab.

Raichore, 28th August 1855.

This process of glazing pottery is very similar to that practised in Italy, Germany and some parts of England where paving tiles, green flower pots and common red Earthenware, are manufactured. The Gar ke puttur is probably either white Felspar or Pegmatile a variety of granite very abundant in Southern India and composed of 3 parts Felspar and about 1 part of quartz. The clay which is employed is probably more refractory than the common red clays of India most of which begin to lose their shape or to become spongy at the temperature for melting such glazes. The above details are of considerable interest as they prove that the art of pottery is improving in Southern India.

Mr. Jaffrey exhibits some good serviceable flower pots of an ordinary pattern, but introducing a valuable horticultural improvement for supplying air to the roots of the plant.

Gunner T. Barton also exhibits some good specimens of jars and common pottery made at Bangalore, from a variety of tough colored clays.

Some good specimens of roofing and draining tiles. Flower pots, goglets and jars of common earthenware, are exhibited by Serjeant M. Chesterfield, of the Madras School of Arts.

Antique Pottery—The finest specimens of common earthenware are the ancient funereal, domestic and cooking vessels, dug out of the old Tombs in the districts of Coimbatore and South Arcot. This kind of pottery has been found in many parts of India in tombs usually arranged in circles, each tomb being built of 6 slabs of stone and occasionally surmounted by large mounds of loose stones and earth. They have been thought to resemble the Druidical tombs of England, and are supposed to be of great antiquity, there being no records of them extant.

The pottery usually consists of tall narrow cinerary urns of 18 or 20 inches in length, with three or four clumsy feet, 4 inches in length, and of a variety of round oval and flattened vessels of different shapes and sizes, some having apparently been used for cooking and others as drinking vessels. The tall urns usually contain burnt human bones, teeth and ornaments of brass, or copper; they are made of a coarse clay, and have not been finished with care. Some of the flattened oval and rounded vessels are made of a fine dense clay that has been carefully prepared, the surfaces are variously ornamented with wavy or crossed lines of red and yellow carefully painted. The pottery appears also to have been smeared (it resembles the potterie antique vernissée et lustree figured by M. Brongniart.) There is great purity of form in most of the vessels which resemble the Etruscan in the precision of the curves and in the angles at which the different surfaces meet. The art of pottery appears to have deteriorated in India, since these samples were made and one branch of it is apparently lost viz, the smearing or thin glazing of the surface.

Black Earthenware.—This is a mere variety of the Red and in most instances it is the same kind of Pottery blackened by the simple process of damping or checking the fire when it is beginning to decline, and thus throwing a great deal of smoke amongst the wares when the heat is not sufficiently intense to burn it off. A few samples of this ware are exhibited from Madras. A better and stronger kind of black Earthenware is manufactured at Bangalore from a fine dense clay that contains both manganese and iron. This approaches the black stoneware of Egypt, and is strong and sonorous when struck; some good samples are also exhibited in the collection of colored Terra Cottas from the Madras School of Arts.

White Earthenware—Some light and elegant samples of goglets, butter pots and vases, are exhibited by the Arcot Local Committee. These are considered deserving of a 2nd Class Medal. This branch of the Art differs from the others in being conducted with more care and cleanliness, some attention being paid to the sifting of the materials and to the ornamenting and finishing of the articles. The material selected is a decaying white granite resembling the cornish stone of England or the grauen of Germany. This is carefully washed and decanted to free it from sand or impurities; it is then allowed to subside, the water is poured off and the soft clay is collected on a clean cloth and laid on a heap of white woodashes to dry; a small percentage of alkali is thus absorbed through the cloth and is incorporated through the mass by kneading. This clay or decayed white granite is the true kaolin or Porcelain earth of China and Europe. It is particularly abundant in India and occurs in beds of enormous extent and of every variety of color. It possesses the valuable qualities of combining with a large percentage of Silica, Felspar, Baryta or other stony bodies and of resisting the most intenss heats, but in India it is employed alone and produces a soft brittle porous ware which is not

susceptible of being well glazed. Numerous attempts have been made to glaze this description of Pottery but the glaze crazes or cracks all over the surface and allows water to penetrate to the body. The reason is that the kaolins require flint, felspar, or stone to open them, and exposure to a long continued and steady heat before they are thoroughly burnt in the biscuit state. They also require a hard fritt or porcelain glaze, which cannot be prepared without expensive machinery, the firing also involves a great consumption of fuel as the heat must be kept up steadily for 40 or 60 hours. The Bangalore Local Committee exhibits some good specimens of white pottery which are deserving of Honorable mention. They are not so elegant in form nor so lightly thrown as the Pottery of Arcot.

The Goa Local Committee exhibits some light articles of good forms painted and coated with Lac varnish.

Stoneware.—The Madras School of Industrial Arts exhibits some creditable specimens of glazed stoneware of different colors of Drab, Brown, Grey, and Black, in the form of jars, butterpots, cooking vessels, &c.

Two very good copies of the Medici Vase in green glazed stoneware are contributed by the Pondicherry Local Committee. These are the largest specimens of colored glazing in the Exhibition. A 2nd Class Medal is awarded to the maker Ange de Babick.

JURY AWARDS.

Class XXV.

2nd Class Medals.

Prog. No	Catal. No.	Names of Exhibitors.	Objects Rewarded.
xcvii	10	Ange de Babick of Pondicherry.	Medici vases.
cccxii	.. ...	Arcot Local Committee	White & colored pottery.

PECUNIARY AWARDS.

lxxii	3	Hyderabad Local Committee. Raichore Manufactory.	Rs 50	Varnished, glazed and colored pottery.

Honorable Mention.

clxxvii.	12	BangaloreLocalCommittee.....	White earthenware.

(Signed) Alex. Hunter, *Reporter.*

CLASS XXVI.

DECORATIVE FURNITURE AND UPHOLSTERY, INCLUDING LACQUERED GOODS.

JURY.

The Honorable Sir William Burton, Kt., (*Chairman.*)
W. U. Arbuthnot, Esq.
J. B. Norton, Esq.
J. Vans Agnew, Esq.
J. Kellie, Esq.

ASSOCIATES.

Lieut.-Col. W. P. Macdonald, *Paymaster.*
Major McDougall.
Mr. J. Shaw.
A. Hunter, Esq., m. d., *Reporter.*

The collection of articles submitted for the consideration of the Jurors in this Class, although somewhat limited, comprises some fine specimens of ornamental furniture.

The Natives of India have indeed been long celebrated for the great patience and fidelity with which they imitate the most elaborate details either of art or manufacture, but they are generally deficient in design, and the articles exhibited prove that much may still be done to infuse artistic taste and boldness of execution when the better principles of art are brought to bear upon this branch of industry.

Carved Furniture.

The first specimen of ornamental furniture deserving of notice, is a richly-carved ebony flower stand, by Armoogum Achary of Madras. The design of this is good and the carving boldly but not equally executed, there is also a deficiency of taste in the arrangement of the ornaments, the pendents being too numerous and heavy, and the general design encumbered with too many repetitions of the same form. The joinery of the several pieces of which it is composed is also susceptible of improvement.

2. *A carved ebony screen*, made by Mooroogapah Achary also deserves remark, the perforated tracery is light and elegant, and the carving well finished but the mounting has a heavy appearance and the joinery is indifferent.

3. *A carved ebony oval screen on a carved pedestal*, by the same maker is more elegant in design, but possesses the same defects.

4. Messrs. Shaw and Co. exhibit a carved flower stand combining tasteful form with bold execution. The wood is a pale variety of rosewood, which gives a lighter appearance to the work than the more sombre ebony.

5. Mr. Deschamps contributes some very fine specimens of ornamental work in rosewood, perhaps the most elegant of these is a carved flower-stand, the property of J. Vans Agnew, Esq., tastefuly designed and ornamented with Indian fruits and flowers, deeply carved and well finished.

6. A large rosewood flower stand executed for Lord Dalhousie is also an elegant piece of furniture. The figures, fruits and flowers are boldly designed and well executed, but the effect of the vase is detracted from by the addition of pendents.

