



OBSERVATIONS

ON THE EXPEDIENCY OF

Shipbuilding at Bombay,

FOR

*THE SERVICE OF HIS MAJESTY, AND OF THE
EAST INDIA COMPANY.*

BY

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LATE

SUPERINTENDANT OF THE MARINE AT BOMBAY.

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TO

JACOB BOSANQUET, ESQ.

CHAIRMAN

OF THE

HONORABLE COURT OF DIRECTORS OF THE
EAST INDIA COMPANY.

SIR,

I HAVE the honour to dedicate
to you the result of some experience
and particular investigation, in a
few observations on a subject of the
utmost importance to the interests
of the British Navy, and of great
concern to the commerce of the East
India Company.

I am prompted to this address,
by a high respect for the pure

public principle which has invariably distinguished you in the discharge of the arduous duties of your important station, and by a lasting sense of gratitude for the favor conferred by my appointment to the respectable office which I lately held, and in which I acquired that experience, of which the following pages contain the results.

I have the honor to be,

SIR,

Your faithful and obliged Servant,

W. T. MONEY.

BOMBAY, }
1st November, 1811. }

THE BRITISH NAVY has so long been the pride of our country, that an interest in every thing, connected with it's prosperity, may justly be regarded as the natural feeling of every British heart.

Any means which can be devised, to preserve and perpetuate this great bulwark, must not only be a benefit to England, but to every nation disposed to contend for it's independence.

The annihilation of the power of Tippoo Sultaun, by the conquest and partition of Mysore, left at the disposal of the British Government, extensive regions, abounding

with timber better adapted than any other to the purposes of naval architecture.

The extent of these resources was, till lately, unknown—the forests of Malabar having served only for the marine of the East India Company, and for the country shipping of India—and the national and natural predilection for British Oak might still oppose an irresistible obstacle to the use of Indian Teak, were it not unhappily a fact too well established, that the excessive consumption of Oak, by the great increase of British shipping, military and mercantile, has created such an alarming scarcity of that valuable timber, that, if some substitute be not employed, the materials of the British navy will, at no distant period, be exhausted.

This fact, however, having been denied in a recent publication, it becomes necessary to establish it upon authority sufficient to set the question for ever at rest—for it must, without hesitation, be admitted, that, if the Oak of

England be the wood best adapted for ship-building, and no real scarcity exist, it would be injustice to the interests of very respectable and valuable bodies of men, the ship-builders, timber merchants, and landed proprietors, to urge the substitution of any foreign wood. Those who contend for foreign timber are, therefore, at issue with the authors of this recent publication, as to the existence or non-existence of a scarcity of Oak for ship-building in England; and if so alarming an evil shall be found to prevail, all individual interests must sink in the magnitude of this national concern.

In a memorial from the shipbuilders in the port of London, to the Committee of the Privy Council for the affairs of Trade and Plantation, they state that “They are induced
 “ to think, from recent accounts, and the
 “ knowledge now possessed by the public,
 “ *in consequence of the inquiries which very*
 “ *generally took place on the discussion of*
 “ *this subject, a few years since, that there*

“ *is not any real scarcity of Oak timber in*
 “ *Great Britain ; and that a reference to*
 “ *the present state of the ships of war now*
 “ *building in the private yards throughout*
 “ *the kingdom, which exceeds three times*
 “ *the number of King’s ships, that were*
 “ *building at one time before, in them, the*
 “ *danger of scarcity will appear merely*
 “ *ideal.*”

The memorialists also observe, that “ It is
 “ well known *that his Majesty’s yards are*
 “ *better provided, and have more timber in*
 “ *them, at present, than for many years*
 “ *past.*”

At the commencement of His Majesty’s
 reign, the British navy consisted of 372 sail,
 of which 129 were of the line.

In 1811, it amounted to 1063, of which
 255 are of the line.

The comparison between the two last pe-

riods, especially when it is considered how many of the intervening years were a time of war, must carry conviction to any unprejudiced mind, that the consumption of Oak must have far exceeded it's growth ; and yet nearly fifty years ago, after the conclusion of the most successful naval war in which England till then had ever been engaged, the scarcity of timber was every where felt ; and a very ingenious person, who had applied his researches to this interesting subject, declared that whoever would reflect, must be alarmed for the consequences, which, it was feared, must inevitably happen to the country in less than half a century, if the most vigorous measures were not then adopted, to increase our stock of timber—or to secure and preserve what remained of the invaluable legacy left by our forefathers.

About that period it was computed that the decrease of timber fit for shipbuilding had been so great, that the quantity then in the kingdom was only in the proportion of

one to six of the stock which the country possessed a century before.

we In the year 1771, in consequence of public attention having been seriously called to the diminution of the quantity of Oak timber throughout the kingdom, a Committee of the House of Commons investigated the subject. The evidence obtained by that Committee was important, and went directly to establish the apprehension of a great scarcity, at no very distant time; but, strange as it may seem,* the Committee moved the House to have that part of the order discharged which required them to give an opinion.

The circumstance, alone, perhaps, would be considered as decisive evidence that, in the opinion of the Committee, our resources in Oak timber at that period had sustained an alarming reduction—otherwise it is not

* Probably in order to avoid exciting an alarm, when no remedy seemed to be then within reach.

possible to conceive that their inclinations, concurring with their duty, would have not prompted the Committee to have given a favorable opinion to Parliament.

It is much to be lamented that they pursued this conduct, as it unquestionably tended to check the further discussion of a most important question, and to prevent the seasonable application of those remedies which a full knowledge of the evil might have suggested.

It is scarcely possible to conceive a more mistaken conduct than that which was pursued by the Committee of 1771; for it may be assumed as a general principle of political wisdom, that the real condition of every branch of the public force should be fully and fairly made known—in order that defects may be supplied. No good can ever result from palliative measures, and temporising projects, in the concerns of a great and free country. To look in the face whatever

danger menaces it's prosperity, is the first step to subdue it—and to inform the nation, by proclaiming it's difficulties, and not to delude it by mysterious silence on points essential to it's well-being, perhaps to its existence, are the sole mode of securing the cordial and indispensable co-operation of the people in the execution of measures commensurate to the impending evil. This was fully illustrated when an alarm of the scarcity of timber prevailed soon after the Restoration, and which was principally ascribed to the devastation committed by the contending parties during the civil wars.

The Commissioners of the Navy represented the evil to the Royal Society, requesting them to suggest a remedy ; and Mr. Evelyn, a member of that institution, declared, in his publications, that the devastation was so extensive that nothing but an universal planting over the kingdom could supply an effectual remedy.

The effect of his writings was a general plantation throughout the country, and a distinguished statesman,* to whom the navy is under peculiar obligations, in remarking on this fact, has observed, that as it is allowed that Oak trees fit for the navy are from 80 to 150 years old, according to the quality of the soil, it is obvious that the vast quantities of great timber which have supplied the consumption of the present reign, were chiefly produced by that spirit of planting which the writings of Evelyn universally excited.

This important fact, which has laid the present age under everlasting obligations to their sagacious countryman, is well worthy of the serious consideration of the nation, as a precedent so eminently successful, as to establish one of the means in our power, and to which we should, at this day, have recourse, to ward off from our posterity, the danger which was thus averted from us.

* The late Lord Melville.

In the year 1791, Mr. T. Nichols, purveyor of the navy for Portsmouth yard, an authority entitled to much respect, in a letter to the Earl of Chatham, then first Lord of the Admiralty, asserted that there had been a great decrease of large timber in the kingdom within the few preceding years, owing to the vast quantities used in the King's and private yards, and care not having been taken to keep up a succession, either on private estates, or on the royal forests. This, Mr. Nichols emphatically observed, is no *chimera*, but an *alarming fact*, of which he was convinced from a knowledge of the timber state of the country in general—and yet, when we reflect on the magnitude of the expenditure of timber since that period, the scarcity which excited so much alarm then, must have been insignificance itself compared with the evil of the present day.

But these single authorities, respectable as they are, are not quoted as decisive evidence on the question at issue—but as concurrent testi-

monies, entitled to weight from the situation and experience of the parties, whose unqualified opinions of a scarcity of timber, at the periods of their writing, tend to confirm the general position.

There is, unhappily, a volume of evidence, which establishes the fact beyond the possibility of doubt.

