Mr. Adams's
note on Madeira
Labour.

7 Nov 85

(8)

No 1715 N dfg 6-85

## Note by Mr. G. L. Molesworth, Consulting Engineer to the Government of India for State Railways, dated 5th May 1888, on the subject of the best position for the entrance to the Madras Harbour.

When I wrote my last note on the Madras Harbour, I had not seen the minutes of evidence which induced the Committee to prefer Plan No. III on "Nautical grounds." I have now had an opportunity of studying that evidence, and I would suggest for consideration a slight modification of the plan I originally suggested (marked No. IV). This modification consists simply in prolonging slightly further the eastern arm which I had suggested; and also slightly altering the tangent point from the north-eastern elbow so as to change its position instead of having it in the position in which it was originally built.

I have shewn the prolongation of the eastern arm sufficiently long to cover the opening and protect it from seas coming in, even at an angle of 30° from the normal direction.

In my report on the Madras Harbour, dated March 1st, 1882, paragraph 96, I advanced the opinion that "the *waves of a dangerous character must always* "*come in broadside to the shore or nearly so* whatever the position of the storm;" and in paragraphs 75 and 76 of that report, I gave my reasons for the opinion I advanced. This opinion is confirmed by the experience of nautical men, as given in the evidence. The direction of the waves is stated to be quite independent of the direction of the wind, and that the heavy swells come in nearly broadside to the shore, even when the wind is blowing off the shore. Others state that the direction of the waves never exceeds an angle of 30° from the normal, but I doubt very much whether any waves, except those of oscillation, which are comparatively harmless, can possibly come in at any angle approaching this.

In fact, it is opposed to the laws, governing the motion of waves, that a *wave of translation* should deviate to any considerable extent from the parallel of the general direction of the contour lines of the bottom of the sea to seaward of the harbour.

An arm covering an angle of 30° will, however, be on the safe side, as protecting the entrance to the harbour, even from waves of oscillation.

I annex a sketch shewing the modifications I would propose in my original suggestion. The existing work being shewn in black lines; my suggestion of July 1883 in red lines; and the slight modifications I now propose in blue lines.

These modifications will, in my opinion, meet any objections that may be raised on "nautical grounds" to my original suggestions, whilst they will be free from some of the objections to which Project No. III is exposed.

