Ackthmy

B Bk 1589 W25/6184

that the navigation might be op
The road from Nagpore to Chan
August 1865, two-fifths of the a
completed. But in 1871, altho
remained unfinished. A channe
The second barrier works were e
third barrier works were not con
the second barrier to the coast, w
the "Wainganga" steamer conti
third barriers; but the amount
August 1871, the Secretary of S
completed on the smallest possi
whence a road should be made
the request of the Government
involving expenditure which did

311. ACCOMMODATION FOR TRA

312. TOWN IMPROVEMENTS.

313. HARBOURS.—The harbo
fully treated of under Marine, an
under construction.

314. (*Especially the construc*
state of works.)

315. In September 1870, Mr
appointed to prosecute inquiries
Madras harbours. During 1870-7
sides of the peninsula. [*What re*

316. MISCELLANEOUS.

317. DEPARTMENTAL HISTORY

323. LAW. (*List and very b*
Branch.)

324. CONSTITUTION OF BRANCH
has already been described in the

325. PROCEDURE.—(*From Ch*

326. The financial control of
and maintenance of roads is met,
to the supervision of the Board
Department; but the actual execu
to village roads, is for the most
a charge of 25 per cent. b[illegible] n
estimates, and audit of expenditu

Anthony

309. *West Coast Backwaters.*—An
is included in the Malabar and Travanc
of India. The great value of this syste
south-west monsoon. In its centre is
being made the finest close harbour in
end, and from 10 to 48 feet deep. Th
a foot of water, and carry 2,000 to 3
Warkallai barrier, and by cutting thro
Venjali lake to the Tirur station of the
line of water communication from Bud
capital of Travancore, whence the Victo
Comorin for 15 miles, which is to be ex
Trivandram, a spur of the ghauts, cons
miles wide, with a summit level of 1
washed by the sea. From the south a
with cocoanut and jack trees, runs up
and there is a similar ravine on the no
intersected by five ravines, and conta
have been four distinct plans for c
the one finally adopted is that of
Circár. It consists of a cutting throug
feet, is to become a tunnel. This hap
tunnels is 2,000 feet. The canal is
progressing towards completion.

310. *Godávary Navigation Work*
much attention during a number of yea
finally abandoned in October 1871.
project, which was first urged upon th
Cotton in 1851. The drainage
Wurda, rising in the Satpura hills, and
is joined by the Painganga a little b
flows on until it receives the Waingang
which joins the other rivers after a co
From this point to the sea is a dis
obstructions to the navigation, cause
above the anicut at Dhauleswaram, at
long. The second is 14 miles long, a
third is 75 miles above the second, an
third barrier from Chanda, in the C
cotton mart of Hinganghaut 115 miles
that the Godávary could be made n
thought that a boat might make a tr
season, by being towed up, in 2½ m
Bombay and the mouth of the Godávary
convey cotton at one-third the rate of t
was thought, would also be sent by th
would be salt, cocoanuts, some Euro
hopes have since been abandoned, so f
concerned. The Godávary wo
locks round the barriers, and clearance
through a ridge of sandstone rocks at
The preliminary work consisted of a su
the river as far as Chanda. This was
first barrier were begun in 1861, two l
and preliminaries. Temporary tramwa
anticipation of the completion of the ca
the works, in January 1863, 70 lakhs
the works at the first and second barrie
barrier, should be proceeded with, at

308. *Paumban Channel.*—The question of
India and Ceylon has recently been investiga
Peninsula is separated from the Rámeswa
Rámeswar Island is divided from that of Man
Adam's Bridge; and the whole line is so shal
has been stated a railroad could be made wi
Ceylon. The object however has been to
Manaar to Palk Strait, so as to save the dist
1822 Ensign (now Sir Arthur) Cotton propo
improving and deepening the Paumban Chan
work has progressed under the Madras Engi
labour (*whence obtained?*). The passage now
the northern one, 4,232 feet long, through a s
a depth from 11 to 14 feet, and a navigable w
2,100 feet long, and 150 wide, through a sand
a depth of 12 feet. It would be useless to ma
is no greater depth in the approaches on eit
has long been of use to the native craft, and
success, for 12 feet is sufficient for the local t
annually passing through the channel during t
amounting to If a canal for large sh
must be sought for elsewhere; either across
the Island of Rámeswar. The site most app
Island. The southern entrance of such a
piece of anchorage nearly a mile long, with
breaks on the reef between Curesadi and
between them and the shore. The line of
island, where it is one mile and one furl
Paumban lighthouse. It traverses a sandy
mark; but as the 30 foot line, on the north
quarter from the shore, a large amount of
has been stated that such a canal would be
where a large vessel would be able to land
without the intervention of a cargo boat.
preferred to that of the Ramnad Promontor
across the Ramnad Promontory; the level
there is probably much rock. The distance
north side is also greater. On the other han
situated as regards railway communication,
If a ship canal is made, the short cut would
from the Red Sea to Madras, and would bri
370 miles.