The eleventh report of the Commissioners appointed to enquire into the state and condition of the woods, forests, and land revenues of the Crown, which was laid before Parliament in February 1792, contains a clear exposition of the subject, describes the state of Oak timber from the remotest periods to the present time—and, by a convincing train of facts, traces effects to their causes, and proves, by evidence which the most sceptical will scarcely venture to question, that the scarcity of that valuable timber, which has for ages been the basis of the British navy, is no longer a problem for theorists to discuss.

The express object of the appointment of the Commissioners was limited to an enquiry into the state and condition of the timber belonging to the Crown ; but they were well aware that they could not execute their trust with advantage to the state, if their researches were confined to the royal forests alone—and therefore, “ To avoid the danger of forming
 “ an opinion on a partial view of the subject,
 “ and to enable them with confidence to re-
 “ commend, to the Legislature, that mea-
 “ sure which would be most expedient for the
 “ public,” they extended their enquiries into the state of the timber growing on private property—for the essential purpose of ascertaining, if there had been a decrease of the quantity of timber, and if the stock remaining fit for shipbuilding, and the prospect of a succession of supplies, were such as to justify Government in a reliance on the resources of our own country, without having recourse to importation from abroad.

The Commissioners had not advanced far

in this important inquiry, before they saw reason to believe, that a decrease, in the quantity of timber, was not confined to the royal forests; but that the general stock of large timber on private property was rapidly declining—and that the apprehensions of an approaching scarcity were but too well founded.

But, although this was the fixed impression on the minds of the Commissioners, who were satisfied that “*the danger of scarcity*” “*was not merely ideal,*” they yet pursued their enquiries with the most prudent caution, and minute research into the state of the timber at the earliest periods of our history; and to guard against the possibility of exciting unnecessary alarm, they resolved to postpone their report, until their information should be so complete, as to remove any doubt on a subject of such consequence to the interests of the state.

England is described, in the earliest ac-

counts, as having been covered with wood ; and in the reign of William, the Conqueror, Oak was so abundant as to be valued, not by the quantity of the timber, or of what could be annually felled, but by the number of swine which the acorns could maintain.

The first general attack upon the Oak is represented as having been made by Henry the VIII. when he seized upon the monasteries, and disposed of the timber.

This measure, the Commissioners state, was followed by a continued consumption of Oak timber, not only in the gradual extension of commerce, and of the royal navy, but in house-building, for which, in the sixteenth and seventeenth centuries, Oak was principally used.

In subsequent reigns, but particularly in the reign of James the I. a considerable revenue was derived to that needy monarch from the sale of timber, which at that time was 10s. a

load, for Oak fit for the navy, being not one twelfth of what is now paid.

The Commissioners have subjoined a very curious note to their report, to shew that the advance in the price of timber has no connection with the value of money since that time.

A shilling contained the same quantity of silver in the time of James the I. as it does now ; and the price of the best wheat, * at Windsor market, for 51 years, from 1595 to 1646, was 2*l.* 0*s.* 3*d.* the quarter, which was higher than the average price for 51 years, from 1741 to 1792.

Does not this incontestibly prove that very opposite causes operate upon the prices of wheat and of timber—that the increase of agriculture keeps the one comparatively

* The soil fittest for Oak is also that best adapted for wheat.

low, and the consequent decrease of wood, with an increased demand, raises the price of the other exorbitantly high?

'Can any circumstance be more decisive on the question, whether the supply be equal to the demand—to a demand which, considering the vast extension of our commerce, and of the force of our navy, is not likely to decrease?

The first great advance in the price of timber took place soon after the Restoration—and the Commissioners of the Navy, at that time, were alarmed by the prospect of a want of timber, the cost of which had increased to *2l* and *2l. 15s. 6d.* per load; and from that period the price of timber has gradually risen, till, in 1809, the price in the private yards, on the river Thames, was *7l. 5s.* per load.

The Commissioners pursued their enquiries with the most diligent research, applying for information to the best sources capable of

affording it—to the Commissioners of the Navy, to the Purveyors employed in surveying and marking the naval timber—to the most extensive private dealers, land surveyors, principal shipbuilders, and the Chairmen of the Quarter Sessions in England and Wales, who all concurred in representing the timber as in a state of decline throughout the kingdom.

The answers which the Commissioners received from the different counties, stated that, within memory, there had been a great decrease of Oak Timber of all sizes, in every part of England, but more particularly of great naval timber, and of knees, the difficulty of procuring which, was such as to induce the Navy Board to make trial of Chessnut and Ash.

The Commissioners observe, that this mass of concurring evidence, from every part of England, and from men of every description, who have any dealings in timber, either as

buyers or sellers, or who are likely to have any information concerning either it's growth or consumption, they apprehend, can hardly leave a doubt in the mind of any person, that there is a great and general decrease in the quantity of large naval timber, and notwithstanding the additional and growing demand; and this decrease is the more alarming, and calls the more for the attention of the public, from it's being occasioned, not by any temporary causes, but by such as will probably render it in future still more general and rapid.

And yet the shipbuilders in the port of London, in the face of the irresistible body of evidence, contained in this important report from the Commissioners of Land Revenue, *express their great doubts of the scarcity of timber—being induced to think, from recent accounts, and the knowledge now possessed by the public, in consequence of the enquiries which very generally took place on the discussion of this subject a few years since, that*

there is not any real scarcity of Oak timber in Great Britain.

To what general enquiries the memorialists allude, as those on which they have founded so extraordinary an opinion, I cannot conjecture; and it were to be wished that the authority had been given—more especially as the valuable report which has been so largely quoted, was the result of the most general enquiry and the most laborious research, and led every unprejudiced mind to a conclusion so opposite from that which the memorialists have drawn from some other general enquiries, with which the public have not been made acquainted.

The Commissioners observe, that a more striking picture of the decrease of timber in the forests cannot, perhaps, be given, than by a comparison of a survey in 1608, with another survey taken by order of the House of Commons in 1783—as to such of the

forests under their consideration as were surveyed at both these periods.

In 1608.

In 1783.

Timber fit for the Navy.	Decayed Trees.	Timber fit for the Navy.	Decayed Trees.
<i>Loads.</i>	<i>Loads.</i>	<i>Loads.</i>	<i>Loads.</i>
New Forest 115,713	118,072	33,666	1,713
Aliceholt & Holmer 13,208	23,934	6,985	5,924
Bere Forest 4,258	8,814	161	175
Whittlewood Forest 45,568	1,472	4,820	7,200
Salcey Forest 23,902	1,673	2,497	5,653
Sherwood Forest . . 31,580	111,180	2,326	14,889
234,229	265,145	50,455	35,554

So that the quantity of timber in 1783, in those forests, was little more than one-sixth part of what it was in 1608.

The Commissioners of Land Revenue considered the consumption of Oak timber to fall under three general heads—the first comprising the quantity required for the internal purposes of the country, in which timber of all sizes is used—the second including what

is employed in building vessels for the whole trade of the country, and to which middling sized timber is applied ; and the third comprehending the great timber used in the construction of ships of war, and the large ships of the East India Company.

They considered any attempt to ascertain the quantity expended for the internal purposes of the country, as impracticable. They ascertained, however, that in house building there had been a considerable decrease in the consumption of Oak, by the substitution of other woods. In rebuilding London, after the fire in 1666, no other timber but Oak was allowed to be used in the roof door, window frames, or cellar floor of any house ; but in the great additions which have lately been made to the capital, and to many other towns, a very small proportion of Oak timber has been used.

The saving of Oak, however, by the sub-

stitution of other woods in house building, which formerly created so large a consumption, has been counterbalanced by the greater expenditure of it in the machinery which the improvements in the mechanical arts have introduced into our numerous manufactories, in the construction of all the wood work of the various canals, and of the barges and boats which are employed in the internal navigation of the kingdom.

The Commissioners wished to trace the progressive advancement of private shipping from the reign of Elizabeth, in order to shew the increase of the consumption of timber under this head ; but they found it impracticable by any other means than by the analogy which the amount of the tonnage bore to the value of the trade, and this they could not satisfactorily compare, before the commencement of the last century.

Campbell in his naval history gives the

number of merchant vessels at the death of Queen Elizabeth, as follows :—

Vessels of 100 Tons and upwards 145.

40 ditto ditto 656.

The amount of exports and imports in 1790, was more than three times as great as that for England in 1700, and of course there has been a proportional increase of shipping and consumption of Oak, which, since the loss of America, must have still more increased, as, prior to that event, many colonial ships were employed in the trade of the mother country.