G. C. Press, Simla.—No. 200 P. W. D.—18-5-88.—50.

# MADRAS HARBOUR

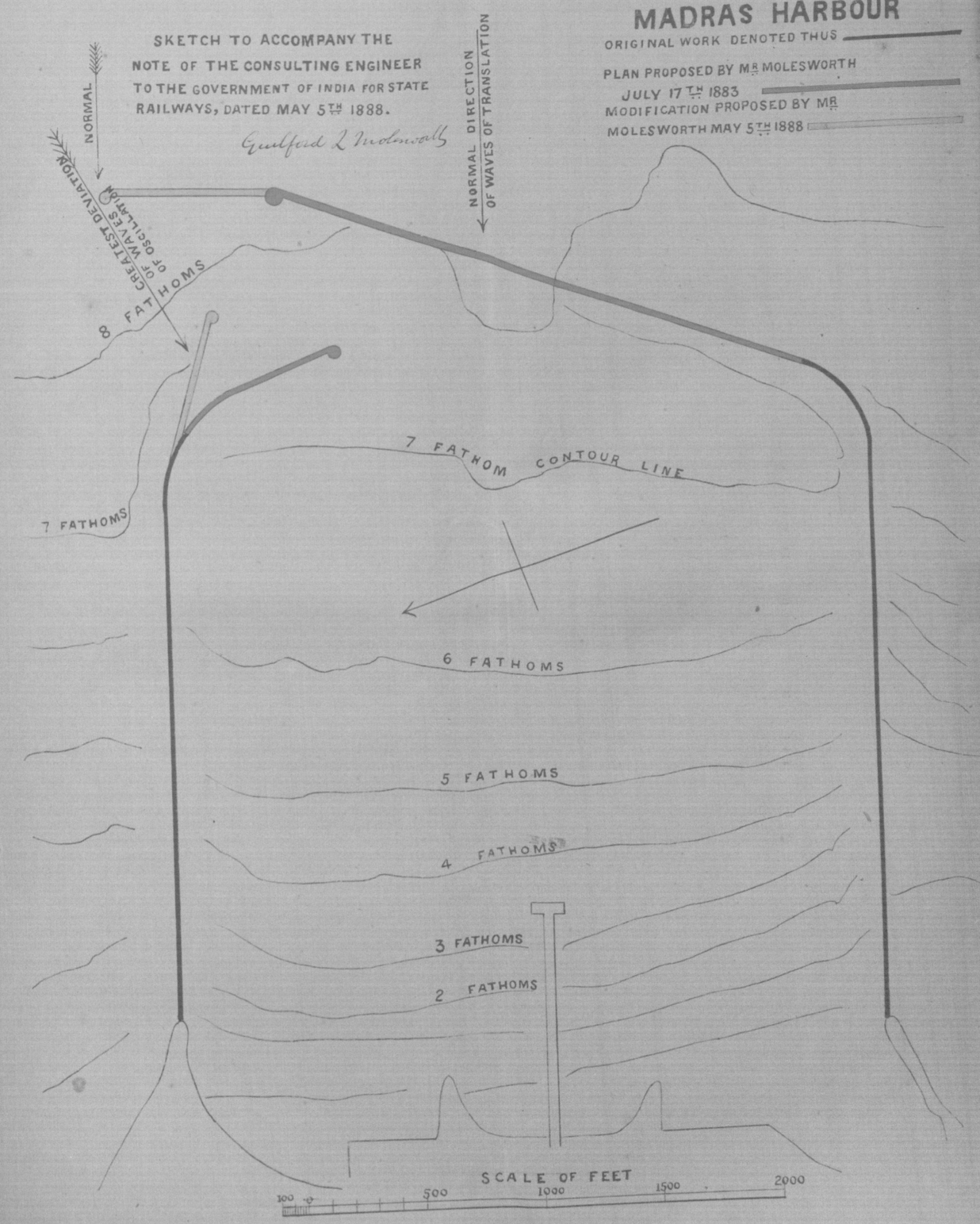
ORIGINAL WORK DENOTED THUS

PLAN PROPOSED BY MR MOLESWORTH JULY 17TH 1883

MODIFICATION PROPOSED BY MR MOLESWORTH MAY 5TH 1888

SKETCH TO ACCOMPANY THE NOTE OF THE CONSULTING ENGINEER TO THE GOVERNMENT OF INDIA FOR STATE RAILWAYS, DATED MAY 5TH 1888.

Guilford L Molesworth



## Note by Mr. G. L. Molesworth, Consulting Engineer to the Government of India for State Railways, dated 5th May 1888, on the subject of the best position for the entrance to the Madras Harbour.

---

When I wrote my last note on the Madras Harbour, I had not seen the minutes of evidence which induced the Committee to prefer Plan No. III on "Nautical grounds." I have now had an opportunity of studying that evidence, and I would suggest for consideration a slight modification of the plan I originally suggested (marked No. IV). This modification consists simply in prolonging slightly further the eastern arm which I had suggested; and also slightly altering the tangent point from the north-eastern elbow so as to change its position instead of having it in the position in which it was originally built.

I have shewn the prolongation of the eastern arm sufficiently long to cover the opening and protect it from seas coming in, even at an angle of 30° from the normal direction.

In my report on the Madras Harbour, dated March 1st, 1882, paragraph 96, I advanced the opinion that "the *waves of a dangerous character must always "come in broadside to the shore or nearly so* whatever the position of the storm;" and in paragraphs 75 and 76 of that report, I gave my reasons for the opinion I advanced. This opinion is confirmed by the experience of nautical men, as given in the evidence. The direction of the waves is stated to be quite independent of the direction of the wind, and that the heavy swells come in nearly broadside to the shore, even when the wind is blowing off the shore. Others state that the direction of the waves never exceeds an angle of 30° from the normal, but I doubt very much whether any waves, except those of oscillation, which are comparatively harmless, can possibly come in at any angle approaching this.

In fact, it is opposed to the laws, governing the motion of waves, that a *wave of translation* should deviate to any considerable extent from the parallel of the general direction of the contour lines of the bottom of the sea to seaward of the harbour.

An arm covering an angle of 30° will, however, be on the safe side, as protecting the entrance to the harbour, even from waves of oscillation.

I annex a sketch shewing the modifications I would propose in my original suggestion. The existing work being shewn in black lines; my suggestion of July 1883 in red lines; and the slight modifications I now propose in blue lines.

These modifications will, in my opinion, meet any objections that may be raised on "nautical grounds" to my original suggestions, whilst they will be free from some of the objections to which Project No. III is exposed.