---

[1] Note.—Difficulties from a nautical point may be thus stated.
Outside the contemplated breakwaters, which have for their
are shallow banks of sand and coral. There must be a considera
the canal after perforating the island of Ramesvaram will req
reaches 35 feet depth of water, and that end must also be protec
Paumben lies midway between the mountains of Ceylon a
moonsoon winds of north-east and south-west traverse the pas
continuous periods. A tumultuous sea is occasioned in the Gulf
and consequent difficult navigation is the rule for eight months o
Greater difficulties arise when Ramesvaram is left behind,
Calymere on the Indian side to Point Pedro on the Ceylon or ra
forty years ago by Mr. J. J. Franklin, who became afterwards
carrying on Marine Surveys in those days were not so satisfacto
line between Calymere and the west end of the Jaffna Island d
more than twelve miles off the Jaffna shore a depth of six and se
is gained when a long shoal of about 40 miles stretches to th
Point Pedro shoal. It was assumed that this was a distinct ban
naar was continued to the northward. But the recent Surve
shallow water obtains in an unbroken line from one bank to the o
where of more than 28½ feet, and this out of sight of land. Th
lated canal. A cutting of about three miles in length will be
experiment. If a cutting was achieved through the sand bank,
would apparently soon re-level the bottom. The fact of the exist
and the injury lately done to the foundations of the Madras H
much greater depth than theory prescribes.

298. Classification.—The Buildings and Roads Branch of the Public Works Department, in this Presidency includes both of what are known in the Northern Provinces of India as the Buildings and Roads division and the Military Works division. It deals with all questions and works not special to the Irrigation or the Railway branches, and comprises therefore the construction and repair of all buildings connected with the different Executive Departments of Government, as well as all works relating to roads, bridges, navigable canals other than those connected with systems of irrigation, accommodation for travellers, improvement of towns, harbour improvements, light houses, mines, and manufactures. When the technical classification according to account heads is followed, works executed under this branch fall necessarily under one or other of the heads given at foot.[1] All roads, except those in military cantonments, come under Local, though grants-in-aid are made from Provincial Funds in some cases, especially for the ghaut roads leading to the hills which overlook the Western coast.

299. Buildings.—(*Placed first because first in point of chronology. At commencement mainly European Barracks and Native military hospitals. Then Civil Courts and Cutcherries, &c. Present development of business.*)

300. (*Account of important buildings on hand, or recently constructed.*)

301. Roads.—(*First military, then commercial. Development of operations.*)

302. *Nature of Indian road-making average cost. Comparison with railways.*)

303. (*Account of roads remaining under charge of D.P.W.*)

304. Bridges.—(*Peculiarities of Indian bridge-making.*)

305. (*Account of important bridges on hand or lately constructed.*)

305. (*Bridges made by private benefactors.*)

306. Water communications.—(*Their value occasionally in place of roads; e.g., east and west coast. How made.*)

307. (*Principal works present or recent.*)

---

[1] Nature of Works under three Account Heads.