The amount of the whole tonnage employed in the commerce of the kingdom was ascertained to be, on the 30th September, 1790, 1,480,990 tons ; and computing the quantity of timber in it's rough state, used in the construction of merchant ships, to be a load and half to a ton, which applied to that quantity of shipping, gives 221,485 loads—and the

medium duration of ships being about 14 years, the annual consumption of Oak timber, under this head, will appear to be 158,679 loads.

Under the third head, "The Navy of Great Britain," the consumption of Oak has been increasing, with very little interruption, for a long series of years.

At the death of Henry the VIII. in whose reign the navy may be said to date its origin, as a royal service, the tonnage of vessels of war of all kinds amounted to Tons 12,455
During the reign of Edward the VI.

it declined to — — 11,065
And at the death of Mary it was only 7,110
Elizabeth improved and extended it to 17,110

The state of the navy, during the reigns of James I. and Charles I. has not been ascertained.

During the Protectorate of Cromwell, it

received a considerable augmentation, and at the Restoration amounted to Tons 57,463

At the death of Charles the II. it was 103,558

In the reign of James, who paid particular

attention to the navy, and

had distinguished himself, as one

of its greatest ornaments, it was

rendered more efficient ; but the

tonnage, at his death, was re-

duced to — — 101,892

King William raised it to — 159,017

At the death of Queen Anne, it had

increased to — — 167,171

And at the death of George the I. to 170,862

At the accession of his present Ma-

jesty, it had attained to — 321,104

And in the 50th year of his reign,

1810, to — — — 800,000

The increase of the consumption of timber in the construction of shipping for the East India Company, has been somewhat similar to that of the royal navy.

From the date of the first charter of the East India Company, in the 43d of Queen Elizabeth, till the year 1771, the general tonnage of their shipping gradually increased. In that year it amounted to 61,000.

In 1772, an act passed, restraining the Company from building any ships, until their whole tonnage should be reduced to 45,000 tons.

This reduction being effected in 1776, the Company began again, in that year, to increase their shipping, and the whole amount of their English built ships, in 1792, was

—	—	Tons 79,913
And in 1811 is about	—	110,000

From the evidence acquired by the Commissioners, and the very clear results which they were enabled to deduce, they computed that in the year 1792, the annual consumption of Oak for the commerce of the country was

—	—	—	Loads 158,679
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And for the royal navy 50,542
loads; but as the navy at this day is
double the amount of what it was at
that period, the quantity of timber
annually consumed, may be justly
estimated at — — Loads 100,000

So that the whole consumption of
naval timber, in this country, for
building alone was — 258,679

But superadded to this extensive consump-
tion, must be the quantity expended in re-
pairs, both of natural decay, and of the num-
berless accidents to which shipping are liable.
It is difficult to estimate the quantity so ex-
pended; but the following data will, I think,
furnish results within the actual amount.

It is presumed, that a ship will require a
thorough repair once in seven years, and that
upon an average, for this purpose, one-fourth
of the quantity of timber originally used in
her construction will be required. This will

be found to give above 64,000 loads septennially, or about 9,000 loads every year—to which may be again added, for repairs of accidents, at the least, 3,000 loads. The whole consumption, then, of naval timber, for building and repairing, will amount annually to the enormous quantity of 270,000 loads.

But great as is beyond all former example in any age or country, the expenditure of timber for the purposes of naval architecture, it is nevertheless true, that, to consumption alone, the scarcity of the present day is not imputable,—the Commissioners of Land Revenue, after a most laborious investigation of the subject, elucidated by a collection of valuable materials, and important testimony, deemed themselves warranted in forming a conclusion, that, in consequence of the prosperity of the country, and of it's progressive advancement in population and industry, there has been, from early times, a gradual extension of tillage and pasture, and a gradual diminution of the wood and timber, and that

this is an effect natural to be expected in every future stage of it's improvement.

The Commissioners were also irresistibly led, by the information before them, to another conclusion, of which subsequent experience has clearly proved the force and the justice. The Commissioners formed this conclusion—that, “ If the prosperity of the country should continue, the consumption of Oak timber for it's internal purposes, and for the shipping necessary for the whole of our trade, including that of the East India Company, will, *at no very distant period*, furnish an ample demand for all that can be expected to be produced on private property in the kingdom ; and that such was the existing state of the growing timber, and the prospect of future supply, that the country would, in all probability, experience a future want of great Oak timber, and become dependent on other powers for the means of supporting her navy, if care should not be taken to provide a supply in

“ future, by the improvement and better management of the royal forests ; and to reduce the consumption of it, by the utmost care and frugality in the expenditure.”

Enough has been here quoted, from the best authorities, to shew, that the scarcity of Oak timber for shipbuilding is not an *imaginary but a real evil*, of alarming extent ; and that it is not of a temporary, but of a permanent nature—the decrease in the quantity of timber, and the increase in the demand for it, having been gradual for a length of time—indeed so great has the scarcity become, that it was lately declared, in the House of Commons, without contradiction, that there was not timber enough at Plymouth to build one ship of the line.

The fact of a scarcity being authenticated, the next consideration is the remedy to be applied. For posterity, whose interests it is our bounden duty to guard, as ours have been preserved by the wisdom of our fore-

fathers—the only great and effectual mode of perpetuating the Oak in England, is by recourse to the same measures which, fortunately, were adopted at the period of the Restoration—a general planting throughout the kingdom.

But, for the present time, many other modes have been suggested, of reducing the consumption of timber, by a more economical employment of it, by the substitution of other woods, and of iron in several parts of a ship's frame—and by so seasoning the Oak, as to render it more durable.

All these are entitled to consideration—they directly tend to a diminution of the existing evil, from a scarcity of timber used being subsidiary to the very important object of allowing the Oak to attain the age of maturity, by which posterity will be materially benefited.

The shipbuilders on the river Thames have indeed suggested another mode of remedy-

ing the scarcity of large timber for the navy, by building the ships for the service of the East India Company with timber considerably *less in size* than that used at present—but this appears to be merely putting off the evil day ; for if the large timber be now spared for the navy, and timber which has not attained it's full growth substituted for the service of the East India Company, the only resource for large timber hereafter must be considerably abridged—and we shall be transferring to after times, the inconveniences of the present day. This is a policy at the expence of posterity, which, I trust, we shall not be tempted to pursue—besides, in any view of the case, it is totally inadequate to the end proposed. The distress of the country for Oak is great, and the relief must not be acquired by means which will hereafter increase it.

The most direct, simple, and efficient mode of applying a remedy to the existing evil, is to spare the Oak, and employ other woods for those purposes to which Oak has heretofore

been appropriated, particularly to ship-building.

The consideration then naturally arises, if there be other woods in England; calculated for that important object.

Of all the woods in Europe, it has been ascertained that next to British Oak, and superior to foreign Oak, the larch may be ranked.

At Archangel, all the ships for the Russian navy, are built of larch, and it was formerly used for the same purpose at Naples and Venice. It has been found to resist the worm, and requires neither pitch nor paint to preserve it.

These are great qualities, and were there abundance of this valuable wood in England, it would doubtless be wise to apply it as a substitute for Oak in shipbuilding—but the quantity is known to be totally inadequate to the demand that would be made for it.

It may, however, be brought in aid of the general measure recommended, of sparing the Oak at the present time, by substituting larch in machinery of various kinds, in lighters, barges, and boats—piers, bridges, wharfs, locks, and sluices—in wheelwrights and coopers works, park pales, posts and rails, and generally in housebuilding.

Of the other woods in England some experiments have been made, during this war, particularly of fir in shipbuilding—but they were intended only as partial experiments for temporary purposes ; for the known qualities of fir forbid any reliance on it's durability.

There being then in England no wood, which approaches the Oak in fitness for shipbuilding, we must look out of England for those supplies which her exhausted forests cannot afford—and where should we so naturally direct our attention as to her own dominions. It has not, however, been till of late that this natural preference has been

given—very large supplies have been drawn from the north of Europe. But necessity has at length compelled us to do that which a regard for our own colonial interest should long ago have taught us to adopt—and we have had recourse to our American possessions for supplies of Oak timber, inferior, no doubt, in every requisite quality, to the Oak of England, but superior to the same wood produced on the continent of Europe.

B.

Upon the same ground of independence of foreign aid, that we seek supplies from our transatlantic dominions, it is incumbent on us, especially in a time of need, to render the vast resources of our possessions in the East subservient to the wants of the mother country.

The Teak of Western India may be obtained in abundance for all the purposes of naval architecture, for which it is known to be eminently adapted.