---

G. C. Press, Simla.—No. 200 P. W. D.—18-5-88.—50.

# MADRAS HARBOUR

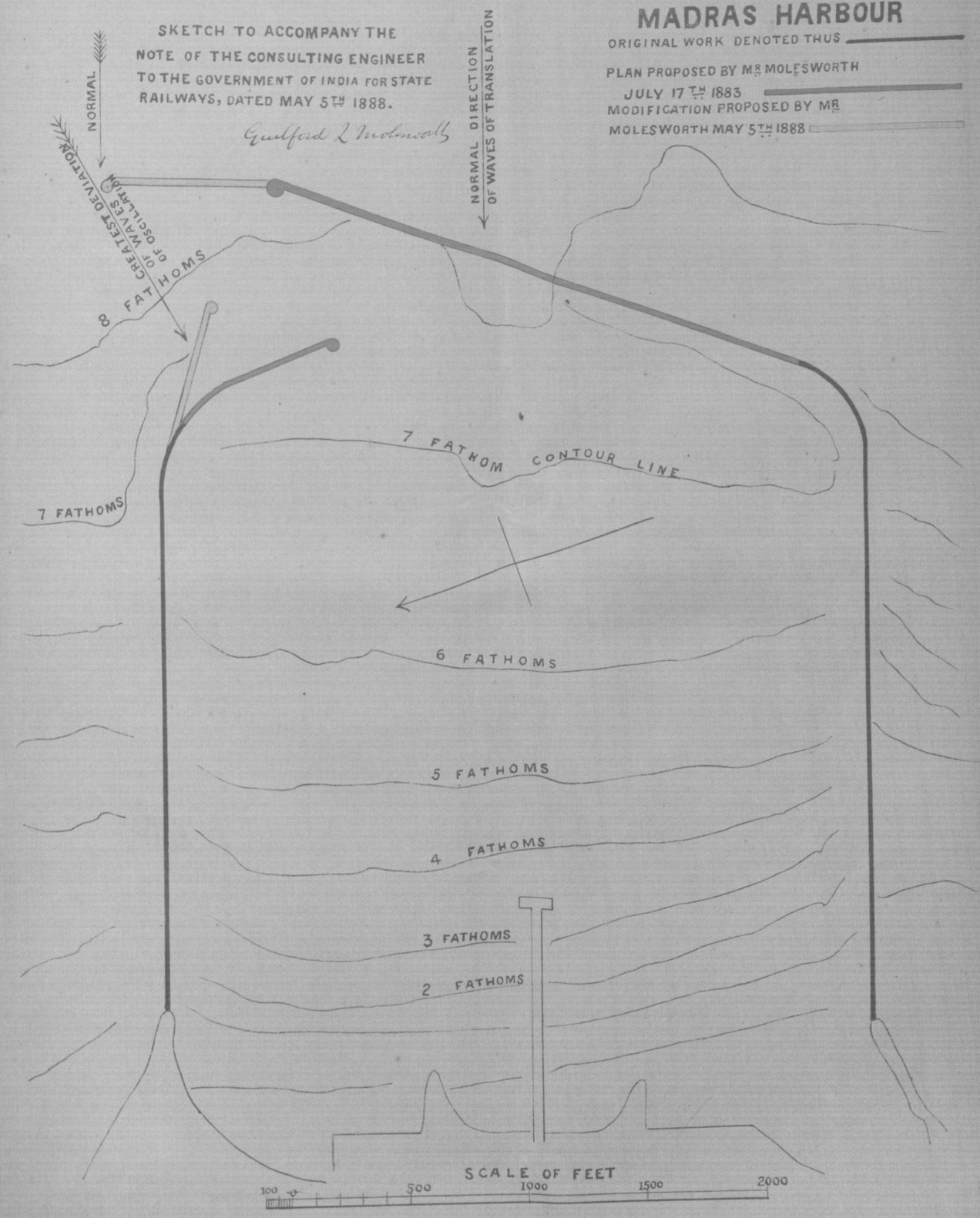
ORIGINAL WORK DENOTED THUS ———

PLAN PROPOSED BY MR MOLESWORTH JULY 17TH 1883 ———

MODIFICATION PROPOSED BY MR MOLESWORTH MAY 5TH 1888 ———

SKETCH TO ACCOMPANY THE NOTE OF THE CONSULTING ENGINEER TO THE GOVERNMENT OF INDIA FOR STATE RAILWAYS, DATED MAY 5TH 1888.

Guilford L Molesworth



## Note by Mr. G. L. Molesworth, Consulting Engineer to the Government of India for State Railways, dated 5th May 1888, on the subject of the best position for the entrance to the Madras Harbour.

When I wrote my last note on the Madras Harbour, I had not seen the minutes of evidence which induced the Committee to prefer Plan No. III on "Nautical grounds." I have now had an opportunity of studying that evidence, and I would suggest for consideration a slight modification of the plan I originally suggested (marked No. IV). This modification consists simply in prolonging slightly further the eastern arm which I had suggested; and also slightly altering the tangent point from the north-eastern elbow so as to change its position instead of having it in the position in which it was originally built.

I have shewn the prolongation of the eastern arm sufficiently long to cover the opening and protect it from seas coming in, even at an angle of 30° from the normal direction.

In my report on the Madras Harbour, dated March 1st, 1882, paragraph 96, I advanced the opinion that "the *waves of a dangerous character must always "come in broadside to the shore or nearly so* whatever the position of the storm;" and in paragraphs 75 and 76 of that report, I gave my reasons for the opinion I advanced. This opinion is confirmed by the experience of nautical men, as given in the evidence. The direction of the waves is stated to be quite independent of the direction of the wind, and that the heavy swells come in nearly broadside to the shore, even when the wind is blowing off the shore. Others state that the direction of the waves never exceeds an angle of 30° from the normal, but I doubt very much whether any waves, except those of oscillation, which are comparatively harmless, can possibly come in at any angle approaching this.

In fact, it is opposed to the laws, governing the motion of waves, that a *wave of translation* should deviate to any considerable extent from the parallel of the general direction of the contour lines of the bottom of the sea to seaward of the harbour.