Imperial.	*Provincial.*	*Local and Special.*
Military— Fortifications. Military Buildings. Military Roads. Miscellaneous. Other Services— Civil Buildings. Communications. Miscellaneous Public Improvement.	Civil Buildings. Communications. Miscellaneous Public Improvement.	Communications. Civil Buildings. Miscellaneous Public Improvement.

utting a canal for large ships between
d with much care. The Ramnad
Island by the Paumban Passage.
ar by the shoals and rocks known as
w, or so occupied by land, that it
hout much difficulty from India to
nstruct a canal from the Gulf of
nce round Ceylon for shipping. In
ed alternative schemes, and that for
l was selected. From that time the
eer Department, assisted by convict
consists of two tortuous channels,
ndstone reef, dry at low water, with
lth of 80 feet; and the southern one
ank which has been dredged out to
e the channel deeper, because there
er side. But the Paumban Channel
this extent it must be considered a
de. The average number of vessels
last 20 years is , with a tonnage
were to be constructed, the line
promontory of Ramnad, or across
ed has been that across Rámeswar
al would be from a well-protected
depth from 29 to 26 feet. The surf
hingle Islands, leaving still water
e canal, from this point, crosses the
in width, about a mile east of
in only 6 to 7 feet above highwater
de, is at a distance of a mile and a
edging will be necessary there. It
nly point, from Calcutta to Kárachi,
discharge cargo direct on to a quay,
The Rámeswar project has been
because the cutting would be longer
re above the sea is also higher, and
m the shore to deep water on the
he Ramnad route more conveniently
represents a more complete scheme.
a steamer 350 miles in the voyage
Madras nearer to Bombay by about

---

ect the protection of the mouth of the canal. There
outlay in lighting and buoying. In the north side
e to be extended half a mile into the sea before it
by a breakwater and also lighted.

the Western Ghauts of India, and the alternate
th a violence rarely encountered elsewhere for such
Manaar and Palk's Bay and Straits, and thick weather
of the year.

account of the great shoals that extend from Point
Jaffna promontory. These shoals were surveyed
superintendent of Marine at Madras. The means of
s at present, and Mr. Franklin except in one direct
not seem to have gone out of sight of land and for
fathoms is found until the east side of Point Pedro
outhward and eastward along the line of coast, called
nd that the depth of 6 and 7 fathoms off Tondima-
carried out in the steamer "*Madras*" shews that the
er and that no greater depth of passage offers any-
is the gravest difficulty in the way of the contemp-
quired here and dredging in a heavy sea is a new
semi annual currents which cross it at right angles
ce of deep pot holes at the mouth of Indian rivers,
bour prove that current action is carried on at a

important line of water communication
e backwaters parallel to the western coast
of natural canals is best shown during the
he harbour of Cochin, which is capable of
he world; 10 miles broad at its southern
canoe boats on the backwaters draw half
00 lbs. each. The only obstruction is the
h this and making another cut from the
adras Railway, there will be a continuous
givi, north of Beypore, to Trivandram, the
ia canal extends southwards towards Cape
nded 30 miles further between Cochin and
sting of a ridge of laterite hills, about six
) feet, ending abruptly in a line of cliffs
vine, covered with paddy fields, and lined
o within half a mile of the summit ridge;
h side. The sea cliffs are of soft laterite,
a remarkable deposit of lignite. There
gs through the Warkallai barrier; but
Barton, the engineer to the Travancore
he hill, which, when the depth reaches 70
in two places, and the length of the two
feet wide and four deep. The work is

One great scheme, which had occupied
previously was, after a large expenditure,
s was the famous Godávary Navigation
otice of the Government by Sir Arthur
stem of the Godávary includes the river
arating the Berárs from Nágpore, which
reaching Chanda. The united stream
and 90 miles lower down is the Godávary,
e of 650 miles from the Western Ghauts.
e of 250 miles. There are three great
rocky barriers. The first is 90 miles
ce called Badrachallham, and is 20 miles
68 miles above the first barrier. The
35 miles long; while the distance of the
l Provinces, is 75 miles, and from the
There never was any expectation
able throughout the year; but it was
down in 10 days, and return the same
nths. Hinganghaut is halfway between
nd it was calculated that the river would
railroad. Linseed, ghee, and gingelly, it
river; while the importations up stream
n goods, and military stores. But these
as a remunerative return on the outlay is
consist of dams or anicuts, canals and
f rock in the river bed, including a cutting
aka, between the first and second barriers.
ey of the river, and a complete profile of
mmenced in 1854, and the works at the
hs of rupees having been spent on survey
were constructed round the barriers, in
ls. When Sir Richard Temple inspected
d been expended. He recommended that
and in the river up to the foot of the third
estimated cost of 25,50,000 rupees so

to the foot of the third barrier by May 1865. was to have been extended to this point. By t at the first barrier, with masonry works, were h the canal was almost completed, the anicut ad, however, been cut through the Albaka reefs. rely suspended, and in an incomplete state. The enced. There was a steamer towing boats from ch carried a total of 188,312 tons of cargo ; and d the communication between the second and traffic was small. In a despatch, dated proposed that the navigation works should be scale as far as the foot of the third barrier, Chanda. But in October of the same year, at India, the whole scheme was abandoned, as give promise of any adequate return.