Seat

There is, however, one, and a very substantial objection to an importation of it into England, for the purpose of building at home, and that is furnished by the very heavy expence of freight on so long a voyage, which would render the cost of a ship dearer than the circumstances of the country could justify.

The question then resolves itself into this proposition—Shall we forego all the benefit of our Indian forests, by a determination to build no where but in England, in compliment to the interests of individuals, however respectable ; or shall we avail ourselves of these valuable resources by the application of them to shipbuilding in India ?

It has been asserted, that an encouragement to shipbuilding in India must tend to the injury of several of the establishments in the port of London, which have been reared at a great expence to individuals, and which in time of war have rendered im-

portant service to the state, by the numerous ships which they have built and repaired for the navy—that the loss to those who have embarked extensive capitals in these undertakings must be ruinous.

Were these to be the results of the measure now proposed, they could not be sufficiently deplored ; but even then they should be regarded as the lesser, in a choice of evils, as necessary sacrifices of individual interests to the public weal.

At Penang and Calcutta, the ships are built of Teak, which is not the produce of British territories ; but Bombay may put forth its equal claim with Canada or any other dominion of the crown of England, to the privilege which the North American States enjoyed, before their separation from the mother country, of employing their own ships in the commerce of Great Britain—and it will hardly be contended that, while ships built of Canadian Oak, and in the

Bombay

Gulph of St. Lawrence, can, under the sanction of a plantation register, trade under the British flag to the ports of England, the East India Company should be deprived of the power of engaging in their own trade, ships built at Bombay, of a superior wood, the produce of Malabar.

By building at Bombay, to which my present argument is confined, the supply of shipping to the navy and to the East India Company cannot be so immediate, or so extensive, as to produce the calamitous consequences predicted by the memorialists, while the aid afforded to those great maritime interests must be considerable.

The demand on the builders on the river Thames for a renewal of tonnage to these important services, must very gradually decrease—there will therefore be many years for preparation to meet the loss of building for the East India Company, and to seek employment for their shipwrights in

other branches of the trade of the port of London, while the number of ships which they will have to construct for the navy will probably not be reduced below the standard at which they were accustomed to contemplate it a few years ago.

There will, therefore, still remain no inconsiderable share of business to the builders on the river Thames—perhaps sufficient to employ all the hands whom they include in their regular establishment.

Hitherto it has been argued, on the ground of ascertained scarcity of Oak to an alarming extent, that the resources of British India should be rendered subservient to the wants of England, and, for the reasons assigned, that they should be applied to that purpose at the port of Bombay.

The mode and extent of the application intended to be proposed, I now proceed to state, and as material to the proposition, it-

is necessary to consider the comparative qualities of Oak and Teak—or, as it has been well named by an eminent botanist, the “*Quercus Indicus*.”

It appears to be universally admitted, and certainly it is practically so, that, of the various metals in common use, iron must ever form a component part of shipbuilding—of what consequence then must it be, that the two substances, wood and iron, which are to have so close a connection, should be free from any mutually destructive qualities. Of what importance would it be, that either one or the other should possess a preservative property, which should render their union more permanent.

ak. It is a lamentable fact that the Oak, the pride and the stay of our country, contains a powerful lignic acid, that corrodes and consumes the very metal which is employed to unite and secure it, in the various forms into which it is converted for the purposes of naval architecture ; and therefore to discover some means of protecting iron from the corrosive action of

the acid of Oak—and thus to encrease the durability of ships, has long been a desideratum with nautical men, and has long, but un-
 availingly, engaged the researches of science.

It is a circumstance too well authenticated to need proof, that Teak abounds with oleaginous particles, the best and certain defence of iron from corrosion by the action of acids.

Here then are two descriptions of wood, both calculated, by many valuable properties, for the purpose of naval architecture, but the one possessing a menstruum that, by gradually destroying the metal which connects the various parts of a ship, loosens its frame and shortens the period of its existence—and the other a preservative which strengthens the union of wood and iron, and quadruples the duration of the noblest work of human ingenuity.

Innumerable instances may be furnished in support of these facts, but one under the

authority of an officer whose professional attainments adorn the service to which he belongs may perhaps be sufficient.

Captain Wainwright, of H. M. ship *La Chiffonne*, in a letter written on board that ship in Bombay harbour, on the 29th March, 1810, observed to the author—" It is impossible to give a more substantial proof of the superiority of the Teak wood over that of any other that I have seen used in building ships, than the following, which was related to me by Mr. Henderson, the carpenter:"—

" The shipwrights who are at work on board *La Chiffonne* cut out of the wales a piece of Teak plank, which had been placed to stop a short hole, *at least* eight years ago. The iron bolt which secured this piece of wood was perfectly good, in the part which remained in the Teak, and the part which had been fixed in the Oak timber totally corroded."

~~subject~~ Oak is well known to be particularly ~~ob-~~
noxious to the worm, whose devastations on
ship's bottoms have sometimes been produc-
tive of fatal consequences, while Teak, guarded
by its native oil, is never penetrated by this
destructive vermin.

It is related of a shipbuilder, who had
examined worm eaten ships, that he had re-
marked that the worm never eat within the
seams where oil had been introduced with
the caulking chissel—that whalers which have
been attacked by the worm are never touch-
ed where the whale had lain in contact with
the vessel till it was cut up—and that a plank
lying under water, at a mill, had been renew-
ed annually on account of the destruction of
the worm, till at length one was put down
which had been for some other purpose im-
pregnated with oil, and it lasted for seven
years.

The author has also known the efficacy
of oil in destroying worm, and particularly in

a recent instance at Bombay. This destructive creature had made its way into the Company's mast house, and destroyed a considerable number of valuable fir spars. Those which had escaped the ravages of the worm were rubbed over with oil, and preserved from its further progress—and it was observed during the progress of applying the oil, that whenever it came in contact with a worm, instantaneous death ensued.

But the frequent application of such a remedy, to large bodies, must be extremely expensive, and in many situations and circumstances impracticable. How invaluable then must that timber be, which combines, with every good property possessed by the Oak, and a sure preservative of iron from corrosion, an inherent defence against the attacks of this destructive worm.

It has been urged as an objection to Teak, that it is much heavier than Oak—that the ships constructed with it draw more water

and that the superior weight in the upper works render them more crank. This objection is founded in error. The advantage I have ascertained by many experiments to be in favor of Teak from Malabar, which, upon an average, weighs one quarter less than Oak ; while the weight of Teak from the forests to the northward of this port, and of Oak, has been found to be nearly the same.

It has also been objected to the use of Teak, in the construction of men of war, that it is particularly disposed to splinter. Those who have had most experience of this invaluable wood have always denied the solidity of this objection ; but as it has, notwithstanding, been repeated, and particularly since the Board of Admiralty most wisely adopted the measure of building men of war at Bombay, it must be satisfactory to every impartial judgment to receive evidence of the truth from an authority which it cannot fail to respect. It is, therefore, with particular pleasure that the author is enabled to give

the opinion of the distinguished officer who commanded the expedition against the Isle of France.

In a letter to the author, written on board L'Africaine, at sea, General Abercrombie observed, " I can now vouch that the effect
 " of shot upon Teak is far less dangerous
 " than upon Oak—on board the Ceylon
 " there were very few men wounded by
 " splinters."

durability | From the great cause of excellence in the Teak over the Oak, by the possession of an oil instead of an acid, there results the most important consequences in the durability of ships built of this wood.

The answers given to the enquiries of the Commissioners of Land Revenue, as stated in their report to parliament, respecting the averaged duration of ships of war, fix the period for those built in the royal yards at

fifteen years, and for those constructed in the private yards, at ten years.

The same enquiries having been made as to the duration of the shipping of the East India Company, twelve or fourteen years appear to be the extent of their service.

The Commissioners observe, upon this information, that every addition to the duration of ships being obviously a proportional saving of timber, if means could be devised to make ships of war last *eighteen years*, one third part of the present consumption of the timber for the navy would be saved.

Had these Commissioners, to whose long, patient, and laborious researches the country is essentially indebted, been aware of the durability of Teak, when they attached so much importance to the devisal of means for continuing the existence of men of war to the length of eighteen years, they could not have

failed to have urged the use of it with all the weight of their experience and authority.

A vertical sun, which rends and contracts European wood, produces no injurious effect upon Teak, which exposed without defence to the greatest heat, or to all the violence of any season, exhibits no indication of injury or decay.

Many of the upright timbers to the old docks, for securing stages in the repairs of ships, have stood more than forty years without a coat of paint or tar for their protection, and yet are as perfect as when first erected.