An arm covering an angle of 30° will, however, be on the safe side, as protecting the entrance to the harbour, even from waves of oscillation.

I annex a sketch shewing the modifications I would propose in my original suggestion. The existing work being shewn in black lines; my suggestion of July 1883 in red lines; and the slight modifications I now propose in blue lines.

These modifications will, in my opinion, meet any objections that may be raised on "nautical grounds" to my original suggestions, whilst they will be free from some of the objections to which Project No. III is exposed.

G. C. Press, Simla.—No. 200 P. W. D.—18-5-88.—50.

# MADRAS HARBOUR

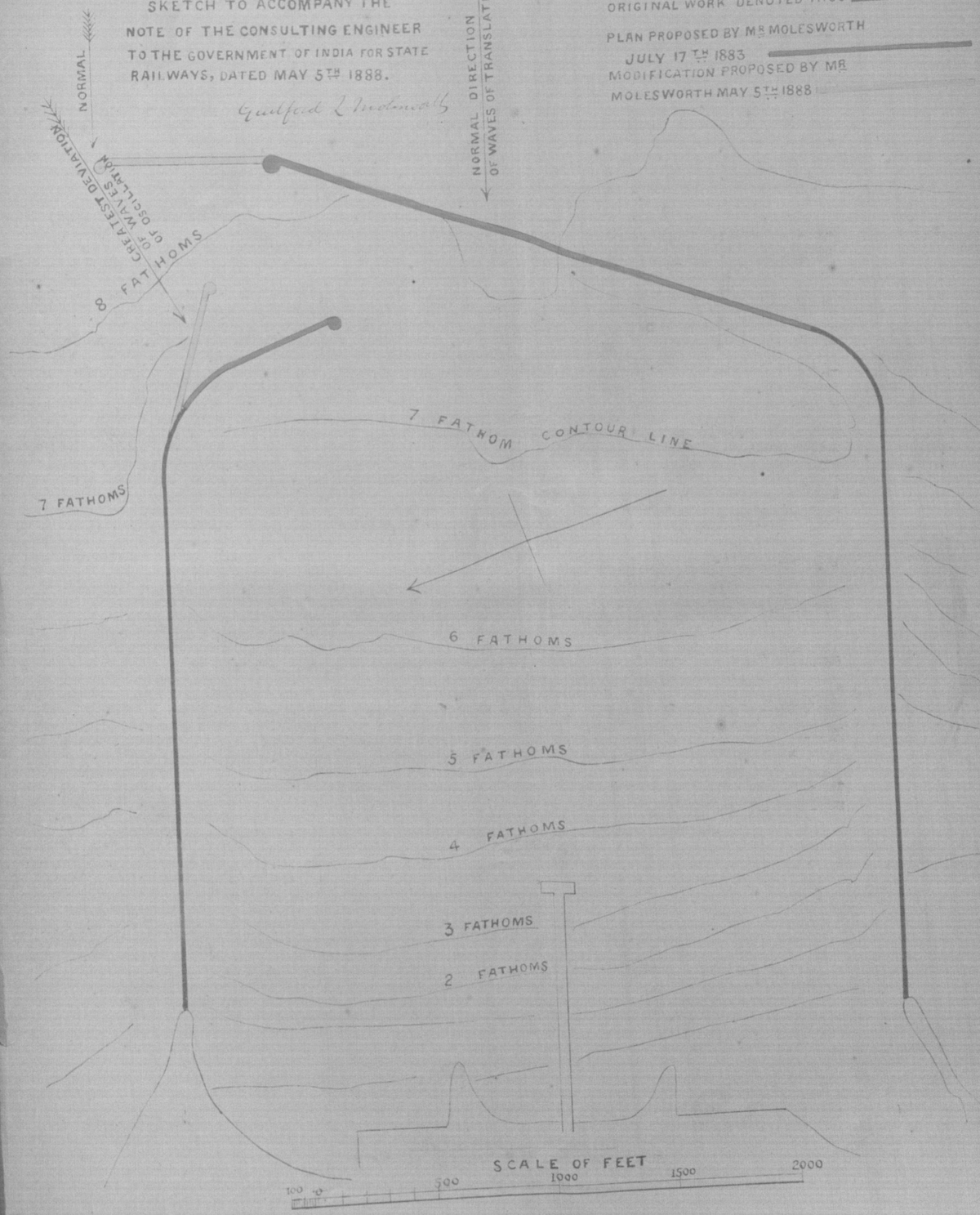
ORIGINAL WORK DENOTED THUS ———

PLAN PROPOSED BY Mr MOLESWORTH JULY 17TH 1883 ———

MODIFICATION PROPOSED BY Mr MOLESWORTH MAY 5TH 1888 ———

SKETCH TO ACCOMPANY THE NOTE OF THE CONSULTING ENGINEER TO THE GOVERNMENT OF INDIA FOR STATE RAILWAYS, DATED MAY 5TH 1888.