LLERS.

and anchorages of the Presidency have been nention will be made here only of works now

of the Madras Harbour, history and present

obertson, a civil engineer of eminence, was h a view to the improvement of some of the ıe examined the Madras anchorages on both *as regards constructive operations* ?]

HE BRANCH.

purport of enactments specially affecting the

The establishment maintained in the Branch roduction.

VIII, P.W. Code.)

funds from which the cost of construction the hands of the Local Fund Boards, subject evenue and of Government in the Financial of work, except in the case of petty repairs t entrusted to the Public Works Department, for supervision, preparation of designs and

B. No: 1492 Wd/16-6-84

No: 1590 Wd/25th June 1884

B

Recorded with reference to G.O No. 1492 Wd/16th June 1884

W. 19-6-84

W. 25-6

W

Govt. of {1884} Madras.

FINANCIAL.

Dtch. 4999

S.C

(15)

Issued

Recd. 14/6/84 Encl.

G.O., 30th May 1884, No. 1196.

B

No: 1590 Wd/25th June 1884

MAY.

Allowances.

Recording rules regarding the power of local Governments to sanction deputations and temporary appointments and regarding the grant of deputation allowances.

2 Copies sent to Accts

Orc 26/6

Ellu 26/6

Id 26/6

G 17/6/84 R 21/6/84

Endorsed Supdt Regr.

GOVERNMENT OF MADRAS.

FINANCIAL DEPARTMENT.

READ—the following paper :—

Resolution of the Government of India, Department of Finance and Commerce, dated Simla, 9th May 1884, No. 900.

Salaries, Establishments, &c.—Deputations and Deputation Allowances.

Read—the undermentioned papers regarding the powers of the Government of India and of local Governments in sanctioning deputations and temporary appointments and regarding the rates of deputation allowance :—

Proceedings in this department (Pay and Allowances) for November 1877, Nos. 28-34, ruling that the deputation allowance of an uncovenanted officer deputed to a distance for a long period on special duty should not exceed Rs. 3 a day with travelling allowance.

Proceedings in this department for the month of June 1878 (Pay and Allowances), Nos. 221-223, empowering local Governments and the Agents to the Governor-General for Rajputana and Central India to grant a deputation allowance not exceeding Rs. 10 a day for periods of absence from their stations, besides actual travelling expenses, to officers deputed to attend on native chiefs or other distinguished personages on journeys.

Proceedings for September 1878 (Expenditure), Nos. 423-424, containing resolution No. 2679, dated 31st August 1878, in the last paragraph of which it was said that, except in cases provided for by special orders, the sanction of the Government of India should be obtained to the grant of remuneration in addition to the fixed pay of any public officer.

Proceedings (Pay and Allowances) for January 1879, Nos. 16-17, empowering local Governments to sanction a deputation allowance of one-fifth of salary up to a maximum of Rs. 10 a day for the entire period of absence from head-quarters on the duty of serving on a commission of special inquiry in addition to actual travelling expenses.

Proceedings (Expenditure) for April 1879, Nos. 137-138, empowering local Governments to depute officers on temporary duties and to entertain temporary establishments in any department, the cost of which is Provincial, without reference to the Government of India, provided the budget grant is not exceeded.

Proceedings (Expenditure) for August 1879, Nos. 324-325, in which it was explained that the permission to sanction deputations and temporary appointments given by the orders of April 1879 holds good only where the salary is not increased over Rs. 5,000, and if temporary appointments do not last more than six months.

Proceedings (Accounts and Finance) for April 1880, Nos. 309-314, in which it was decided that temporary appointments on more than Rs. 250 a month, which are not likely to be permanent, and the deputation of officers on any temporary duty with an increase to their pay raising it above Rs. 5,000 a year, do not require the sanction of the Secretary of State, and need not be reported.