7. A carved rosewood chair and two unfinished portions of a side-board by the same Exhibitor Mr. D. are deserving of commendation, on account of the freedom of design, the variety of ornament and the care bestowed in their finish; the convenience of the chair however is materially interfered with by the introduction of Palmtree ornaments which are inappropriately placed. As specimens of ornamental carving the portions of the side-board are the best in the Exhibition, the fruits and flowers being grouped with great taste,

and the reptiles being judiciously introduced. The taste, precision, and freedom with which Mr. Deschamp's ornamental furniture is executed, prove the great advantage which attends the combination of European taste and design with Native workmanship. Native workmen in fact have greatly benefited by Mr. Deschamp's models in this important branch of manufacture, and the Jury consider him deserving of a 1st Class Medal.

8. Messrs. Hider and Co. contribute two specimens of carving, one being the frame of a cheval glass in ebony, elaborate in execution, but faulty in design, the outline being stiff and formal. The fruits and flowers are well carved, but the animals are out of proportion. The other also is a frame for a large cheval glass of a more graceful outline. The general effect of which is spoilt by Cocoanut tree supports of an inappropriate character.

Vencatanarraina Pillay sends an Ivory Sofa and 12 Ivory chairs interesting as an application of this substance to useful purposes.

The Jury observe that there are very few contributions of ordinary Cabinet work or household furniture. The only article calling for special notice is a teakwood Office stand in the Elizabethan style with partitions for papers, drawers and shelves for Ledgers, &c., made by Mr. Deschamps. This is a useful and appropriate article of furniture and the wood is well selected.

A Buffalo horn music stool exhibited by the Honorable W. Elliot, Esq., and made at Vizagapatam from a design furnished by Mr. Deschamps is a good piece of furniture and deserves special commendation as a novel application of taste to a branch of manufacture that is gradually rising into importance.

No specimens of carved furniture are contributed from Mofussil stations although it is known that the manufacture has long been carried on at Trichinopoly and other localities with great success.

The following Tabular View of the woods used for furniture in Madras is contributed by Dr. Cleghorn.

Common Furniture.	Carved and Ornamental Furniture.
1 Chitagong wood.	1 Ebony.
2 Teak wood.	2 Blackwood. *or* East Indian Rosewood.
3 Toon.	3 Satin wood.
4 Jack.	5 Kiabooca wood.

1. *The Chittagong wood (Chickrassia tabularis)* is more used at Madras in the making of furniture than any other wood. It is light cheap and durable.

2. *The Teak (Tectonia grandis)* is probably the most durable of all timbers, it is very hard, and very heavy. It is extensively used for bullock trunks and for house and camp furniture, for which it is well adapted, as it does not split.

3. *The Toon (Cedrela toona)* resembles its congeners chittagong wood and mahogany and is very much used for furniture all over the Peninsula.

4. *The Jackwood (Artocarpus integrifolia)* is an excellent timber, at first yellow, but afterwards brown, when made into tables and well kept it attains a polish, little inferior to mahogany. In England it is used as well as satin wood for making backs of hair brushes, &c.

1. *Black Ebony (Diospyros Melanoxylon)*. This well known and much admired wood lignum nigrum, non variegatum ? is very hard, heavy, and susceptible of a high polish. It is seldom obtained of great size.

2. *E. Indian Blackwood or Rosewood*, is an excellent heavy wood, suited for the best furniture. It can be procured in large quantities, and of considerable size, the wood contains much oil, which is exhibited in Cl. IV (by the Ganjam Local Committee). In large panels it is liable to split.

3. *Satin wood (Swetenia Chloroxylon)* is hard in its character and when polished it is very beautiful and has a satiny lustre, it is much used for picture frames, rivalling the birds eye maple of America. It is occasionally used by cabinet makers for general furniture, but it is liable to split.

4. *Sandal wood (Santalum album)* is found in abundance in Mysore and Canara ; it is chiefly remarkable for its agreeable fragrance, which is a preservative against insects. It is much used in making work boxes, walking sticks, penholders, and other small articles of fine ornament but cannot be procured of a large size.

5. *Kiabooca wood (Petrospermum Indicum.)* A handsome specimen of this ornamental wood is exhibited by Dr. Sanderson, it is imported from Singapore. It is beautifully mottled, of different tints, evidently produced by excrescences from the tree. The wood is chiefly used for inlaying or for making desks, snuff boxes, puzzles, &c.—these are exhibited by the Madras Local Committee.

Lacquered Ware.

Some large and interesting specimens of this manufacture have been contributed by the Local Committee of Kurnool. The articles consist of Charpoys, Trays, an Almirah and several boxes.

These exhibit considerable proficiency in the execution and arrangement of the patterns, but there is too great a sameness of color with a preponderance of yellow. The joinery also admits of much improvement.

JURY AWARDS.

Class XXVI.

1st Class Medal.

Prog. No.	Catal. No.	Name of Exhibitor	Object Rewarded.
ccxiv	.....	Mr. Deschamps...	Carved furniture generally.

CLASS XXVII.

MANUFACTURES IN MINERAL SUBSTANCES USED FOR BUILDING OR DECORATION, AS IN MARBLE, SLATE, PORPHYRIES, CEMENT, ARTIFICIAL STONES, &c.

JURY.

Lieut. Colonel J. T. Smith, Engineers, *Chairman.*

Dr. A. Hunter, } *Joint Reporters.*
Captain Rawlins, }

Captain Hitchens.

Captain Lake.

Allan Wilson, Esq.

This Class comprises subjects of great interest to the Architect and Builder, and it is to be regretted that the specimens exhibited are not more numerous nor generally of so important a character as might have been reasonably expected.

The Temples of Southern India are justly celebrated for their elaborate design ; durability of material, and massiveness of construction. They are of an antiquity and magnitude which shew the great attention paid to the art of building in days of yore, and the laborious perseverance with which the natives (of this country) executed with simple means the most gigantic work in stone.

Many of the carvings in the Pagodas at Sadras, Sreeringum, Tripettee, Ellore, Tarputree, Humpee, and the ruins of Omrawattee in the Guntoor District, are of exceeding grace and spirit, while the beautifully executed photographs of sculptural antiquities at Hullabede, Belloor, and other localities exhibited by Captain Tripe and Doctors Neill and Pritchard, illustrate most interesting examples of the superior skill and artistic merit of those ages, and show that in oriental construction and decoration there has been of late years great retrogression.

The size of some of the stones used in those edifices is very remarkable, particularly when it is remembered that they were raised by manual labor unaided by the power of steam, and when the science of mechanics was but little known. In ancient history we read the most extravagant accounts of enormous stones and monolithic temples. The Latona on the Nile was hewn out of a solid rock, it weighed 5,000 tons and was conveyed to its present site. The Temple of Amasis was nearly as large and is said to have been brought a distance of 700 miles ; while many others employed thousands of people for several years to cut and deposit them in their assigned places.

At the seven Pagodas there are several monolithic temples and one of considerable size and beauty ; its length is 49 feet, and height and breadth 25.

The gateway of Sreeringum near Trichinopoly is built of single blocks of granite, each upwards of 40 feet in length ; and at Humpee there are stones weighing probably from 20 to 30 tons, which have evidently been raised to the height of at least 15 or 20 feet.

The articles under consideration may be classed under two heads :

1—Works in stone.

2—Manufactures in cements and clays.

Works in Stone.

The stones in general use for building, and for decorative and domestic purposes are granite, marble, basalt, hornblende, angite, laterite, sandstone and steatite.

Granite.—Many of the temples of Southern India are constructed of this stone. Its preservation, and the sharpness of its carvings, testify to its great durability and the absence of wear and decay makes it difficult to determine from appearances, the age of many oriental buildings made of this substance.

The best granite quarries are at Bangalore, Sadras, Cuddapah, Vizagapatam and Bellary ; and the different modes of quarrying by the action of fire, by wedges, or by gunpowder, are explained in " Captain Foord's valuable little practical treatise on building and road making."