A piece was taken out of a gate of one of Tippoo's forts in Canara, which had been exposed to every change of weather for more than half a century, and when brought to Bombay was ascertained to be unimpaired, with nails which had secured it quite free

from corrosion or rust, and as sound as when first driven.

The notoriety of the durable quality of Teak, and especially in climes to which it is indigenous—and the experience which has been had, in some instances almost fatal, of tropical heat accelerating the decay of Oak, forcibly suggest the policy, the expediency, and the humanity of having all the men of war employed in the East or the West Indies, and all the ships in the East India Company's service, constructed of Teak.

It would be good policy, inasmuch as a great expence would be saved—and this, when we reflect on the magnitude of the present scale of our public expenditure, is a consideration of no little importance. An idea may be formed of the extent of the saving from the following calculation.

It is presumed that the East and the West Indies, the Cape of Good Hope and the

Brazils, will require, with the *necessary reliefs*, twenty sail of the line, and fifty frigates.

Twenty sail of the line, each ship averaging 2000 tons, at 36l. per ton, will cost in England, 1,440,000l. and if three times renewed in fifty years, the expence will be..... *L.5,760,000*

Twenty sail of the line of the same tonnage, not requiring to be renewed for fifty years, will at Bombay cost, at 30l. per ton..... 1,200,000

 4,560,000

Fifty frigates, each averaging 1000 tons, at 30l. per ton, will cost in England..... 1,500,000

And if three times renewed in fifty years, the expence will be..... 6,000,000

Fifty frigates of the same tonnage, not requiring to be renewed for fifty years, will at Bombay cost, at 25l. per ton..... 1,250,000

4,750,000

Total saving to the public, in the original cost of the hulls of the ships, exclusive of what must be saved in repairs, which cannot be calculated.....

L.9,310,000

It is expedient to have recourse to India built ships for the navy, and the East India

Company, to save the British Oak, of which there is an alarming and increasing scarcity, and the following calculation will shew the extent of the saving that may be accomplished.

It has been computed by a very experienced and intelligent shipwright, the late Mr. Snodgrass, surveyor to the East India Company, that each ton, upon an average, requires a load and a half of timber.

Twenty sail of the line, each of 2000 tons, require of timber.....	60,000 loads
Fifty frigates, each of 1000 tons	75,000
Total saved	135,000 loads
The number of ships at present employed by the East India Company is about 130, con- taining about 110,000 tons.....	165,000
	<hr/>
	300,000

Which renewed every $12\frac{1}{2}$ years will expend per annum 24,000 loads of Oak timber, which, by the prosecution of building with Teak, may be saved to replenish the exhausted forests of the kingdom.

Humanity is concerned in the measure proposed, inasmuch as it will increase the safety, or rather diminish the risk to which the lives of our seamen are exposed, as well those who fight the battles of their country as those who extend it's commerce to the most distant regions of the globe.

Whatever tends to render ships more durable, must render them more secure. It has been shewn that Teak ships must be more durable than Oak, because the one possesses properties of self-preservation and the other of self-destruction. Can humanity hesitate which to prefer?

His Majesty's ship Sceptre, of seventy-four guns, Captain Bingham, which had been built in England in 1803, sailed from Bombay for England in May, 1807, and had accomplished the greatest part of her passage to the Cape, when she sprung a dangerous leak, and it was not without difficulty and incessant exertions that she was preserved from

foundering. Captain Bingham bore up for Bombay ; but such was the perilous condition of the ship, that he was under the necessity of hiring a Portuguese vessel at Mosambique, for the purpose of accompanying the Sceptre, to receive her crew in the event of the extreme necessity occurring for abandoning the ship. She, however, fortunately reached Bombay with a sail under her bottom, in the end of July ; and, when hauled into dock it was discovered that the dangerous leak principally arose from the penetration of worms in the bottom plank, about eight feet under water close to the wooden ends, where they had entirely eaten a hole about seven inches square—and in many other parts of the ship, where the copper was off, had nearly perforated the bottom, and entirely destroyed the gripe.

Many other instances might be adduced of the injury and decay to which Oak ships are exposed, and from which those built of Teak are exempt ; but the two which have

been selected are, it is presumed, sufficient to shew from what imminent perils the valuable lives of our seamen may be saved by the adoption of the measures proposed.

It has been objected to Bombay ships, that they are rudely put together—that the scantling of their timbers is disproportionately large—that they are built by the eye and not by the rule ; that, in short, they are not constructed according to the principles of science.

The last seven years have fortunately furnished conclusive answers to these objections in the beautiful and durable specimens of naval architecture, which have been supplied in that period from the dock-yard of Bombay, for the service of his Majesty and of the East India Company.

The first of these was the Salsette frigate, and, in proof of her good qualities, the author submits a quotation from a letter, dated Ply-

mouth, December 25th, 1809, from Vice Admiral Sir Edward Pellew, who, he is persuaded, will readily excuse the use here made of a private communication, since it tends to the honor of the Port of Bombay, which has been so deeply indebted to him for the protection of its commerce, and to the credit of a man to whose merits he has ever been anxious to render justice.

“ I beg to make Jemsatjee* proud of his
 “ frigates. The Salsette sails as well as any
 “ of ours, stands up better under canvas,
 “ and, had any other ship been frozen up in
 “ the Baltic as she was, for nine weeks,
 “ Captain Bathurst says she would not have
 “ stood the buffeting of the ice one day,
 “ whereas the Salsette came off unhurt. It
 “ was wonderful the shocks she resisted during
 “ heavy gales.”

After the completion of the Minden,

* Master Builder, vid. Appendix, No. 1.

seventy-four, the author considered it his duty, on surrendering his charge to the Naval Commissioner, to request his professional opinion of the first ship of the line ever built for the navy out of England—and Mr. Dundas favored him with the following satisfactory answer :—

“ In replying to your letter of yesterday’s
 “ date, wherein you request I would state
 “ my opinion of the construction and finish-
 “ ing of H. M. ship Minden, I beg to say,
 “ that on my arrival here, in May, 1809, I
 “ visited the Minden with an earnestness and
 “ carefulness of enquiry, that I considered
 “ due to the undertaking ; at the period
 “ of forwardness I first viewed the ship, her
 “ principal timbers were all open to inspec-
 “ tion ; with such timbers I could not but
 “ be highly delighted, as certainly very
 “ many of them I have not seen equalled
 “ in the building of any ship in England ;
 “ the mode of securing the beams by dove-

“ tailing them into strong clamping planks
 “ (a method not used in the King’s yard)
 “ gave me much satisfaction, as much
 “ strength is thereby given to the ships.
 “ As the work was carried on towards com-
 “ pletion, I continued daily watching the
 “ progress, and must declare was at all
 “ times pleased with the solidity of the work,
 “ as well as with the manner of its being put
 “ out of hand ; and I can have no difficulty
 “ in giving it as my opinion, that she will be
 “ found to be as well put together, and as
 “ highly finished, as any ship built for the
 “ British Navy.”

“ I can only add my hopes, that while the
 “ Minden remains a proud proof of what may
 “ be expected from Bombay, she will add
 “ to that credit the builder has already gain-
 “ ed in the opinion of those who, having
 “ had opportunities, are capable of setting
 “ a just value on his abilities.”

To command this noble man of war, and

to try the merits of the first experiment of an Indian built ship of the line, Captain S. W. Hoare was selected by the Commander in Chief; and the following comparative statement of the properties of the Russel, which had long been a favorite in the navy, and particularly with the late Admiral Drury; and of the Minden, which had been fitted for his flag, was obligingly furnished to the author by Captain Hoare.

RUSSEL.

In smooth water with all sail set, on a wind will go from five to eight knots, but not stiff.

With top-gallant sails and much sea, will go from three to five knots, according to the swell; she plunges a great deal, and carries her helm a turn a weather.

Under her topsails behaves much the same, will stay under them in smooth water, and veers and stays well.

MINDEN.

In smooth water with all sail set, on a wind will go from seven to nine knots, and does not complain with this sail.

Under top-gallant sails, and with much sea, will go from five to seven knots, according to the swell; and very easy; she carries her helm half a turn a weather.

Under her topsails behaves much the same; will stay under them in smooth water, and veers and stays well.

RUSSEL.

With the wind from one point, free to a beam, will go seven or eight knots. Her best sailing is with the wind abaft the beam; she will go eight or nine knots.

Before the wind she rolls easy; she carries her lower deck ports badly.

Height of ports when stowed for 6 months.