Proceedings (Accounts and Finance) for November 1881, Nos. 1973-74, directing that temporary appointments on more than Rs. 250 a month, which may be sanctioned by the Government of India, should be reported for the confirmation of the Secretary of State in the usual annual statement of increases which is sent to the Secretary of State after the close of the year.

Proceedings (Accounts and Finance) for May 1882, No. 559.

———

Resolution—

In supersession of the foregoing orders the Governor-General in Council is pleased to lay down the following rules :—

(i) An officer is said to be on deputation when he is detached on special temporary duty for the performance of which there is no permanently or temporarily sanctioned appointment. A temporary appointment is an appointment carrying a definite rate of pay and sanctioned for a limited time.

(ii) A temporary appointment, if the cost is Provincial, may be sanctioned by a local Government without reference to the Government of India, provided the pay of the appointment does not exceed Rs. 3,000 a year. If the cost is Imperial a temporary appointment requires the sanction of the Government of India, but if the pay of the appointment does not exceed Rs. 3,000 a year, it will be sufficient to include it in the statement of fresh charges submitted to the Government of India unless it should last for more than a year; in the latter case a special application must be made for the sanction of the Supreme Government.

(iii) Temporary appointments on more than Rs. 250 a month will be reported to Her Majesty's Secretary of State in the annual statement of increases and decreases of expenditure, or separately in each instance, according to the nature of the case.

(iv) An officer may be deputed on special duty by a local Government without reference to the Government of India and without limit of time if the cost of the deputation is Provincial and if the remuneration granted to the officer is not at a higher rate than Rs. 3,000 a year. An officer may not be deputed on special duty by a local Government if the cost is Imperial without the sanction of the Government of India.

(v) An officer, no matter what his salary, may be deputed on special duty by a local Government for a period not exceeding six months, provided the cost of the deputation is Provincial, and he may be allowed by the local Government to draw the pay or salary which, but for his deputation, he would have continued to draw either as substantive or officiating. If the duties involve a decided increase of work or responsibility in comparison with the duties of his regular appointment, or require a change of station, the local Government may in addition allow the officer to draw a deputation allowance at a rate not exceeding one-fifth of salary, subject to a maximum limit of Rs. 10 a day.

If it is expected that the deputation should last for more than six months, or if it does actually last for more than six months, a special application for the sanction of the Government of India must be made.

Deputation allowances are granted independently of any travelling allowance which may be admissible.

Order—

Ordered that this resolution be communicated to the several departments of the Government of India, the several local Governments, and the Comptroller-General and the several Accountants-General and Comptrollers.

Ordered also that the rules above sanctioned be inserted in the Pay and Acting Allowance Code in lieu of section 57 (*l*).

(Signed) J. F. FINLAY,
Offg. Under Secy. to the Govt. of India.

ORDER—dated 30th May 1884, No. 1196, Financial.

Recorded.

(True Extract.)

Ag. Under Secy. to Govt.

To the departments of the Secretariat.
Copy to the Accountant-General.

Exd. C. Howarth.

F6 Enc 1 3747/84

Ackattorney

Ba 1589 W 25/6/84

that the navigation might be open to th
The road from Nagpore to Chanda was to
August 1865, two-fifths of the anicut at t
completed. But in 1871, although the
remained unfinished. A channel had, hov
The second barrier works were entirely sus
third barrier works were not commenced.
the second barrier to the coast, which carr
the "Wainganga" steamer continued the
third barriers; but the amount of traffic
August 1871, the Secretary of State prop
completed on the smallest possible scale
whence a road should be made to Chand
the request of the Government of India
involving expenditure which did not give

311. Accommodation for Travellers.

312. Town Improvements.

313. Harbours.—The harbours and
fully treated of under Marine, and menti
under construction.

314. (*Especially the construction of t
state of works.*)

315. In September 1870, Mr. Robert
appointed to prosecute inquiries with a v
Madras harbours. During 1870-71 he ex
sides of the peninsula. [*What result as re*

316. Miscellaneous.

317. Departmental History of the B

323. Law. (*List and very brief purp
Branch.*)

324. Constitution of Branch.—The e
has already been described in the Introduc

325. Procedure.—(*From Chapter VII*

326. The financial control of the fund
and maintenance of roads is met, is in the h
to the supervision of the Board of Reven
Department; but the actual execution of w
to village roads, is for the most part entr
a charge of 25 per cent. being made for
estimates, and audit of expenditure.