The prices vary in different localities, according to the cost of labour and the hardness of the stone. There is a variety of greenstone resembling the whinstone of

Scotland which is much used for building and ornamental purposes in Madras ; it occurs in many parts of Southern India and is known under the names of firestone and grey granite. It is hard and durable but more expensive than the granites, from the greater labor of quarrying and cutting the blocks; at Madras the cost of this stone is as follows:

Tank stones, from 3 to 600 lbs. R. 1-4-0 per ton.

In addition to the general use of this material for building and religious sculptures, the natives occasionally make domestic articles of it, such as round millstones, pestles and mortars, door-posts, lintels, &c. Ornamental granites of bright colors occur in several localities, those of Salem, Chittoor and Seringapatam are flesh colored, red, green, yellow and grey. Those of Arcot and Goodoowanchairy are pure white. The Bellary and Bangalore sienites, are red, grey, and white, with the colors blended in about equal proportions.

The two last may perhaps be considered the most durable in India, some of the pale-grey granites and pegmatites or binary granites of Southern India contain a large proportion of felspar which leads to their decay. The carvings at Conjeveram, Trichenacoonum, Sadras and Chellumbrum, have lost a good deal of their sharpness from this cause, while those at Tarputree, Woontimitta, Hera Toombal, and other places in the Ceded Districts are nearly as sharp as when first executed. In a few temples and Mahomedan tombs, the most richly cut pillars and ornaments are hewn out of basalt, augite, or basaltic hornblende. The best specimens of this kind of carving are at Vellore, Seerah, Tinnevelly, Humpee, Adony, Dummul, and Anagherry. The carvings have often a polished surface resembling black marble, but they are so hard as to strike fire with steel. Samples of some of these granites are exhibited in Class I.

The Local Committee of Travancore have exhibited some fair specimens of workmanship in granite. A plate of about 18 inches in diameter is well chiselled, and a jewel box of a close grained grey colored stone is cut out of a solid block, and although not large or elaborately finished, is useful as being proof against fire.

There are some cups and other small articles forwarded by this Committee, which need no particular remark.

Marble.—The Marbles of this Presidency deserve prominent notice on account of their rare color, and fine quality. The specimens sent to the British Exhibition were favorably reported upon as indicative of a valuable material, well adapted to sculptural and ornamental purposes. At present the Indian Manufacture in this article is comparatively insignificant and chiefly confined to small miscellaneous articles for domestic use. It may be well worth the consideration of persons of capital and taste to endeavour to further develop the resources of this Presidency as regards this beautiful stone, and to improve the practical means of obtaining it in greater size and perfection. Marble tables, pedestals, vases, baths, and fountains are particularly refreshing, and suitable to an oriental climate and possessing as this Presidency does such an abundance of the raw material, and where labour is comparatively cheap, it seems an anomaly that so much should be imported from foreign countries at a great cost, and of a quality not superior to some of the marbles found in India.

(See Report upon the Marbles of Southern India by E. G. Balfour, Esq., and the interesting and valuable collection of sculptures in marble from Aumrawattee in Guntoor, presented to the Museum by the Honorable Walter Elliot, Esq.)

Last year the purest white statuary marble and Alabaster were discovered in great quantities between Nagpore and Jubbulpore ; and it is reported that very large slabs can be easily quarried there at a moderate price. The Rev. S. Hislop writes to say " that the cost of slabs of granular white marble fro m Korhadi 3 feet by 2 and 9 inches thick is Company's Rs. 2. As soon as the navigation of the Godavery is opened up, this marble and the sandstone and coal of the same locality with the alabaster, gypsum and dolomite of Jubbulpore, will probably become articles of export.

At Tinnevelly also, there is an excellent description of white marble, but considered rather too hard for statuary purposes, and Guntoor and the Ceded districts abound with marbles of a great varicty of colors being tints of grey yellow and red.

A Cup and Butter Pot of Bellary marble, exhibited by Lady Montgomery, have attracted deserved attention, and some *Egg Cups*, and other small domestic articles exhibited by Captain Applegath are equally worthy of commendation. The Natives of Bellary have improved in this useful branch of art, and the above articles are handsome specimens of taste, and industrial execution. The Jury are informed that the butter pots cost eight or nine, and the egg cups, two Rupees each. This is rather dear, and a drawback to their general use.

Models of machinery and household implements are sometimes beautifully carved in this material. It is a species of compact limestone often found accompanying lithographic slate, sandstone and dolomite. Its principal color is yellow, but between Ghooty and Apiapilly there are occasional strata of pink, red, grey, black, purple and a peculiar pale green ; a tint considered very rare, and unknown in Europe. This is an encouraging fact, and it is to be hoped the natives will take advantage of it, to make known the commercial value of this excellent material, so that it may become more generally appreciated in the European and Indian markets.

Two large Circular Tables of shell marble from the

vicinity of Trichinopoly contributed by the Trichinopoly Local Committee are worthy of remark.

Captain Johnstone also exhibits some *rulers, table weights* and a *series of the Rough Marbles* from the same locality.

Laterite.—There are few specimens of this stone exhibited. It is much used on the Western Coast, and about Madras for building and road making, and when ground into clay and mixed with jaggery, it makes a good water proof cement for the roofs of houses.

The proportions for laterite road making at Madras are:

15 Laterite.
$\frac{3}{4}$ Gravel.
2 Clay.
$2\frac{5}{8}$ Sand.

which costs Rs. 2-2-1 per square of 100 feet.

Laterite makes a good hydraulic cement when ground up with the nodular concrete that occurs near Tondiarpett. The late Dr. McLeod examined many of the laterites of this Presidency and found them to consist of iron, manganese, silica, alumina, and lime with traces of magnesia soda and potass. They differ from the conglomerates of other countries in containing more manganese and ochrey clay.

Sandstone is met with in great variety and abundance. In the Tada and Poddelay talooks of Nellore there are excellent beds of white sandstone of superior working quality, similar to the freestone of Scotland, and an equally valuable building material. At Streepermatoor and at Verdachellum near Cuddalore, there are immense beds of another kind, used by the natives for rice mills and grindstones. At Sadras also there is one of the finest quarries in the Presidency; the grindstones made from which, are quite equal to those imported from England.

At Panumparae in the Tinnevelly district there is a sort of "Bath stone" most valuable for building. A church has been constructed of this stone in the neighbourhood, and its color strikingly resembles in appearance that used in the old Cathedrals in England. It is of a fine hard grain, bears a smooth surface and is easily worked up. Its price is Rs. 0-1-8 for a piece 30 x 10 x 6 in the rough and for squaring and dressing another Rs. 0-1-8 is charged. A common country cart will carry 4 of these stones 10 miles for 8 annas=0-2-10 per ton per mile.

The Godavery annicut is built of a sharp grained sandstone of a bluish color and variable in hardness and durability; exposure appears to harden the surface of this stone probably from the lime which it contains. It is delivered on the work for rubble building, for about 8 annas per ton, and the cut stone for the flooring of the annicut, costs about $2\frac{1}{2}$ Rupees per square yard 1 foot in thickness.

The Kistna annicut is built of a coarser description of sandstone blended with gneiss and containing grey quartz and garnets of a light pinkish color, but not valuable. This rock occurs in large inclined strata lying loosely upon each other, it is easily quarried, and is a handsome building material, but being very brittle, it is not susceptible of a finely chiseled surface. The specific gravity of this stone is 157 lbs. per cubic foot, and it is delivered on the work for 8 annas per ton; somewhat cheaper than the Dowlaishwarum stone, considering the comparative rates of wages at the two places.