	F. I.	
Fore port	5	5½
Midship	4	3½
After	4	11½

MINDEN.

Her best sailing is before the wind; she will then go nine or ten knots; she rolls easy, and carries her lower deck ports well.

Height of ports when stowed for 6 months.

	F. I.	
Fore port	6	3½
Midship	4	9½
After ditto.....	6	1½

With such specimens of men of war as are exhibited in the Minden and Salsette, and in the Doris too, which, though not so fast a sailer as some of the frigates of the squadron, yet abounds with other good properties, to which her commander, Captain Cole, has frequently borne testimony, every inducement is supplied to render this great naval arsenal conducive to the augmentation of the British navy, and no less encouragement is furnished to the East India Com-

pany to prosecute shipbuilding for their own service in this their own dock-yard, by an inspection of the *Charles Grant*, the *Earl Balcarras*, and the *Abercromby*, which are universally pronounced to be the finest merchantmen in the world, and with which the *Herefordshire*, in the course of a year, may be classed as a rival in stability of construction and beauty of form.

work employed in the Thames

In the two dock-yards of this port there is capacity for building at the same time two ships of the line, two frigates, and a large and a small Indiaman, the whole of which, by a proportionate increase of the establishment of artificers, easily effected, may be completed within the period of eighteen months; so that, in the course of fifteen years, the British navy may receive an addition of twenty seventy-four's and twenty frigates, calculated to last in substantial condition for half a century.

Although some instances of the durability

of Teak have already been noticed, it may be here proper to state a few striking proofs, that the estimated extent of the durability of ships constructed with that unequalled wood, has not been the result of light conjecture, but of a fair application of precedents, furnished in times when the noble art of shipbuilding had not attained the perfection at which it has now arrived, and which superadds the strength of scientific construction to the natural advantage of the wood.

The present Turkish flag ship at Bussorah, was built by Nadir Shah, before his march to Delhi, and therefore, at the latest period, in 1738 ; about eight years ago this ship was in dock at Bombay for repairs, and her timbers ascertained to be perfectly sound.

Mr. Nicholas Hankey Smith, the Hon. Company's Resident at Abooshiher, states, that during his late residence at that place, he saw one of the Teak vessels built by or-

der of Nadir Shah (which, he was informed, had been upwards of twenty years under water), broken up, and the plank and cotton in her rabbit work appeared to him as fresh as if the ship had been recently built.

It may be proper to notice that this vessel had been sunk by the Arabs, who were compelled by the Persians to serve as part of her crew.

The ship *Hercules*, of 485 tons, was built here in 1763, and constantly employed in the trade of this port, till 1805, when she was captured off the Cape in her voyage to Europe. When she sailed from Bombay she was in a perfectly sound condition, with every appearance of ability to double the course of time she has already so actively run.

The ship *Milford*, of 679 tons, and belonging to this port, was built in 1786, and after constant employment in the trade to

China, and occasionally to Europe for twenty-four years, received her first thorough examination in 1810, when it was not found necessary to shift a single timber—and the whole expence of her repairs, including a new set of chain plates, amounted only to 1000*l*.

It is also worthy of remark, that the same Teak mainmast which she had when she first went to sea, continued in her for one and twenty years, and then being partially sprung, was converted into a mainmast for a smaller vessel.

The stock of timber and plank at Bombay, the gradual collection of years since the first order to build men of war in 1802, is equal to three years' consumption; and, by systematic arrangements in the forest department, now one of the principal branches of the public service, will be annually replenished from Canara and Malabar. Some of the forests abound with the largest Teak,

straight and curved; in others, more contiguous to the sea-coast, great devastations have been committed by the timber merchants, who till lately were under no check or control; but by judicious regulations, which prevent the felling of young trees, and secure a replantation of the naked tracts, these valuable provinces will, in a few years, contain inexhaustible resources for the dock-yard. In the mean time they are fully equal to answer any demand which ship-building to the utmost extent proposed can possibly create.

In addition to these resources from the southward, an annual supply of compass timber is procured from the country to the northward, between this port and Surat, where a regular trade has been established, employing considerable capitals, and several thousands of the native population.

This trade, so valuable in a public point of view, owes it's rise to the zeal, activity,

and influence of Lowjee, the founder of the dock-yard at Bombay ; who naturally sought the necessary materials for supporting his infant establishment, and improved the means of acquiring them to his successors, who have extended what he had so laudably and so fortunately commenced ; and in particular, his grandson, the present master builder, to the weight of whose personal character is to be attributed the revival of this important branch of the timber trade, after a long suspension, in consequence of a cessation of building, which enabled the marine department to effect the early completion of the *Minden* and the other ships which have been described, and which will render the construction of the Cornwallis seventy-four, just laid down, and the prosecution of future shipbuilding, a task comparatively of easy execution.

It remains to state briefly the capacity of the dock-yards for building so many ships at the same time, and the means to be em-

ployed. It is proposed that the two seventy-fours shall be constructed in the two new docks, which have been formed for the reception of that number of ships of the line of the largest class.

These docks, the ornament and the pride of Bombay, are the fruits of the science and genius of Major William Cowper*, of the engineers—they are the theme of admiration of all professional judges from Europe, and objects of wonder to the natives of this country.

The whole are built of granite—the piers are constructed with vaulted arches, and each stone is dovetailed into the other.

They promise to be lasting monuments of the British power in India.

The two frigates may be built on slips in

* Vide Appendix, Nos. 2, 3, 4.

the dock-yard at Bombay, the large India-man in the upper old dock, and the smaller one on a slip at Mazagon.

By this arrangement the middle and lower old docks will be left for repairing ships. These docks are certainly in a very dilapidated state, and every year of delay in repairing them, must add to the difficulty and the expence. Whenever that work, which sooner or later must be accomplished, shall be undertaken, it is to be hoped that it will be committed to the experience, the science, and the taste of the eminent architect of the adjacent new docks, by which durability will, as much as possible, be communicated to works originally executed upon no principles of architecture, and some degree of uniformity of appearance given, to which a dock-yard of such national utility and rising importance is so fully entitled.

With respect to the establishment of shipwrights for executing the great undertaking

to build so many ships, it may with truth be said, that the many noble works of his hand sufficiently prove that the ability of the master builder, Jemsatjee Bomanjee, is fully competent to the task, while the unextinguishable zeal, which, after a laborious service of forty years, still animates him to extraordinary efforts wherever the public interests can be promoted by his exertions, affords a certain pledge that the duty will be performed. To assist him in his important duties Jemsatjee has his son Nowrojee, a worthy descendant of his venerable father, and several young men of the different branches of his family; and to execute the mechanical part of his respectable and important office, he has about a thousand workmen of various descriptions, whose numbers may be increased or diminished at pleasure.

Such are the means which Bombay commands of contributing to the strength and durability of the British navy, and the com-

mercial prosperity of the East India Company.

Her docks are easy of access, and capacious ; her shipwrights are experienced, and have approved themselves skilful, and her timber possesses the singular virtue of self-preservation.

By the liberal substitution of this incomparable wood in the construction of ships, the most important interests will be secured, by the saving of millions in expence ; and, what is still of more consequence, even by the durability of our ships, and by the preservation of the lives of thousands of our gallant seamen.

MS



APPENDIX.

NO. I.

EXTRACT OF A LETTER FROM THE SUPERINTENDANT
OF THE MARINE TO THE HONORABLE THE GOVERNOR
IN COUNCIL, AT BOMBAY, DATED SEPTEMBER 28th,
1810.

PARA. 20th. Prior to the year 1735, there was no dock-yard at Bombay. Surat was the principal building place on this side of the Peninsula, and it may be said in all India. In that year, Mr. Dudley, the master attendant, was sent by the Government of this Presidency to Surat, to agree with the builder there, Dhunjeebhoy, to build a ship for the H. C. service, to be called the Queen.

21st. In the construction of this vessel Mr. Dudley was so much pleased with the skill and exertions of the foreman, Lowjee Nassurwanjee, that after the launch he endeavoured to persuade him to proceed with some artificers to Bombay, where the Government were desirous of establishing a building yard; but his fidelity to his engagements would not allow him to yield to Mr. Dudley's solicitation, till his master's consent could be procured. This was at length obtained with great difficulty, and in the year 1735, with a few shipwrights, Lowjee arrived at Bombay, and selected for the place of his future operations a small part of the present dock-yard, which was then occupied by the dwellings of all

the principal officers of the marine, the habitation of the Lascars, and by the common jail of Bombay. The avenues to these buildings rendered the yard open to the public; but, on the other hand, it may be observed that the residence of the officers of the establishment on the spot, afforded a security to the property deposited there.