Guilford L Molesworth



## Note by Mr. G. L. Molesworth, Consulting Engineer to the Government of India for State Railways, dated 5th May 1888, on the subject of the best position for the entrance to the Madras Harbour.

When I wrote my last note on the Madras Harbour, I had not seen the minutes of evidence which induced the Committee to prefer Plan No. III on "Nautical grounds." I have now had an opportunity of studying that evidence, and I would suggest for consideration a slight modification of the plan I originally suggested (marked No. IV). This modification consists simply in prolonging slightly further the eastern arm which I had suggested; and also slightly altering the tangent point from the north-eastern elbow so as to change its position instead of having it in the position in which it was originally built.

I have shewn the prolongation of the eastern arm sufficiently long to cover the opening and protect it from seas coming in, even at an angle of 30° from the normal direction.

In my report on the Madras Harbour, dated March 1st, 1882, paragraph 96, I advanced the opinion that "the *waves of a dangerous character must always "come in broadside to the shore or nearly so* whatever the position of the storm;" and in paragraphs 75 and 76 of that report, I gave my reasons for the opinion I advanced. This opinion is confirmed by the experience of nautical men, as given in the evidence. The direction of the waves is stated to be quite independent of the direction of the wind, and that the heavy swells come in nearly broadside to the shore, even when the wind is blowing off the shore. Others state that the direction of the waves never exceeds an angle of 30° from the normal, but I doubt very much whether any waves, except those of oscillation, which are comparatively harmless, can possibly come in at any angle approaching this.

In fact, it is opposed to the laws, governing the motion of waves, that a *wave of translation* should deviate to any considerable extent from the parallel of the general direction of the contour lines of the bottom of the sea to seaward of the harbour.

An arm covering an angle of 30° will, however, be on the safe side, as protecting the entrance to the harbour, even from waves of oscillation.

I annex a sketch shewing the modifications I would propose in my original suggestion. The existing work being shewn in black lines; my suggestion of July 1883 in red lines; and the slight modifications I now propose in blue lines.

These modifications will, in my opinion, meet any objections that may be raised on "nautical grounds" to my original suggestions, whilst they will be free from some of the objections to which Project No. III is exposed.

G. C. Press, Simla.—No. 200 P. W. D.—18-5-88.—50.

SKETCH TO ACCOMPANY THE
NOTE OF THE CONSULTING ENGINEER
TO THE GOVERNMENT OF INDIA FOR STATE
RAILWAYS, DATED MAY 5TH 1888.