(*Note.*—The Gunpowder used for blasting this rock is made for about one anna per lb. Its proportions are 75 saltpetere, 15 charcoal, and 10 brimstone. These materials are first pounded separately very fine with a common wooden pestle and mortar, similar to those used by the natives for rice. The ingredients are then mixed and repounded for several hours until they are thoroughly incorporated. It is afterwards damped and hand rubbed till it granulates and hardens. The powder is then placed in the sun to dry, for a couple of days. The wastage is two per cent. It should be again exposed to the sun for a short time immediately before using. It will not keep well during wet weather, and of course is inferior to gunpowder made by English machinery—it only costs, however 1 anna, while *that procured from the Arsenal* is about 5 annas per lb. In large blasts of 3 and 400 lb. it took on an average 12 oz. for every ton of rock blown down, and its comparative strength with English powder is as 2 to 3. The charcoal is made of the calotropis gigantea, zillady or yerookum shrub, which grows wild near the coast. The milk edge, euphorbia tirucalli will do equally well, and so will the stalks of cholum or Indian corn.

The match costs 18 annas per 100 yards, to make which quantity, it takes the following ingredients:

Composition.
1 lb. Twisted cotton thread.
1 lb. English rifle powder.
1 lb. Rosin.
1 oz. Grease.
1 oz. Bees' wax.
$\frac{1}{2}$ oz. Lamp oil.

The powder is rolled in the thread by a simple little machine. The match is then covered with the composition which is boiled and applied hot; it will burn perfectly under water. Two men and a boy can make 300 yards per day.)

Steatites—are common and of all sorts and colors. At Kurnool and Salem and near Mysore there are very fine beautifully white soapstones, and near Chittoor there is a valuable description, (similar to the cornish serpentine) procurable in large blocks and suitable for many statuary and decorative purposes. There is a quarry of excellent potstone at the Nagerry Hills, which is likely to become a valuable addition to the

Madras trade. The stone is of fine grain, easily worked with the chisel and susceptible of a high polish ; when oiled this stone resembles in a great degree black marble. There are some interesting specimens of manufacture in this material, which show a considerable advancement in design and execution.

N. F. Mooroogasen Moodely, an influential gentleman at Madras, has exhibited some *Goglets and a Jar* for preserves. They are of superior workmanship and elegant in construction ; but too expensive for general use. The Jury recommend a 2nd Class Medal to this gentleman, not so much to mark the intrinsic merit of the articles under consideration as to draw attention to the manufacture and the improvement already exhibited in this useful branch of domestic economy.

An Inkstand and a Butter Cup exhibited by Appavoo of Madras, deserve Honorable Mention.

There are also some specimens of *Carving in Potstone* from Bangalore, made of a softer quality of steatite and with some pretension to neatness and useful adaptation ; while others exhibited by Beri Shamanah, Merchant of the same place, though inferior in execution, are extremely cheap.

Some *Articles exhibited by R. Ratliffe*, Esq., and made at Chinaaunndum in the Nellore district are mentioned on account of the excellent cement with which the joints are united. In trying to dissever those of an ink bottle, the stone broke across the joint which remained perfect. This cement is made of pounded laterite and jaggery boiled together and applied hot ; it stands the effect of boiling water and appears to be uninjured by time or climate.

2.—Manufactures in Clays.

In this group are exhibited bricks, tiles and cements.

Bricks.—No authentic information is extant regarding the early history of brick making in India. It is known that sun dried unburnt bricks of a very large size were formerly employed in building and these may still be seen in the basements of some of the old ruined Jain temples at Heera Toombal in the Ceded Districts, Anagherry in the Southern Maharatta country and in the walls of the mud Forts at Gudduk, Dummul and other localities. The bricks appear to have been usually $2\frac{1}{2}$ feet in length by 15 inches in breadth and 7 or 8 inches in thickness. The seams are apparent from the effect of the weather, but the bricks cannot be separated without breaking. The basement and a good deal of the interior of the solid Muntapums or Pyramidal towers of these jain temples were built with unburnt bricks and the masonry and carved slabs, ornaments and pillars were built over this foundation of earth work. This accounts for the dilapidated condition of parts of these temples. In some of the old Forts in Southern India the lower part of the walls is built of unburnt bricks and the upper part of hewn stones. The more modern Forts are chiefly constructed of mud embankments cased in large blocks of stone, very accurately fitted but not cemented with lime or mortar. In the ancient buildings of India, brick work does not appear to have been extensively employed ; although in some of the temples we find the upper stories made of brick, while the lower ones are of stone. Bricks of a superior quality, and many times the present ordinary size, are often discovered in this country ; and in the Northern Circars, South Arcot and other Districts excellent specimens have been found, which indicate that formerly they were made of a much larger size, and that great attention was paid to their manipulation and burning. The bricks made in Madras 30 or 40 years ago, are also larger and of better quality than those now manufactured. The mortar of this period is also good. The test of a good brick is its hardness, non absorption, and regular shape ; and the larger it is the better, provided it possesses these qualities, and is well burnt. The weight required to crush a square inch of a well made English brick, varies from 1200 to 4500 lbs. ; but half that weight will produce fracture. Its tensile strength is about 275 lbs., and it absorbs about a fifteenth of its weight of water. The best brick earth consists of 3 parts common clay and 1 sand or calcareous earth in powder. The London brick makers often use a mixture of 3 clay to 1 coal ashes, by which the bricks help to burn themselves, and less wood is consumed. It would be interesting to try the experiment with charcoal ashes in lieu of coal.

Tubular, or hollow bricks, have been lately used in England and are recommended to the consideration of the Indian public. In size they are 12 ⋈ 6 ⋈ 4. They soon dry, take less fuel, and can be better burned than the ordinary solid brick, and they are 30 per cent. cheaper ; exclusive of a considerable reduction for chunam, labour and cartage. They are particularly suitable in deltas near canals, rivers and on the coast, where the soil is often treacherous, and when lightness of foundation is required.

There are no means of correctly ascertaining the number of bricks annually made in this Presidency ; but it cannot be less than 400 millions costing 11 lacs at the average price of 2-14-0 per 1000. In a manufacture for which there is so great a demand the smallest improvement is of great importance, a saving of even 4 annas per 1000 would amount to a considerable sum in the annual expenditure of Government.

Brick making at Madras is not conducted on any scientific or well arranged system, every one makes according to his fancy, and the durability and goodness of the materials seem to be lost sight of in the cheapness with which they can be delivered in the market. Little attention is paid to the selection of the earth, as cartage is expensive, and the bricks are usually made in the vicinity of the proposed building, without much

reference to the quality of the ingredients. The earth is seldom dug up and exposed to the atmosphere for any length of time before being used, and it is generally insufficiently kneaded and mixed with too much water. Bricks are burnt in clamps and there is a considerable waste in fuel and material. There are also great risks incurred in the Native mode of firing and covering the clamps. If a high wind comes on, the fuel is consumed too rapidly and the bricks are unequally burnt. If heavy rain falls during the firing, the fires are apt to be extinguished and the whole clamp of bricks, the labor, and the fuel may be lost, but the most serious objection is that the sides and roof of the clamp are not made thick enough to retain the heat, the roof or a part of it often falls in and in attempting to cover the holes again the walls are apt to give way and serious accidents not unfrequently occur to the workmen. A clamp containing a lac will produce.

1st sort	40,000.
2nd do.....	40,000.
3rd do.....	20,000.

The wastage is from 15 to 20 per cent., while in England it is not more than 2 or 3 on bricks double the size. There, the stocker is allowed 10 per 1000 for broken bricks, and a similar per centage for unburnt ones, which are replaced in the next kiln, and considered the burner's perquisite.

There is no reason why Indian made bricks should not be as good as English ones, for the temperature is more even, and the frost at home is one of the brick makers greatest enemies. The rains there are also more uncertain, no month can be safely depended on, whereas in this country the manufacture can be prosecuted for several consecutive months, without the slightest fear of interruption from the weather. Madras bricks usually absorb a fifth of their weight of water. They are coarsely made, brittle, unevenly shaped, of no fixed proportions, and far too small. The builder is often obliged to use many different sizes in the same structure, and uneven settlement and imperfect workmanship are the necessary consequences. It would be desirable to have some uniform standard established, and bricks of no other dimensions should be purchased for Government works. This would encourage the natives to make a larger and better article. It is from mistaken economy that the present small bricks have been so generally adopted. Their dimensions have decreased in proportion to the prices paid. The following extract from Captain Foord's book is most pertinent to the subject.