C

A Authority

309. *West Coast Backwaters.*— is included in the Malabar and Trava of India. The great value of this sy south-west monsoon. In its centre being made the finest close harbour end, and from 10 to 48 feet deep. a foot of water, and carry 2,000 t Warkallai barrier, and by cutting th Venjali lake to the Tirur station of t line of water communication from P capital of Travancore, whence the V Comorin for 15 miles, which is to be Trivandram, a spur of the ghauts, miles wide, with a summit level o washed by the sea. From the south with cocoanut and jack trees, runs and there is a similar ravine on the intersected by five ravines, and con have been four distinct plans for the one finally adopted is that of Circár. It consists of a cutting thro feet, is to become a tunnel. This ha tunnels is 2,000 feet. The canal is progressing towards completion.

310. *Godávary Navigation Wor* much attention during a number of y finally abandoned in October 1871. project, which was first urged upon Cotton in 1851. The draina Wurda, rising in the Satpura hills, ar is joined by the Painganga a little b flows on until it receives the Waingan which joins the other rivers after a c From this point to the sea is a di obstructions to the navigation, caus above the anicut at Dhauleswaram, at long. The second is 14 miles long, a third is 75 miles above the second, a third barrier from Chanda, in the C cotton mart of Hinganghaut 115 mile that the Godávary could be made thought that a boat might make a season, by being towed up, in 2½ Bombay and the mouth of the Godáva convey cotton at one-third the rate of was thought, would also be sent by would be salt, cocoanuts, some Eur hopes have since been abandoned, so concerned. The Godávary w locks round the barriers, and clearanc through a ridge of sandstone rocks at The preliminary work consisted of a the river as far as Chanda. This wa first barrier were begun in 1861, two and preliminaries. Temporary tram anticipation of the completion of the the works, in January 1863, 70 lakh the works at the first and second bar barrier, should be proceeded with, a

308. *Paumban Channel.*—The question of cutt
India and Ceylon has recently been investigated
Peninsula is separated from the Rámeswar Is
Rámeswar Island is divided from that of Manaar
Adam's Bridge; and the whole line is so shallow,
has been stated a railroad could be made witho
Ceylon. The object however has been to cons
Manaar to Palk Strait, so as to save the distanc
1822 Ensign (now Sir Arthur) Cotton proposed
improving and deepening the Paumban Channel
work has progressed under the Madras Enginee
labour (*whence obtained*?). The passage now co
the northern one, 4,232 feet long, through a sanc
a depth from 11 to 14 feet, and a navigable widt
2,100 feet long, and 150 wide, through a sandba
a depth of 12 feet. It would be useless to make
is no greater depth in the approaches on either
has long been of use to the native craft, and to
success, for 12 feet is sufficient for the local trad
annually passing through the channel during the
amounting to If a canal for large ships
must be sought for elsewhere; either across the
the Island of Rámeswar. The site most approve
Island. The southern entrance of such a cana
piece of anchorage nearly a mile long, with a de
breaks on the reef between Curesadi and Shi
between them and the shore. The line of the
island, where it is one mile and one furlong
Paumban lighthouse. It traverses a sandy plai
mark; but as the 30 foot line, on the north sid
quarter from the shore, a large amount of dre
has been stated that such a canal would be the o
where a large vessel would be able to land and
without the intervention of a cargo boat.[1]
preferred to that of the Ramnad Promontory, b
across the Ramnad Promontory; the level the
there is probably much rock. The distance fro
north side is also greater. On the other hand, t
situated as regards railway communication, and
If a ship canal is made, the short cut would save
from the Red Sea to Madras, and would bring
370 miles.