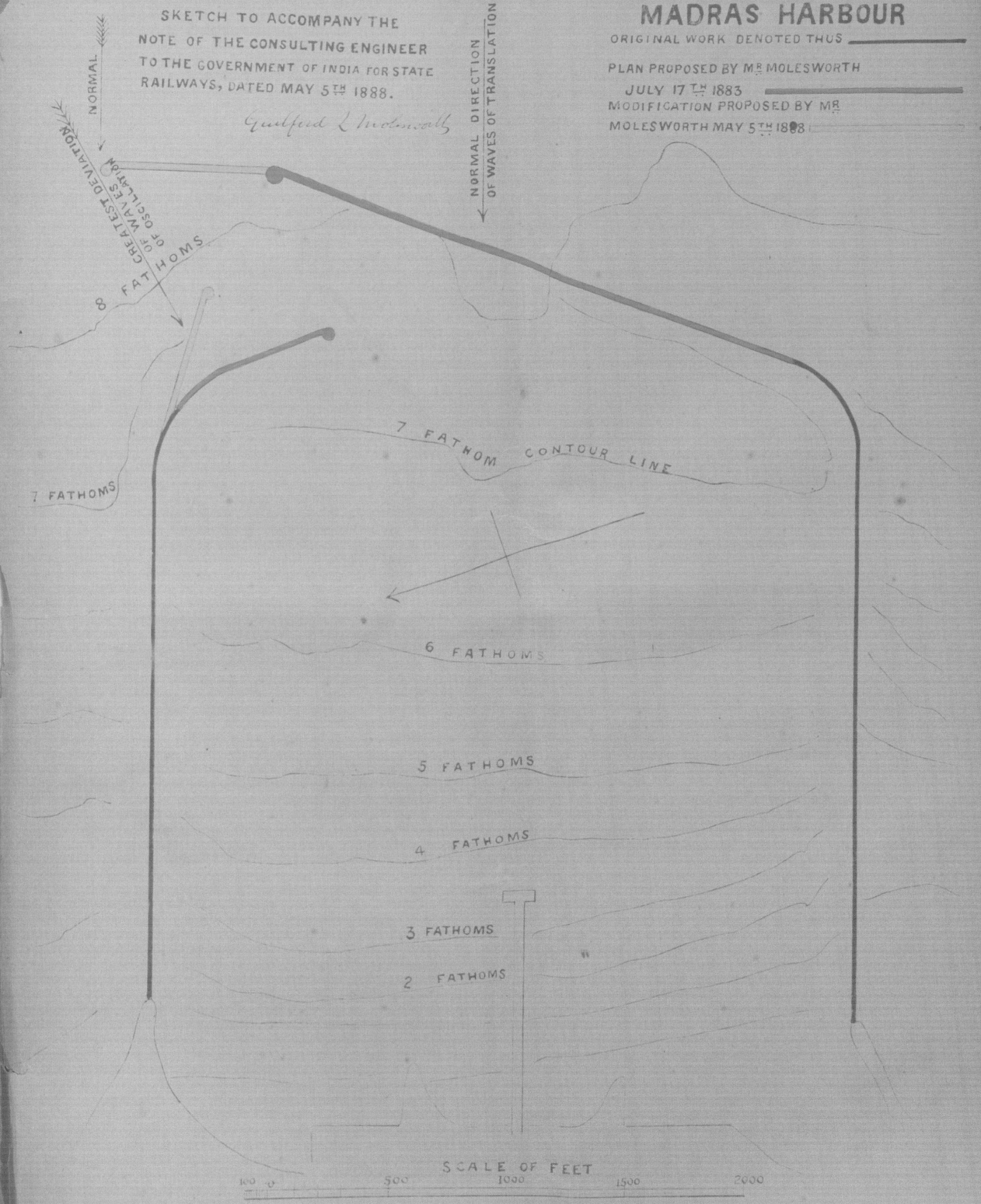
Guilford L Molesworth

# MADRAS HARBOUR

ORIGINAL WORK DENOTED THUS _____

PLAN PROPOSED BY MR MOLESWORTH
JULY 17TH 1883 _____

MODIFICATION PROPOSED BY MR
MOLESWORTH MAY 5TH 1888 - - - - -



## Note by Mr. G. L. Molesworth, Consulting Engineer to the Government of India for State Railways, dated 5th May 1888, on the subject of the best position for the entrance to the Madras Harbour.

When I wrote my last note on the Madras Harbour, I had not seen the minutes of evidence which induced the Committee to prefer Plan No. III on "Nautical grounds." I have now had an opportunity of studying that evidence, and I would suggest for consideration a slight modification of the plan I originally suggested (marked No. IV). This modification consists simply in prolonging slightly further the eastern arm which I had suggested; and also slightly altering the tangent point from the north-eastern elbow so as to change its position instead of having it in the position in which it was originally built.

I have shewn the prolongation of the eastern arm sufficiently long to cover the opening and protect it from seas coming in, even at an angle of 30° from the normal direction.

In my report on the Madras Harbour, dated March 1st, 1882, paragraph 96, I advanced the opinion that "the *waves of a dangerous character must always* "*come in broadside to the shore or nearly so* whatever the position of the storm;" and in paragraphs 75 and 76 of that report, I gave my reasons for the opinion I advanced. This opinion is confirmed by the experience of nautical men, as given in the evidence. The direction of the waves is stated to be quite independent of the direction of the wind, and that the heavy swells come in nearly broadside to the shore, even when the wind is blowing off the shore. Others state that the direction of the waves never exceeds an angle of 30° from the normal, but I doubt very much whether any waves, except those of oscillation, which are comparatively harmless, can possibly come in at any angle approaching this.

In fact, it is opposed to the laws, governing the motion of waves, that a *wave of translation* should deviate to any considerable extent from the parallel of the general direction of the contour lines of the bottom of the sea to seaward of the harbour.

An arm covering an angle of 30° will, however, be on the safe side, as protecting the entrance to the harbour, even from waves of oscillation.

I annex a sketch shewing the modifications I would propose in my original suggestion. The existing work being shewn in black lines; my suggestion of July 1883 in red lines; and the slight modifications I now propose in blue lines.

These modifications will, in my opinion, meet any objections that may be raised on "nautical grounds" to my original suggestions, whilst they will be free from some of the objections to which Project No. III is exposed.