"The economy in using thick bricks will be seen by the following calculation, a brick measuring with its mortar joint $9 \bowtie 4 \bowtie 2\frac{1}{4}$ contains 91 cubic inches. Another measuring $9 \bowtie 4\frac{1}{2} \bowtie 3\frac{1}{4}$ contains 131 cubic inches. A cubic foot will take 18 of the former and only 13 of the latter. Now a large annicut or bridge may contain 200,000 cubic feet of brickwork, and the difference on that quantity would be 10 lacs. But besides this, less chunam would be used as the mortar joints would be fewer, and again as a bricklayer can lay in a day as many thick bricks as he can thin ones, so a further saving would be effected by the use of the former. The chief points to be attended to in making good bricks are first to select as tough a clay or fine loam as can be found, dig and expose it to the weather for some time turning it every three or four days and wetting it with soft water occasionally if no rain falls. After standing for a fortnight it must be gathered into a heap, well soaked with water and trodden till it becomes stiff and uniform. It must not be too sloppy when put into the moulds, but should be firm like dough. Good bricks should be made on a flat board, they should bear to be lifted soon after being moulded, and they ought not to be exposed to the sun for two or three days as they will crack if dried too quickly. The bricks and paving materials made in the Madras School of Industrial Arts, are of excellent quality, and some of them equal to any produced in England. Great attention has been paid to the selection and tempering of the clays, and from the density and compactness of the bricks and the sharpness of their corners it is evident that they have been made upon good principles and more with a view to ensure quality than to attract attention from their cheapness. The firebricks have already been in great demand and have been found very refractory and durable. The arch wedge, pillar and key bricks, are deserving of notice from the variety of their shapes and their general good quality.

Roofing tiles of four different kinds. Paving and draining tiles are also deserving of notice as articles that would soon come into extensive use if they could be made on a large scale, and for moderate prices. They are interesting also from their having been made with machinery manufactured in this country by Mr. Dickson from drawings done in the School of Arts. The Jury would suggest that a second Class Medal be awarded to Serjt. M. Chesterfield, 2nd M. E. L. I. for the improvements in building-materials.

Gunner Barton is also awarded a 2nd Class Medal for his improved bricks and for the successful and practical manner in which he has manufactured them after the English mode. He is an experienced and intelligent professional brick-maker, and has been long engaged in the trade both at home and in this country, with equal credit to himself and advantage to the public service. The specimens exhibited by him are $9\frac{1}{2} \bowtie 4\frac{5}{8} \bowtie 2\frac{1}{4}$ in dimensions and intended for arch-building. They cost 5-12-0 per 1000 or rupees 7 delivered on the works, and are nearly twice the size of the ordinary Madras Brick.

Cements.—There are a good many contributions of Limes, Concretes, Septariæ, Dolomites, Magnesite Gypsum and other substances used in manufacturing Cements, and there seems to be an abundant supply of minerals of this class all over Southern India. The shell lime of Sooloorpett is too well known to require further notice except that it is far too pure a carbonate of lime to be used for out door plastering near the sea. The Kunkurs or Nodular limes are more durable though not so white. The Septariæ or Parker's cement stones, are very common in Southern India, though the beds are not extensive; they accompany the strata of blue and white Potters' clay and kaolin that are so common in this Presidency. The best hydraulic septariæ occur at Awady near Madras, Bangalore and Chingleput. A very fine natural Hydraulic cement occurs on the banks of the Godavery and has been extensively used in the construction of the Godavery and Kistna Anicuts. A very good Hydraulic Limestone occurs along with the blue slate of Cuddapah—and the Dolomites of the Ceded Districts and the Northern Circars make good cements. The magnesite of Salem, Bangalore, and Vizianagram, would probably improve the qualities of some of the other Limestones in certain proportions, as it acquires great hardness of surface but is deficient in adhesiveness. Numerous experiments have been tried with this mineral which certainly possesses some good hydraulic properties but has disappointed the expectations at first formed of its usefulness.

Gypsums.—Extensive beds of crystalline and fibrous Gypsum and Selenite occur near Ennore, the Red Hills, Ootatoor, Tiagar, Madura, Bangalore, Masulipatam, Hyderabad, and other localities. These are not put to any use except in the vicinity of Madras. The substance can be purchased in most bazaars in India under the names of *kulnar* and *kurpoora silasit* and is used in small doses as a medicine, but the Natives do not appear to be acquainted with the uses of this mineral in taking casts, plastering and house decoration, or in manufacturing Keene's cement. The finest specimens of selenite are contributed by the Local Committee of Bangalore and of Fibrous Gypsum by J. Ricketts, Esq. from Ootatoor. An interesting series of the applications of this substance to useful, educational and decorative purposes is contributed by the Madras School of Industrial Arts.

Some specimens of artificial hydraulic cement prepared by Mr. Carriot of Pondicherry are considered worthy of Honorable Mention as the manufacture has been carried on for some time on an extensive scale. The artificial blocks or betons however, and the large bottle of this cement forwarded by the Local Committee of Pondicherry with a report upon its employment have not satisfied the Jury. On examining the blocks it was found that they were very soft and pulverulent, and on trying a series of experiments with the cement it was found to be very slightly hydraulic and deficient in cohesiveness. Balls and cakes of the lime having acquired very little solidity after 72 hours' immersion in pure or brackish water; rough and smooth surfaces of brick having been very feebly cemented by it and thin strata having fallen off the surfaces of bricks.

JURY AWARDS.

Class XXVII.

2nd Class Medal.

Pro. No.	Catal. No.	Name of Exhibitor.	Object Rewarded.
CXLVII	13-14	N. C. Mooroogasen Moodelly.	Goglets and a Jar made of Naggery potstone.
CCCIV	22	M. Chesterfield ...	Improved building and roofing materials.
CCCIV	..	T. Barton	Building materials.

Honorable Mention.

Pro. No.	Catal. No.	Name of Exhibitor.	Object Rewarded.
XCVI	74	Mr. Carriot of Pondicherry	Artificial hydraulic cement.
LXXXV	4	Appavoo.....	Inkstand and butter cup of Soapstone.

CLASS XXVIII.

MANUFACTURES FROM ANIMAL AND VEGETABLE SUBSTANCES, NOT BEING WOVEN OR FELTED, OR INCLUDED IN OTHER SECTIONS.

JURY.

Sir Henry C. Montgomery, Bart.—*Chairman.*

W. A. Morehead, Esq.

Lieut. General Tulloch.

Colonel J. McCally.

Lieut. Colonel J. Hill.

Captain A. H. Hope.

C. V. Cunniah Chettyar.

ASSOCIATE.

Alex. Hunter, Esq.—*Reporter.*

Manufactures in Ivory.

A very interesting and complete series of carvings in Ivory, is exhibited by His Highness the Rajah of Travancore. It comprises many of the common animals, reptiles, fruits and flowers of the country which are carved with taste and carefully finished. There is a good deal of grace and spirit in the action of the animals, some of which are in natural attitudes particularly the bull and cow, the two deers, the cheeta and the rabbit. Of the reptiles, the frog and lizard are well represented and a pair of paper cutters with ornamental handles are particularly deserving of notice, one for the judicious adaptation of a common garden flower to the design, and the other of a lizard in a spirited attitude. The fruits and flowers are well represented and the whole series evinces a perception of the natural beauties of the objects represented. The Jury recommend a 2nd Class Medal for the series.

Messrs. Scriven and Co. also exhibit a series of animals carved in ivory of a small size, but these have been spoiled by the injudicious application of color. Some walking sticks carved in ivory are exhibited, but they are not finished with taste. The Jury regret to find so meagre a display of manufactures in this Class.

JURY AWARDS.

Class XXVIII.

2nd Class Medal.

Pro. No.	Catal. No.	Name of Exhibitor.	Object Rewarded.
CCXXI	16 to 64	H. H. the Rajah of Travancore.	Series of carvings in ivory.

(Signed) Alex. Hunter,

Reporter.

CLASS XXIX.

MISCELLANEOUS MANUFACTURES AND SMALL WARES.