22d. At that time there were so very few materials for building, there being no mart for timber at Bombay, that Lowjee was sent by the Government a year afterwards to the northward to establish a trade with the natives concerned in the forests, and was desired to bring with him, on his return, the whole of his family, and permanently settle them at the Presidency.

23d. Having succeeded in his engagements with the timber merchants, and procured a sufficient supply of materials for the commencement of shipbuilding, he was employed in the construction of cruizers for the H. C. marine, soon afterwards in building vessels for the trade of the port; and so much was his work approved of, that H. M. ships were sent here for repairs.

24th. As shipbuilding increased with the prosperity of the place, in the year 1754, the Superintendant of the Marine proposed the construction of a dry dock, which was acceded to by Government, and with the assistance of Lowjee, it was completed for the moderate sum of twelve thousand rupees.

25th. This proved a great acquisition to the yard, as it necessarily attracted the shipping from the other side of the peninsula to seek those repairs at Bombay which they could not procure elsewhere.

26th. Lowjee encouraged by the success of his undertaking, and the countenance of Government, brought up two

of his sons (Monackjee and Bomanjee), to his own craft, and by his instructions rendered them so proficient in naval architecture, that by their united exertions the reputation of the Bombay dock-yard became universally known in India, and their business was so much increased, that in the year 1760 it was found necessary to construct another dock.

27th. Upon this occasion the Honorable Court expressed it's conviction of the great utility of the first dock, not only for their own ships, but as it had brought a considerable trade to Bombay, by the means it afforded of repairing the shipping of Bengal, and of the other parts of India, and therefore cordially acquiesced in the proposition of building another.

28th. The abilities of Lowjee in his profession, and his great integrity in the purchase of materials for shipbuilding, had now in more than one instance attracted the particular notice, approbation, and reward of the Honorable Court; but his skill and exertions in repairing H. M. squadron about this period, called forth their distinguished commendation, and they emphatically say—"That such essential services should not be passed over without some particular mark of their favor," which the Government were directed accordingly to confer.

29th. So rapidly did the dock-yard advance in importance, that soon after the construction of the second dock, it was deemed expedient to have a third; and the Court of Directors, gratified by this proof of the prosperity of the port, gave it their ready sanction, and in consideration of the services of Lowjee and his two sons, approved of an augmentation to their pay.

30th. The increase in demand upon the dock-yard to build and repair ships, particularly to refit those of H. M. squa-

dron, which, before the docks were constructed, were obliged to heave down at Hog Island, rendered necessary an enlargement of the limits of the yard, and the Court of Directors, in the year 1767, expressed their conviction of it's necessity; but the jail of the town, and the officer's houses still rendered the space for the reception of timber extremely confined, while from these causes the dock-yard continued very much a thoroughfare.

31st. Grateful for the favors and support which he had received from the Hon. Company, Lowjee resolved to bring up another generation of his family in the same creditable line; and in 1771, a few years before his death, he introduced into the dock-yard his grandsons Framjee Monackjee and Jemsatjee Bomanjee, but, determined that they should not eat the bread of idleness, he made them work as daily carpenters at 12 rupees per mensem.

32d. In 1774 this most respectable man and upright servant of the Hon. Company died, leaving no other property, after a service of 40 years, than his dwelling-house in the bazar, and about 20,000 rupees in cash; but he left what was of far greater estimation with his family, a rich inheritance of ability, industry and integrity, which they have preserved unimpaired to the present day.

33d. The venerable founder of this dock-yard was succeeded by his two sons, Monackjee, as master builder, and Bomanjee as his assistant, who conducted the business of building and repairing with undiminished credit.

34th. In reward of the merits of these worthy sons of Lowjee, the government awarded, and the Court of Directors in 1776 approved of an increase to their pay; and to the elder Monackjee, the Court directed a silver rule and a shawl to be presented in their name, as a testimony of their

approbation of his past services, and to “encourage him to “behave with the same diligence and fidelity as his father.”

35th. Bombay had now acquired the consideration of a great naval arsenal; and during a very arduous period of war, the fleet under the command of Sir Edward Hughes was frequently docked and repaired by Monackjee and Bomanjee, who also constructed two ships of 900 tons each, for the service of the Company. Bomanjee died in 1790 in debt, and Monackjee in 1792, leaving a slender provision for his family.

36th. They were succeeded by their sons Framjee Monackjee and Jemsatjee Bomanjee, who have, particularly the latter, constructed ships of a much larger class than any of their predecessors, and have been constantly employed in repairing H. M. squadron.

37th. The reputation of Bombay built ships at length very forcibly attracted the attention of the Lords of the Admiralty, who having seen and admired the Cornwallis, a frigate of 50 guns, built at this port, and now in H. M. navy, in 1802 determined upon the construction of men of war in India.

38th. It was at first suggested to their Lordships to send out an European builder and shipwrights, but one of the Board of Admiralty (Sir Thomas Trowbridge), who was intimately acquainted with the character and merits of Jemsatjee, pledged himself to the King's Government, that he would build not only frigates, but ships of the line, to their perfect satisfaction, without the intervention of European direction or aid.*

* Vide Appendix, 5, 6, 7.

39th. Orders were accordingly issued for the construction of two frigates and a seventy-four.

40th. The masterly execution of these orders have nobly redeemed the pledge which that distinguished Admiral gave in England. The frigates, of 36 guns each, have been highly approved of, and the seventy-four rides in this harbour, a proud monument of Jemsaatjee's skill in naval architecture, and the admiration of all professional men.

41st. The great increase of work of the establishment of shipwrights, and of the collection of timber, rendered the extension of the dock-yard premises indispensably necessary ; and the erection of another jail beyond the limits of the town, and other arrangements, in the year 1805, presented a favorable opportunity of accomplishing this desirable object. In consequence the prison, and various other old buildings which could be dispensed with, were removed, the whole yard completely enclosed, and regulations put in force to prevent the resort thither of any other boats than those of the navy and the Company, and of the ingress of people through the gates, whose business did not justify their appearance in the yard.

42d. To provide the public with adequate accommodation, in lieu of the convenience of which they were deprived by an exclusion from the general use of the yard, a pier was ordered to be constructed to the southward of the saluting battery, which is now complete, with two very commodious stairs, and universally frequented.

43d. Great as had been the improvements of the dock-yards from time to time, yet the still rising importance of this place as a naval arsenal called for further means of meeting the demands of the public service, and in 1805 it was resolved to construct two additional docks, one for the

purpose of building, and the other for that of repairing the largest men of war which are ever sent to the Indian seas.

44th. These docks (executed by Captain Cowper*), in one of which the *Miniden*, 74, has been built, are now finished, and for the beauty of their form and proportions, the durability of the materials with which they are constructed, and the perfection of the work, are allowed by all competent judges to constitute a *chef d'œuvre* in architecture, unrivalled by any similar works in the British dominions.

45th. From this rapid sketch of the history of the dock-yard of Bombay, traced through a period of seventy-five years, it will be seen, that from an insignificant spot where the most trifling vessels were repaired, it has by slow degrees, and the vicissitudes of an age, attained to a degree of eminence which may be the just boast of this government.

46th. At the head of the building establishment is Jemsatjee Bomanjee, his predecessor having died without a rupee in 1804.

47th. There are now in a course of construction two ships building, with the intention of being offered for the service of the Hon. Company, one of 1400 and the other of 1200 tons, and an expectation is entertained that orders will be received to build another ship of the line.

48th. For the valuable services which Jemsatjee has rendered to the Hon. Company and to the navy, he has received numerous testimonies of approbation and applause from the Hon. Court and this Government, from the Admiral and every Commander in Chief in India, tributes to his integrity as much as to his talents.

* Of the Engineer Establishment at this Presidency.

49th. To perpetuate so fair an inheritance in a family which, through three generations, have exercised it so much to the public advantage, the fourth from their ancestor Lowjee are now pursuing the profession of their fathers, and so long as they continue to follow the great example before them, no well wisher to the interests of this flourishing settlement would desire to supersede them by European shipwrights.

NO. II.

TO WILLIAM COWPER, ESQ. CAPTAIN, ENGINEERS,
&c. &c. &c.