G. C. Press, Simla.—No. 200 P. W. D.—18-5-88.—50.

# MADRAS HARBOUR

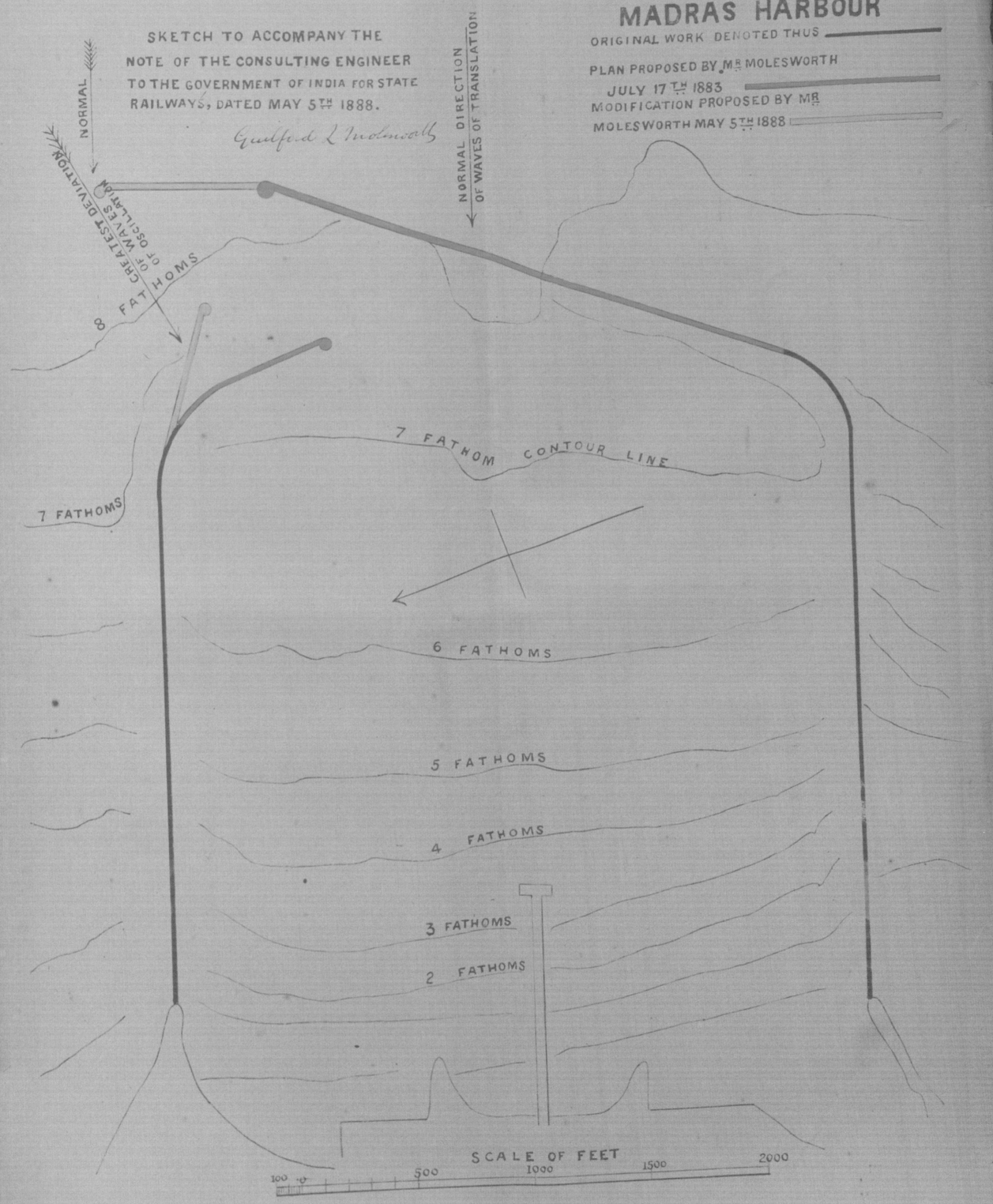
ORIGINAL WORK DENOTED THUS ———

PLAN PROPOSED BY MR MOLESWORTH JULY 17TH 1883 ———

MODIFICATION PROPOSED BY MR MOLESWORTH MAY 5TH 1888 ———

SKETCH TO ACCOMPANY THE NOTE OF THE CONSULTING ENGINEER TO THE GOVERNMENT OF INDIA FOR STATE RAILWAYS, DATED MAY 5TH 1888.

Guilford L Molesworth




£2 15/6.

No. 1715 W dy 9-6-88.

## Note by Mr. G. L. Molesworth, Consulting Engineer to the Government of India for State Railways, dated 5th May 1888, on the subject of the best position for the entrance to the Madras Harbour.

When I wrote my last note on the Madras Harbour, I had not seen the minutes of evidence which induced the Committee to prefer Plan No. III on "Nautical grounds." I have now had an opportunity of studying that evidence, and I would suggest for consideration a slight modification of the plan I originally suggested (marked No. IV). This modification consists simply in prolonging slightly further the eastern arm which I had suggested; and also slightly altering the tangent point from the north-eastern elbow so as to change its position instead of having it in the position in which it was originally built.

I have shewn the prolongation of the eastern arm sufficiently long to cover the opening and protect it from seas coming in, even at an angle of 30° from the normal direction.

In my report on the Madras Harbour, dated March 1st, 1882, paragraph 96, I advanced the opinion that "the *waves of a dangerous character must always "come in broadside to the shore or nearly so* whatever the position of the storm;" and in paragraphs 75 and 76 of that report, I gave my reasons for the opinion I advanced. This opinion is confirmed by the experience of nautical men, as given in the evidence. The direction of the waves is stated to be quite independent of the direction of the wind, and that the heavy swells come in nearly broadside to the shore, even when the wind is blowing off the shore. Others state that the direction of the waves never exceeds an angle of 30° from the normal, but I doubt very much whether any waves, except those of oscillation, which are comparatively harmless, can possibly come in at any angle approaching this.

In fact, it is opposed to the laws, governing the motion of waves, that a *wave of translation* should deviate to any considerable extent from the parallel of the general direction of the contour lines of the bottom of the sea to seaward of the harbour.