JURY.

E. Lecot, Esq.—*Chairman.*

W. H. Crake, Esq.

Lieut. General P. E. Craigie, c. b.

H. A. Murray, Esq.

Edward Balfour, Esq.

N. C. Mooroogasen Moodeliar.—*Reporter.*

ASSOCIATE.

H. Stanborough, Esq.

Of the collection of articles submitted for the consideration of the Jurors in this Class, the following deserve notice.

Perfumery.—An interesting series of perfumery was exhibited as part of the articles of the Madras Tariff, purchased by Government for transmission to the Museum at the East India House; another series consisting of lavender water, eau de cologne and essence of rose manufactured by the late Mr. Gay, and a third collection by the Local Committee of Cuddapah.

The perfumery comprised among the articles of the Madras Tariff, consisting of various descriptions of attar generally used by the natives of India, appears to be of excellent quality, some of the scents are however rather powerful, and better suited to Native than European tastes. They exhibit much skill on the part of the manufacturer to whom the Jury recommend a reward of 50 Rupees.

The next specimens of perfumery examined by the Jurors, were those manufactured by the late Mr. Gay. The lavender water, eau de cologne, and essence of rose, are not equal to the same description of articles manufactured in Europe, yet being the only specimens of such articles in the exhibition, the Jury think the manufacture worthy of encouragement and award a 2nd Class Medal.

Wax Candles.—Various descriptions of wax candles were exhibited and examined. Those sent by the Cochin Sircar were excellent, and the Jury consider the manufacturer deserving of a 2nd Class Medal.

Lac ware.—A series of lacware from Hyderabad consisting of bracelets, chains, neck ornaments, pin-cushions, purses, and other ornaments exhibited through Dr. Smith (No. 30 to 45) deserve creditable mention. They are excellent of their kind, and well finished.

Bead ware.—Of the articles brought to the notice of the Jury under this head, the following are deserving of remark.

Specimens of beadware exhibited by a native lady Munnul Cody Ummal (No. 105 to 112 and 147 to 153) and similar articles from Miss Locker.

Fans.—The fans exhibited are numerous and made of a variety of materials. Those of peacocks' feathers exhibited by the Travancore Local Committee excel in beauty and workmanship. The Jury consider tho manufacturer of these fans deserving of Honorable Mention. The fans purchased and exhibited by the Local Committee of Rajahmundry and Tinnevelly, are next in excellence to those of Travancore, and deserving of commendation.

Walking Sticks.—A walking stick exhibited by His Excellency the Rajah Tondiman Bahadoor of Poodoocottah, is a very elaborate and ingenious piece of workmanship. It contains a gold watch and chain, a gold snuff box, spaces for paper, pens, ink, &c.; the skill and ingenuity displayed by the maker of the stick, deserve in the opinion of the Jury the Prize of a 2nd Class Medal.

Gilding.—Amongst the articles laid before the Jury, the gilding executed by Lutchmiah Rajoo, No. 120 to 122, are good specimens of their kind, and deserve a 2nd Class Medal.

Soap.—Several samples of soap were exhibited and carefully examined by our associate Mr. Stanborough. The best appears to be a cake of castor oil soap, exhibited by Dr. G. W. Flynn, which the Jury think deserving of a 2nd Class Medal. It would have been more satisfactory however if Mr. Flynn had exhibited a larger quantity, stating the price per lb., it would then admit of consideration in a commercial point of view.

JURY AWARDS.

Class XXIX.

2nd Class Medals.

Pro. No.	Catal. No.	Names of Exhibitors.	Objects Rewarded.
ccv	87	H. H. the M. Rajah of Cochin	Wax candles and peacock's feather fans.
cxv	50	H. E. the Tondiman Bahadoor...	Walking stick.
.....	.....	Mr. W. Gay ..	Perfumery.
ccxix	114 to 116	Lutchmiah Rajoo..	Gilding.
Class II.	86 to87	Dr. G. W. Flynn..	Soap (Cl. II.)

Honorable Mention.

cxxxi	27 to40	Hyderabad Local Committee	Lac ware.
cxlvii	99 to 106	Munnul Cody Ummal	Bead ware.
ccxxxiv	117 to 123	Miss Locker	Bead ware.
		Rajahmundry Local Committee..	Fans.
lxiii	19 to23	Tinnevelly Local Committee	Fans.
cxlii	68 to69	Masulipatam Local Committee	Condapillay toys.

Pecuniary Award.

Madras Tariff..	Seelar Sahib	Rs. 50	Attars, &c. & c.

(Sd.) N. C. Mooroogasen Moodelliar,
Reporter.

CLASS XXX.

FINE ARTS, INCLUDING ALSO COINS, BOOKS, &c.

The Right Hon'ble Lord Harris.
His Excellency Lt. General the Hon'ble G. Anson.
The Hon'ble Walter Elliot, Esq.
Robert Orr Campbell, Esq.
Nana Thakoor.
T. G. Clarke, Esq.
Capt. J. W. Hay.
A. Hunter, Esq. m. d.
Capt. Cunningham.
The Hon'ble Sir W. W. Burton, Kt.
H. A. Murray, Esq.

SUB JURY.

PHOTOGRAPHY ARCHITECTURAL ANTIQUITIES AND LANDSCAPES.

The Right Honorable Lord Harris,—*President.*
General J. S. Fraser.
The Honorable W. Elliot, Esq.
Captain Ogilvie.
Nana Thakoor.
T. G. Clarke, Esq.
Captain J. W. Hay.
H. A. Murray, Esq.
A. Hunter, Esq. m. d. —*Reporter.*

The collection of Photographs is very large and interesting comprising views of Antiquities, Landscapes, Architecture, Trees, Modern Buildings, groups of figures, illustrations of native costume and portraits.

The best series of photographic views on paper is exhibited by Captain Tripe, 12th M. N.I., it consists of 68 large pictures, 21 inches by 14, taken from the Jain temples and ruins at Hullabede and Bellore in Mysore. The majority of these are clear, sharp, and well defined in the details, proving that great care has been taken to obtain the correct chemical focus. The half tints and reflected lights are also well brought out, a few of the views are sombre and heavy, but this has been caused by the dark shawdows cast by parts of the massive buildings. As studies for the artist, the antiquary or the engraver these are invaluble ; as regards the design of the buildings themselves however, there is a sameness in the style of the ornaments, and so great a repetition of long horizontal lines and of complicated details that the eye is fatigued with minutiæ and seeks for more quiet flat surfaces to set off the exuberance of ornament. We would notice the following as being particularly deserving of attention, Nos. 2-6-8 and 12 views of the temple at Bellore and Nos. 22-26 and 34 from the same temple.

No. 35. The great bull in the temple of Siva, in this the half tints are beautifully delicate.

No. 37. Side view of the Mundapum with the small bull No. 32 principal entrance to the temple with guardian figures, No. 40 a figure of Ganesa No. 54 a picturesque Sule mundapum with good foreground—No. 57 Agatharswara pagoda with a banian tree growing from the top. Captain Tripe also exhibits some good landscapes of which the best are No. 63, the overturned lingum of Hullabede taken from the platform of the temple. No. 9, distant view of the temple from across the tank No. 65, bridge, and No. 64 large tank near the ruins. These views are very Indianin their character and picturesquely selected. Two careful ground plans of the position and measurements of the temples at Bellore and Hullabede accompany the photographs. The Jury are of opinion that Captain Tripe is entitled

to a first Class Medal, and they recommend that the whole series be purchased for transmission to the Honorable Court of Directors.

Dr. Neill of the 1st Regiment Light Cavalry also exhibits a good series of views of the same temples nearly equal in merit to the former, but not so numerous; amongst these may be mentioned the interior of the Court of the pagoda at Bellore No 5, principal pagoda near Hullabede, No. 7 ruined pagoda near Hullabede, in this the sky is a little too dark and the clouds rather harsh and artificial. The view of the celebrated Hill of Mavana Bellagole with the gigantic statue on the top 60 feet high is very characteristic. Dr. Neill also exhibits good views of St. Andrew's Church, and the Light house at Madras, with a few characteristic landscapes, the best of which are a cocoanut and betel garden with jungle, A dead tree in a landscape, bund of a tank and a large banian tree. The Jury recommend a 2nd Class Medal for this collection.