[1] NOTE.—Difficulties from a nautical point may be thus stated.
Outside the contemplated breakwaters, which have for their obje
are shallow banks of sand and coral. There must be a considerable
the canal after perforating the island of Ramesvaram will require
reaches 35 feet depth of water, and that end must also be protected
Paumben lies midway between the mountains of Ceylon and
moonsoon winds of north-east and south-west traverse the pass with
continuous periods. A tumultuous sea is occasioned in the Gulf of M
and consequent difficult navigation is the rule for eight months out o
Greater difficulties arise when Ramesvaram is left behind, on a
Calymere on the Indian side to Point Pedro on the Ceylon or rather
forty years ago by Mr. J. J. Franklin, who became afterwards Se
carrying on Marine Surveys in those days were not so satisfactory a
line between Calymere and the west end of the Jaffna Island does
more than twelve miles off the Jaffna shore a depth of six and seven
is gained when a long shoal of about 40 miles stretches to the so
Point Pedro shoal. It was assumed that this was a distinct bank, a
naar was continued to the northward. But the recent Survey c
shallow water obtains in an unbroken line from one bank to the oth
where of more than 28½ feet, and this out of sight of land. This
lated canal. A cutting of about three miles in length will be re
experiment. If a cutting was achieved through the sand bank, th
would apparently soon re-level the bottom. The fact of the existe
and the injury lately done to the foundations of the Madras Ha
much greater depth than theory prescribes.

PUBLIC WORKS—BUILDINGS AND ROADS, &c.[54]

298. CLASSIFICATION.—The Buildings and Roads Branch of the Public Works Department, in this Presidency includes both of what are known in the Northern Provinces of India as the Buildings and Roads division and the Military Works division. It deals with all questions and works not special to the Irrigation or the Railway branches, and comprises therefore the construction and repair of all buildings connected with the different Executive Departments of Government, as well as all works relating to roads, bridges, navigable canals other than those connected with systems of irrigation, accommodation for travellers, improvement of towns, harbour improvements, light houses, mines, and manufactures. When the technical classification according to account heads is followed, works executed under this branch fall necessarily under one or other of the heads given at foot.[1] All roads, except those in military cantonments, come under Local, though grants-in-aid are made from Provincial Funds in some cases, especially for the ghaut roads leading to the hills which overlook the Western coast.

299. BUILDINGS.—(*Placed first because first in point of chronology. At commencement mainly European Barracks and Native military hospitals. Then Civil Courts and Cutcherries, &c. Present development of business.*)

300. (*Account of important buildings on hand, or recently constructed.*)

301. ROADS.—(*First military, then commercial. Development of operations.*)

302. *Nature of Indian road-making average cost. Comparison with railways.*)

303. (*Account of roads remaining under charge of D.P.W.*)

304. BRIDGES.—(*Peculiarities of Indian bridge-making.*)

305. (*Account of important bridges on hand or lately constructed.*)

305. (*Bridges made by private benefactors.*)

306. WATER COMMUNICATIONS.—(*Their value occasionally in place of roads*; e.g., *east and west coast. How made.*)

307. (*Principal works present or recent.*)

---

[1] NATURE OF WORKS UNDER THREE ACCOUNT HEADS.

Imperial.	*Provincial.*	*Local and Special.*
Military—		
Fortifications.	Civil Buildings.	Communications.
Military Buildings.	Communications.	Civil Buildings.
Military Roads.	Miscellaneous Public Improvement.	Miscellaneous Public Improvement.
Miscellaneous.		
Other Services—		
Civil Buildings.		
Communications.		
Miscellaneous Public Improvement.		

g a canal for large ships between
ith much care. The Ramnad
nd by the Paumban Passage.
y the shoals and rocks known as
or so occupied by land, that it
much difficulty from India to
ruct a canal from the Gulf of
round Ceylon for shipping. In
lternative schemes, and that for
as selected. From that time the
Department, assisted by convict
sists of two tortuous channels,
tone reef, dry at low water, with
of 80 feet; and the southern one
which has been dredged out to
he channel deeper, because there
ide. But the Paumban Channel
is extent it must be considered a
The average number of vessels
st 20 years is , with a tonnage
ere to be constructed, the line
romontory of Ramnad, or across
has been that across Rámeswar
would be from a well-protected
th from 29 to 26 feet. The surf
gle Islands, leaving still water
anal, from this point, crosses the
n width, about a mile east of
only 6 to 7 feet above highwater
, is at a distance of a mile and a
ging will be necessary there. It
y point, from Calcutta to Kárachi,
scharge cargo direct on to a quay,
The Rámeswar project has been
ause the cutting would be longer
above the sea is also higher, and
the shore to deep water on the
e Ramnad route more conveniently
presents a more complete scheme.
a steamer 350 miles in the voyage
Madras nearer to Bombay by about