An arm covering an angle of 30° will, however, be on the safe side, as protecting the entrance to the harbour, even from waves of oscillation.

I annex a sketch shewing the modifications I would propose in my original suggestion. The existing work being shewn in black lines; my suggestion of July 1883 in red lines; and the slight modifications I now propose in blue lines.

These modifications will, in my opinion, meet any objections that may be raised on "nautical grounds" to my original suggestions, whilst they will be free from some of the objections to which Project No. III is exposed.

G. C. Press, Simla.—No. 200 P. W. D.—18-5-88.—50.

# MADRAS HARBOUR

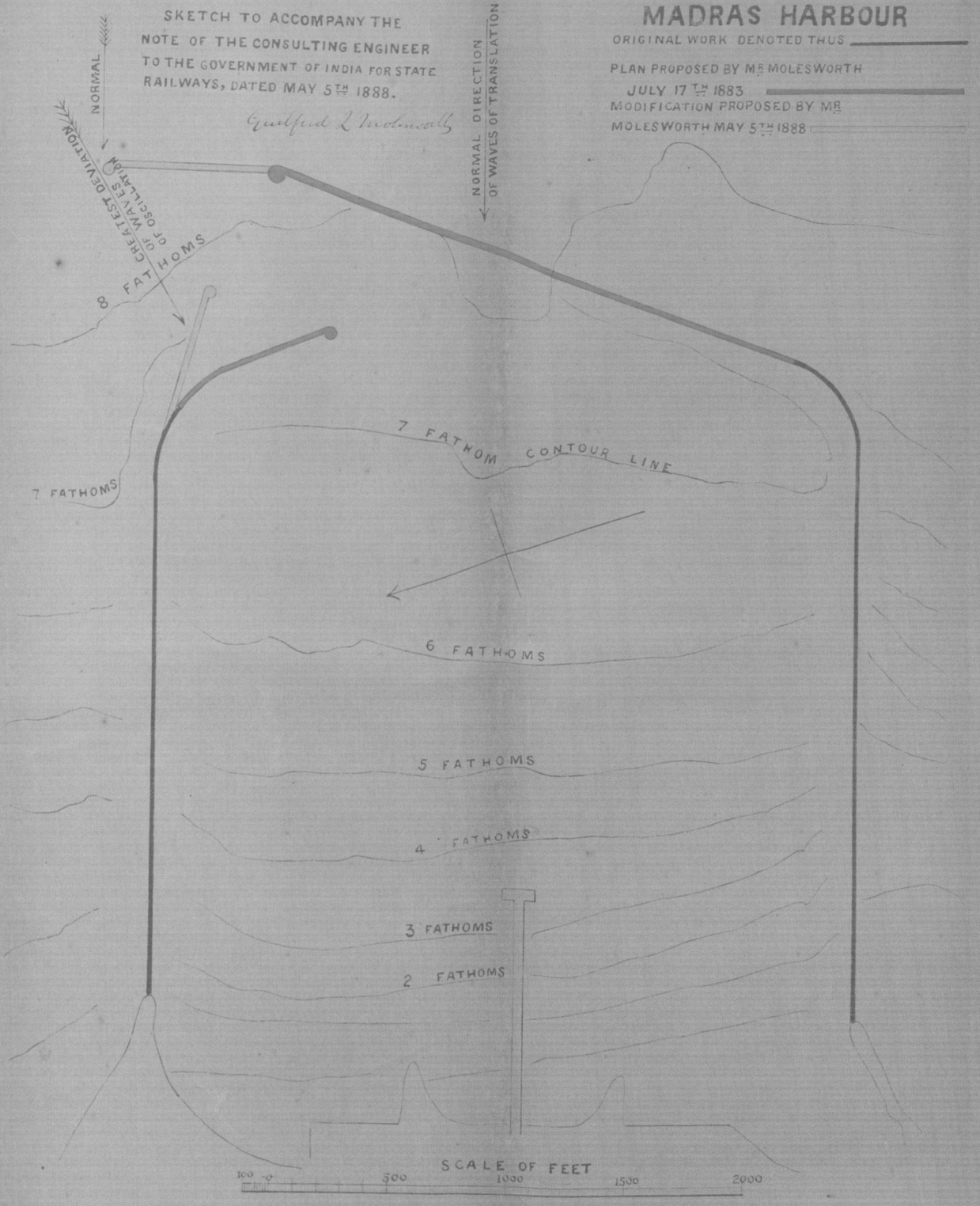
ORIGINAL WORK DENOTED THUS _____

PLAN PROPOSED BY MR MOLESWORTH JULY 17TH 1883 _____

MODIFICATION PROPOSED BY MR MOLESWORTH MAY 5TH 1888 _____

SKETCH TO ACCOMPANY THE NOTE OF THE CONSULTING ENGINEER TO THE GOVERNMENT OF INDIA FOR STATE RAILWAYS, DATED MAY 5TH 1888.

Guilford L Molesworth




22170.