Dr. Pritchard exhibits some good views on a smaller scale of the pagoda at Woontimettah. The old palace and some tombs at Golcondah and Hyderabad. The Jury consider these worthy of honorable mention—as very fair specimens of the paper process.

Mr. Underwood exhibits some small views taken on glass by the collodion Process, but one or two of them are solarised, the view of the barracks in the Fort is well focused.

Dr. Scott also exhibits some small views on paper of the Cathedral, the Cenotaph, the Munro statue and St. Andrews Church; they appear to have been taken with an indifferent lens.

Portraits.—There is a great collection of photographic portraits, consisting of single figures, groups, costumes and three-quarter lengths, the majority of these are negative pictures printed on paper from positives taken on glass by the collodion process. The Jury consider that the most artistic series as regards proportion of the figure, general position of the sitters, focusing and clearness of printing, is that exhibited by Mr. Cochrane CLIX 529. This collection however is not free from faults, and one of these appears to be that too strong a light surrounds the heads, and there is deficiency of shadow throughout the pictures. Several of them have faded since the Exhibition opened; from the hyposulphite having been but imperfectly washed out. The positives on glass by this exhibitor are very dark from the film of collodion being too thin to give solidity to the lights. The Jury recommend a first Class Medal for this series.

Captain Greenlaw exhibits a great variety of head size portraits, half lengths, and groups, many of which have been carefully focused and exhibit the half tints and delicate shades which give rotundity to the figures, but several have been spoilt by being left too long in the hyposulphite solution; the attitudes however are good and the proportions artistic. Some of the groups contain from 8 to 11 figures well arranged though not all in focus. Capt. Greenlaw exhibits a very good clear positive upon glass with delicate half tints and well focused features, but the dress and back ground are a little flat. The Jury recommend a 2nd class medal for Capt. Greenlaw's groups. Mr. Underwood contributes a great variety of portraits in different styles positive, negative, and colored portraits. Among these are some good negatives printed on paper, but the effect of a few is spoilt by the light being too strong at the lower part of the figure, giving the outlines of the chair and dress a cut out appearance; one or two are also spoilt by being in bad proportion to the frames some of which are oval, others square or too much rounded at the corners. The Jury consider this collection worthy of honorable mention. Dr. A. J. Scott exhibits a large and varied collection of negative portraits, taken by the collodion process and printed on paper, several of the likenesses are striking and the positions of some of the figures good, but the proportions are not artistic, too much of the lower part of the figure being shown and the head being in general too high and out of focus. The Jury would remark that the contrasts of light and shade are too strong, the half tints having been lost from too short an exposure in the camera. The attitudes also of the figures are susceptible of much improvement. The native costumes exhibited by Dr. Scott form the best part of this large and varied collection they are on a larger scale than the others and in more artistic proportions, but they appear to have been taken with an inferior lens they are deserving however of honorable mention. Mr. Lafond exhibits some creditable portraits but they are deficient in half tints and too strong in the lights and shades.

Mr. Holt exhibits some portraits taken at Mysore but they are on too large a scale for the size of the camera which appears to have been a small indifferent instrument. They are not focused with sufficient accuracy and most of them have been left too long in the hyposulphite solution. The four positives on glass by the same exhibitor are very dark and the attitudes are stiff and unartistic.

Coins.—An interesting series of Coins is contributed from nearly all parts of the Presidency, it embraces both ancient and modern current and uncurrent coins of India and other neighbouring countries.

The largest contributors are His Highness the Rajah of Tanjore, the Salem Local Committee, the Hyderabad Local Committee, His Highness the Rajah of Travancore, the Madura Local Committee, the Hon'ble W. Elliot, Senior Apothecary A. Harris, and the Local Committee of North Arcot. A few coins were also transferred from the duplicates left with the Paris Exhibition Committee, and others were procured from Masulipatam, Pondicherry and South Arcot. The most valuable collections were those sent by their Highnesses the Rajahs of Tanjore and Travancore. Among the latter was a most interesting series of old

Roman gold and silver coins that had been accidentally dug up in this country. Those who are interested in this subject will find a complete list of the Coins in the printed Catalogue, and the majority of the Coins have been purchased for deposit in the Government Museum at Madras.

Works of Art.

H. Sawmy of Madras, exhibits some very creditable specimens of Portrait carving in wood and Ivory. The best of these are two profile busts of children, one in Ebony and the other in Ivory, and a bust of Moliere in Ebony. Mrs. Monckton exhibits a very tasteful *Chess table* painted on wood, each alternate square being filled with a landscape Vignette and the border being composed of larger vignettes.

The Jury award a 2nd Class Medal for this Artistic and elaborate work of Art.

Diagrams.

Two very good series of Botanical Diagrams and 7 Vols of original Botanical plates are exhibited by Dr. Cleghorn, these have been executed under his superintendence from living plants by Native Artists, Govindoo and P. Mooroogasen. The Jury award Honorable Mention for these useful colored plates.

Dr. Blacklock exhibits a diagram illustrative of type printing on a large scale upon cloth from wooden blocks. This is one of a series of class Diagrams used in the Medical College.

Pith Models.

The Trichinopoly Local Committee exhibit a large collection of figures and Architectural Models, carved in the Pith of the Typha. The attitudes of the figures are stiff but the draparies are characteristic. The figures introduced into the model of the Trichinopoly Fort are out of proportion being far too large for the scale of the buildings.

Modelled Figures and Fruits.

Mootoosawmy Potten of Cuddalore, exhibits a large series of the Fruits of this country modelled in Chunam and colored in imitation of Nature : also well finished figures of a Native Rajah and of a Peon, executed in the same material. These are considered very creditable specimens of modelling and a Prize of Rs. 20 is awarded.

Drawings and Paintings.

There were very few of these and none of particular merit, with the exception of the etchings by Kasava Doss, which were remarkable for the minuteness of detail with which they were finished and for the spirited manner with which prints, the subject of which were various English sports, had been copied. A 2nd Class Medal was awarded to him.

A water-colour drawing by Mr. Just Gantz, exhibited by Mr. Kellie, was considered worthy of mention.

Some drawings of Arms and ancient Pottery from old Tombs by T. Chengulroy, were considered deserving of Honorable Mention.

The paintings in oil by Mr. Fonceca, were deserving of credit, but were considered to require finish and taste.

LITHOGRAPHS.

A set of Lithographed Books with drawings, published by Dr. Balfour, were remarkably good : a 2nd Class Medal was awarded to the Exhibitor.

PHOTOGRAPHY.

Some photographs executed by Mr. Underwood, and placed by him in the Exhibition, subsequently to the decision of the Jury, to which these articles had been submitted were superior specimens of the art, and would, it is thought, have been entitled to a 2nd Class Medal, had they been submitted prior to the assembling of the Jury in Class XXX.

BOOKS.

Of the English Works exhibited, Mr. Baynes' compilations of the Civil and Criminal Law of this Presidency, a classified compendium of the Circular Orders of the Court of Sudder Udalut, and Hints on Medical Jurisprudence by the same author, and Colonel Smith's Pamphlet on Mint Affairs, appear to be deserving of special notice.

DR. BALFOUR'S *Barometrical Sections of the Madras* Presidency, and his *Statistical Maps of the World in English, Telugu, Tamil and Hindustani*, are also very useful works.

The English, Telugu and Tamil readers published by the School Book Society, are useful works and well adapted for elementary schools. They supply in some measure the want which has long been felt of Elementary School Books, in which the illustrations and allusions have reference to objects familiar to the Native mind.

An edition of the Tamil Cural, by the Revd. Mr. Drew, and published by the same Society, is a useful work.

The Madras Tract and Book Society have exhibited a set of English and Vernacular Almanacs, remarkably well got up, containing a great deal of useful information and extremely cheap.