SIR,

On the subject of the Bombay docks I have no hesitation in declaring it to be my firm opinion, that the new docks constructed, and lately finished under your sole and immediate directions, are equal to any work of the kind I have seen, or that I believe is to be found in England; whether we consider the form of the dock, the solidity of the materials, or the elegant manner the masonry and the whole of the work is put out of hand—which, I doubt not, will long remain a proud memorial of the abilities of the engineer, as well as the great labour he must have undergone to produce such a work with such workmen.

I am, Sir,

With much respect,

Your most obedient Servant,

(Signed) GEO. DUNDAS, Com. Navy

Bombay,

30th July, 1810

NO. III.

CAPTAIN WILLIAM COWPER, ENGINEERS, BOMBAY.

SIR,

We are just honored with your address of this day's date, requesting our opinion relative to the docks lately finished under your directions.

We have much pleasure in bearing our testimony in favor of this work, and we shall be happy if it should at all conduce, as you imagine it may, to your benefit.

In our opinion the Bombay docks stand inferior to none we have ever seen in point of accommodation or construction, and must be deemed superior to most in the very lasting materials with which they are built, and the very judicious manner in which the principal and exterior blocks of stone are so locked into each other as to bid defiance, as much as human power can do, to the effects of time and injuries by accident.

The extreme difficulty of the task, the numerous obstacles encountered, and the exertions requisite to surmount them, have been witnessed by some of us, whenever our duty has called us to the Presidency; and we conceive it reflects as much credit on your zeal and exertions as on your abilities to have perfected a work of such magnitude and national importance, with such slender hands as those of the ignorant and prejudiced natives of this country.

We have the honor to be,

Bombay,

Sir,

1st August, 1810.

Your most obedient servants,

{Signed) H. LINDSAY.

M. CRAIG.

W. S. CLARKE.

SAM. LANDON.

H. M. SAMSON.

ROBT. WELBANK.

J. HAY.

WM. YOUNGHUSBAND.

NO. IV.

CAPT. WILLIAM COWPER, BOMBAY ENGINEERS, &c. &c.

SIR,

It has been impossible for the merchants of Bombay to view, without the most lively interest, the institution and progress of the great works accomplished by you in the dock-yard at this Presidency, which, while they afford facilities towards the construction and repair of H. M. navy, which no British port out of Europe can boast, must essentially contribute to the accommodation of our shipping, the means of which have hitherto borne no proportion to the commerce of this settlement.

We feel gratitude for the success of your persevering labours, combined with admiration of the consummate skill which appears to have been displayed in the construction of two docks, capable of containing the largest ships of the line, which, whether the durability of their structure, or the beauty of their form and proportions be considered, we believe no works for similar purposes in any part of the world can excel.

In token of these sentiments, we have sincere pleasure in congratulating you, on the completion of this magnificent undertaking, so important to the naval and commercial interests of the east; and as commemorative of the sense we entertain of your eminent public services, we request you will do us the honor to accept a vase of the value of two hundred guineas.

We have the pleasure to subscribe ourselves, Sir,

Your most obedient servants,

(Signed)

FORBES & Co.

BRUCE, FAWCETT, & Co.

SHOTTON, CALDER, & Co.

BRISCOE & BEAUFORT.

JOHN LECKIE.

DE SOUZA & Co.

Bombay,

Sept. 28th, 1810.

NO. V.

EXTRACT OF A LETTER FROM REAR-ADMIRAL SIR THOMAS TROWBRIDGE, BART. TO JEMSATJEE BOMANJEE, MASTER BUILDER, AT BOMBAY, DATED ADMIRALTY, 30TH MAY, 1802.

Although you have forgot me, I well remember you, and have ever been forcibly struck with your abilities, and I have *pledged myself* that you will build us a 74 gun ship, and a frigate, which shall be a *pattern* to an English *builder*. I have no fear but you will fully justify my assertion; long before this reaches you, the draft for building will have been presented, and I hope begun upon. I am aware it will require your influence to prevail on the artificers to reside on Butcher's Island, but you can easily accomplish it—the firm attachment all casts have to you and your family insure success.

NO VI.

EXTRACT OF A LETTER FROM REAR-ADMIRAL SIR THOMAS TROWBRIDGE, BART. TO JEMSATJEE BOMANJEE, MASTER BUILDER, AT BOMBAY, DATED ADMIRALTY, 14TH JUNE, 1802.

I am favoured with your letter of the 12th December, but the one of the 15th November has never reached me. You will find I had anticipated your wishes respecting the building men of war in Bombay, and the plans must have long since been in your possession, having been forwarded by the Company's overland dispatch. I had also written you on the subject, pledging myself for your ability and exertion, and that I was sure the ships you built would be models for our people to copy from. In short, I said every thing in my power which your merits richly deserve, and any thing I can do for you, or your family will give me great pleasure.

Pray let me know how many ships of the classes you now have plans for can to a certainty be built for us annually? Timber I presume can now be had in abundance from Tippoo's country, as well as Poon, for temporary masts to navigate them home.

Mr. Dundas is not yet arrived in England; any assistance I can render your family with the Company will give me great pleasure. I sincerely hope the Cornwallis will soon be home, that our builders and surveyors may have ocular demonstration, though they appear perfectly satisfied with, from what I have told them; as a proof they have not sent any one out to superintend the work, having a thorough confidence from my statement of your ability and integrity to perform the work well, and of the best materials; be assured you will have every support from the Admiralty.

NO. VII.

EXTRACT OF A LETTER FROM REAR-ADMIRAL SIR THOMAS TROWBRIDGE, BART. TO JEMSATJEE BOMANJEE, MASTER BUILDER, AT BOMBAY, DATED ADMIRALTY, 16TH NOVEMBER, 1803.

I am very anxious to hear you have begun our two ships; I am deeply pledged for your ability and exertion, and I know you will do all that is possible to meet the wishes of the Company and British Government, and be assured you will be rewarded. We have numberless offers of building at Bengal line of battle ships, but I have no opinion of the people, who are to perform the work, or the Pegu Teak; I therefore rest entirely on you; I have seen and know you are fully equal to it, and I have pledged myself you will produce ships that will eclipse those built in England.

THE HONORABLE JONATHAN DUNCAN, GOVERNOR IN
COUNCIL, BOMBAY CASTLE.

HONORABLE SIR,

During the period in which I have had the honor to command His Majesty's squadron in India, which now embraces a space of nearly ten years, I have necessarily had frequent occasion to visit your Presidency as the only station to which the naval force in this country can resort, with a certainty of deriving a prompt and ample supply of those manifold and extensive wants which the nature of the maritime service at all times requires.

In bearing a due testimony to the zeal and alacrity which have distinguished those departments under your Government, with which my situation has led to frequent and important intercourse, it may, I trust, be permitted to me to bring more pointedly to the notice of your Honorable Board, the very able and meritorious assistance at all times derived by my squadron from the exertions of the builders department, under the immediate management of Jemsatjee Bomanjee and Framjee Manockjee, and their sons Nowrojee Jemsatjee and Nowrojee Framjee.

It is wholly unnecessary for me, Honorable Sir, to enlarge on the great ability displayed by those men (but particularly Jemsatjee Bomanjee), in the various branches of their professional duties, or to state to you their value to this most important naval station, as the numerous specimens they have already exhibited of their talents in the science of naval architecture will always form their best panegyric. I cannot, however, pass over, unnoticed, a further essential merit they possess, and which with those who have had less occasion than myself to view them in the discharge of their duties, might frequently not attract particular notice. I al-

lude to their indefatigable zeal, activity and perseverance on those occasions where the nature of the service has called for more than ordinary energy and exertion on their part; and I can with truth assert, that their conduct has not only claimed my highest approbation, but likewise been productive of a great national benefit.

Thus impressed with a sense of the important assistance rendered by these men to the naval department in India, I have already borne testimony thereof in my correspondence with the Honorable the Lords Commissioners of the Admiralty. I also feel it a duty incumbent on me to recommend them to the particular favor and protection of your Government, and to suggest the policy of conferring on them some public mark thereof, as a distinction that may at once prove gratifying to themselves, as well as the means of securing a continuance of their fidelity and attention to the duties of their departments. If I may be allowed to point out in what manner this distinction could be most effectually bestowed, I would recommend that government should assign to them a small portion of batty ground, either on this island or that of Salsette, to be considered as an hereditary possession, which I have reason to believe, would be received by them as a very flattering and honorable assurance of the countenance and approbation of Government.

I have the honor to be,

Honorable Sir,

Your most obedient, humble servant,

(Signed) PETER RAINIER.

*Trident, Bombay Harbour,
the 12th Feb. 1804.*

FINIS.