---

t the protection of the mouth of the canal. There
ntlay in lighting and buoying. In the north side
to be extended half a mile into the sea before it
y a breakwater and also lighted.

he Western Ghauts of India, and the alternate
a violence rarely encountered elsewhere for such
naar and Palk's Bay and Straits, and thick weather
the year.

count of the great shoals that extend from Point
Jaffna promontory. These shoals were surveyed
perintendent of Marine at Madras. The means of
at present, and Mr. Franklin except in one direct
ot seem to have gone out of sight of land and for
fathoms is found until the east side of Point Pedro
thward and eastward along the line of coast, called
d that the depth of 6 and 7 fathoms off Tondima-
rried out in the steamer "*Madras*" shews that the
r and that no greater depth of passage offers any-
s the gravest difficulty in the way of the contemp-
nired here and dredging in a heavy sea is a new
semi annual currents which cross it at right angles
e of deep pot holes at the mouth of Indian rivers,
our prove that current action is carried on at a

An important line of water communication
ncore backwaters parallel to the western coast
tem of natural canals is best shown during the
is the harbour of Cochin, which is capable of
in the world; 10 miles broad at its southern
The canoe boats on the backwaters draw half
3,000 lbs. each. The only obstruction is the
rough this and making another cut from the
ne Madras Railway, there will be a continuous
udagivi, north of Beypore, to Trivandram, the
ctoria canal extends southwards towards Cape
extended 30 miles further between Cochin and
onsisting of a ridge of laterite hills, about six
180 feet, ending abruptly in a line of cliffs
a ravine, covered with paddy fields, and lined
up to within half a mile of the summit ridge;
north side. The sea cliffs are of soft laterite,
tain a remarkable deposit of lignite. There
cuttings through the Warkallai barrier; but
Mr. Barton, the engineer to the Travancore
igh the hill, which, when the depth reaches 70
ppens in two places, and the length of the two
25 feet wide and four deep. The work is

gs.—One great scheme, which had occupied
ears previously was, after a large expenditure,
This was the famous Godávary Navigation
the notice of the Government by Sir Arthur
ge system of the Godávary includes the river
d separating the Berárs from Nágpore, which
efore reaching Chanda. The united stream
ga; and 90 miles lower down is the Godávary,
ourse of 650 miles from the Western Ghauts.
stance of 250 miles. There are three great
ed by rocky barriers. The first is 90 miles
a place called Badrachallham, and is 20 miles
and is 68 miles above the first barrier. The
nd is 35 miles long; while the distance of the
Central Provinces, is 75 miles, and from the
s. There never was any expectation
navigable throughout the year; but it was
trip down in 10 days, and return the same
months. Hinganghaut is halfway between
ry, and it was calculated that the river would
the railroad. Linseed, ghee, and gingelly, it
the river; while the importations up stream
pean goods, and military stores. But these
far as a remunerative return on the outlay is
orks consist of dams or anicuts, canals and
es of rock in the river bed, including a cutting
Albaka, between the first and second barriers.
survey of the river, and a complete profile of
s commenced in 1854, and the works at the
lakhs of rupees having been spent on survey
ways were constructed round the barriers, in
anals. When Sir Richard Temple inspected
s had been expended. He recommended that
ier, and in the river up to the foot of the third
t an estimated cost of 25,50,000 rupees so

foot of the third barrier by May 1865.
have been extended to this point. By
first barrier, with masonry works, were
nal was almost completed, the anicut
ver, been cut through the Albaka reefs.
ended, and in an incomplete state. The
There was a steamer towing boats from
d a total of 188,312 tons of cargo ; and
mmunication between the second and
vas small. In a despatch, dated
ed that the navigation works should be
s far as the foot of the third barrier,
But in October of the same year, at
the whole scheme was abandoned, as
omise of any adequate return.

chorages of the Presidency have been
will be made here only of works now

Madras Harbour, history and present

on, a civil engineer of eminence, was
w to the improvement of some of the
mined the Madras anchorages on both
rds constructive operations?]

ANCH.

rt of enactments specially affecting the

tablishment maintained in the Branch
ion.

P.W. Code.)

s from which the cost of construction
ands of the Local Fund Boards, subject
e and of Government in the Financial
rk, except in the case of petty repairs
sted to the Public Works Department,
upervision, preparation of designs and