A Hindoostanee Calendar, for a period of 55 years, exhibited by Shaik Bundaghee of Poodoopet, Madras was considered deserving of notice.

An elementary Geography being a Tamil translation of a work by Lieut. Col. Browne, published by the same society is deserving of notice.

The Upayukat Grandha Karana Sabha, a society of Hindoo young men, most of them past scholars of the Madras University, have exhibited several very useful Elementary School Books. Of these a Tamil exposition of a portion of Robertson's History of America, by Viziarunga Moodelly, a brief History of India in Telugu, by Thenathialoo Naidoo, and a Tamil and Telugu Arithmetic by Vencatacharry and Sadagapacharry, are deserving of special notice.

The Revd. W. Taylor contributes some useful Elementary School Books in Tamil, and others on Geography and Astronomy in English.

The Christian Knowledge Society have exhibited copies of Mr. C. P. Brown's Telugu and English, and English and Telugu Dictionaries, one of the most important contributions that have yet been made to the study of the vernacular languages.

In Canarese, two very useful Dictionaries have been contributed by the Revd. J. Garrett, of the Wesleyan Mission at Bangalore.

An edition of the Bagavat Gita, in Sanscrit, Canarese and English, edited by Mr. Garrett, is a valuable contribution to the study of Oriental Literature.

A very good translation in the same language (Canarese) of the adventures of Robinson Crusoe, has been exhibited by Kristnasawmy Iyengar of Bangalore.

The German Mission at Mangalore, have contributed a number of useful works in Canarese and Tulu.

The only Malayalum Works that call for special mention are the Dictionaries by the Revd. Mr. Baily, and the Grammar by the Revd. Mr. Peet.

The Report upon the Books was written by A. J. Arbuthnot, Esq.

SUB JURY.

Carvings in Sandal Wood, Ebony, Ivory, Stone Metals and Inlaid Woods.

His Excellency Lieut.-General The Honorable George Anson,—*Chairman of Sub Jury.*

R. O. Campbell, Esq.

A. Hunter, Esq., m. d.—*Reporter.*

ASSOCIATES.

Captain Ogilvie.

Dr. Cleghorn.

Lieut. Hawkes.

The box exhibited by Mrs. Wilkieson, is undoubtedly the best specimen of the sandal wood carving. The figures and ornaments are taken from the sculptures in the celebrated temple of Hullabede in Mysore, they are boldly and deeply cut and well finished. The work was executed under the direction of Captain Cunningham of the Mysore Commission, and was carved by a native of Soorub, from careful drawings prepared expressly for the purpose. The jury are of opinion that the Exhibitor of this box is entitled to a second Class Medal.

Some very creditable specimens of carved sandal wood are exhibited by the Bangalore LocalCommittee, of these the most deserving of notice are two large and two small boxes carefully finished and varied in the design; but not so bold in relief as the box from Soorub.

The Bangalore Local Committee also exhibit two rosewood carved boxes very similar in design to those made of sandal wood. The ornaments are all floriated without figures and are clearly cut, but the general effect of tho work is spoilt by the deep ground work being dotted instead of being left flat.

The Canara Local Committoe contributes a well carved sandal wood chess table, a model of a Hindoo car, and some neatly finished boxes, one of which is inlaid with ivory and metal.

Mrs. James Fraser exhibits, two card cases and a work box carved at Ganjam. These though not so deeply cut as some of the other carvings in sandal wood are deserving of notice, as being from a district where the manufacture has been recently introduced.

Some well carved sandal wood chowries are exhibited by Lady Montgomery, and the Madras Local Committee. Mr. Meppen contributes sandal wood bracelets and crochet needle holders made near Cuddoor in Mysore, and Mrs. Bourdillon a box containing sandal wood knitting pins and silk winders.

The jury would remark that the art of carving in sandal wood though creditable to the Natives of India, as evincing care and laborious industry owes its chief value to the quaintness of the designs and the elaborate nature of the work. As a branch of the fine arts it can hardly be ranked under the head of carving, as many of the specimens are little more than ornamental surfaces showing much of the plain rectangle in the leading forms and little originality of invention.

The Art is still susceptible of great improvement.

Some neatly finished writing books, card cases and inkstands of sandal wood, inlaid with Ivory, Ebony, and Metal, were contributed by Mr. G. Leonard of Chicacole, shortly after the Jury had assembled to draw up their report. These are interesting specimens of an Indian manufacture, for which there is an increasing demand. Bombay has hitherto been the chief market for this manufacture, but it is now carried on at Chicacole, Hyderabad, and Vizagapatam.

Some creditable specimens of inlaid fancy woods are exhibited by the Travancore Local Committee; the best of these are a lady's workstand with silk winders, and a backgammon board.

A carved cocoanut cup mounted in silver exhibited by the same Committee is deserving of notice.

Sculptures in Stone.—Captain Harvey of the Mysore Commission, exhibits two very spirited sculptures in *Potstone*, executed by a Native from drawings made on the stone by Captain Harvey and finished under his directions. The subject of one is taken from a design in the London Art Journal, Joshua commanding the sun and moon to stand still. The spirit and action of the figures are well represented, and the chiselling is good the relief given by bold undercutting is also worthy of commendation. The other sculpture is copied from one of the groups on the Temple of Hullabede. A 2nd Class Medal is awarded for these.

Sculptures in Metal.—It is to be regretted that there is a very poor display of sculptures in metal.

The Tinnevelly Local Committee exhibit six small copper images of deities intended as paper weights. They are copied from the stone sculptures on the pillars of the Kistnapooram Temple. The chiselling and finish of the surface are careful, but as works of Art, they give a very insignificant idea of the bronze and metal workmanship of Southern India. This branch of Art, has greatly deteriorated during the last few centu-

ries and the only application of it, to decorative or useful purposes, is to be found in the handles of bells, and small paper weights, but the designs of these are stiff, grotesque and formal without any pretensions to beauty, the subjects being constant repetitions of a few of the favourite Hindoo deities in uneasy and constrained attitudes. This is the more to be regretted as the Natives of India have long been celebrated for the casting and chasing of Metals.

Lieutenant Shuldham exhibits a number of Burmese images in Metal and Alabaster, but these are in stiff attitudes and do not evince any taste or originality of design.

JURY AWARDS.

CLASS XXX.

1ST CLASS MEDALS.

Pro. No.	Catal. No.	Names of Exhibitors.	Objects Rewarded.
CCXCVIII	621	Captain Tripe....	Photographic views of the temples of Hullabede and Belloor.
CLIX	529	W.E.Cochrane, Esq	Collection of Photographic portraits.

2ND CLASS MEDALS.

Pro. No.	Catal No.	Names of Exhibitors.	Objects Rewarded.
LVII	27	Mrs. Wilkieson.	Carved Sandal wood box.
CLXXII	549	Capt. G. Harvey.	Carvings in stone.

2ND CLASS MEDALS.

Pro. No.	Catal. No.	Names of Exhibitors.	Objects Rewarded.
CCXLVIII	622	Dr. Neill	Landscape and Architectural views.
CCCIII	.....	Capt. Greenlaw ..	Groups of figures.
CCCIII	.....	Mrs. Monckton ..	Chess table painted on wood.
CXLVI	598	Casava Doss ...	Etchings on walking stick and bamboo boxes.

HONORABLE MENTION.

CCCIII	.....	Dr. Pritchard ..	Good Photographic views of Mahomedan and Rajpoot Tombs, and Pagoda at Woontimettah.
CCXCIX	628	W. E. Underwood, Esquire	Variety of Photographic portraits
CCCIII	.....	Dr. Scott	Native Costumes.
CCCIII	.....	Govindoo	Botanical drawings
CCCIII	.....	P. Mooroogasen ..	Ditto.
CCCIII	.....	T. Chengulroy ..	Drawings of arms and ancient pottery.

PECUNIARY AWARD.

CCCXXXIV	683-4	Mootoosawmy Potten, Cuddalore, Rupees 20.	Modelled figures and fruits.

(Signed) ALEX. HUNTER, *Reporter.*

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