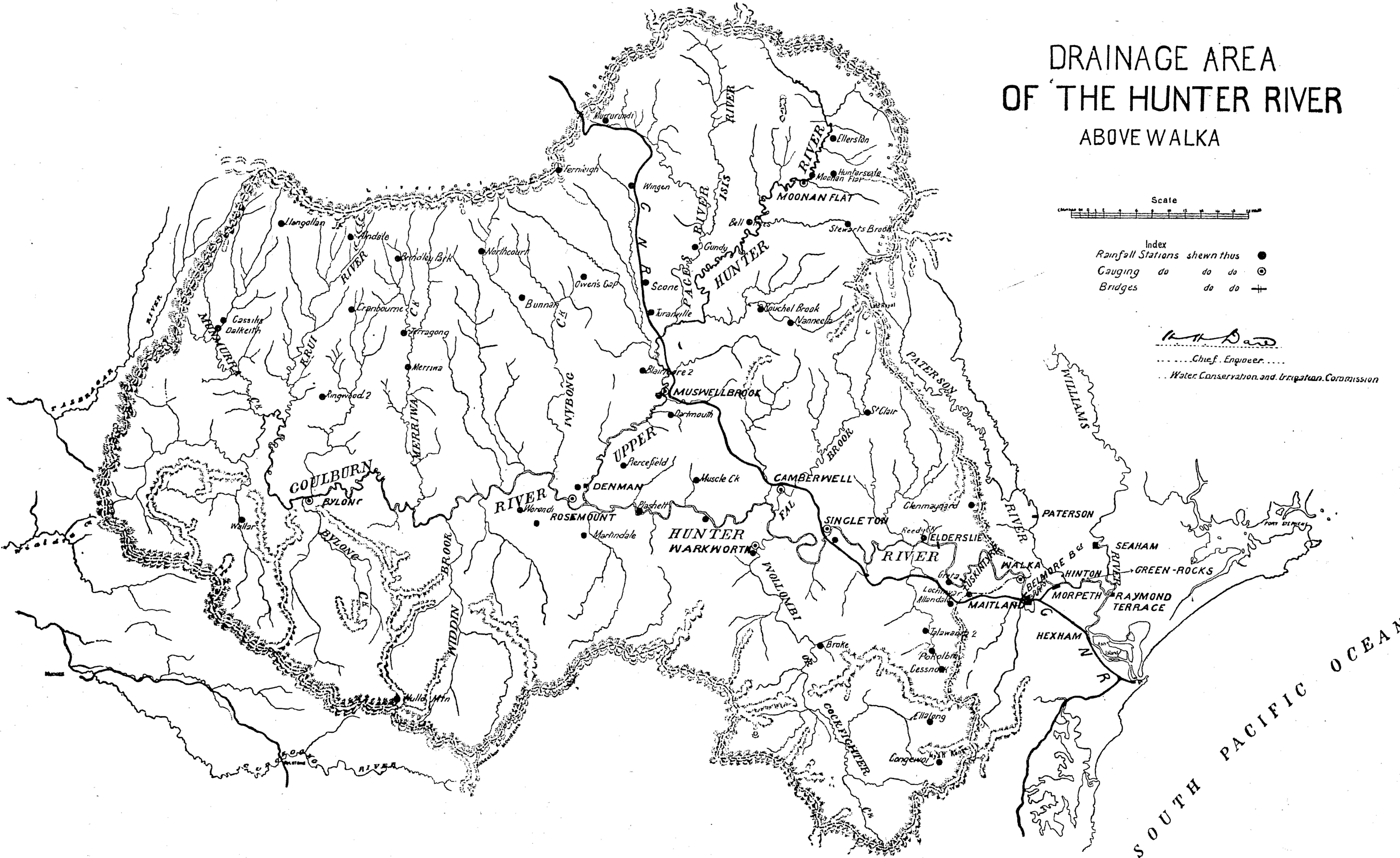


DRAINAGE AREA OF THE HUNTER RIVER ABOVE WALKA



Index

Rainfall Stations	shewn thus	●
Gauging	do do do	⊙
Bridges	do do	+

[Signature]

Chief Engineer
Water Conservation and Irrigation Commission

SOUTH PACIFIC OCEAN

THE HUNTER RIVER FLOOD OF MAY, 1913.

By H. H. DARE, M.E., M. INST., C.E.,

Chief Engineer for Water Conservation and Irrigation.

*(Read before the Sydney University Engineering Society,
17th September, 1913.)*

In May, 1913, there occurred a flood in the Hunter River, the height of which, as recorded at Belmore Bridge, West Maitland, has been exceeded on two occasions only during the last 100 years, and then only by a narrow margin, viz.—

1820 Flood	Height on Gauge	37ft. 2½in. approx.
1893	”	37ft. 3in.
1913	”	37ft. 0in.

Very complete records of some of the earlier floods are contained in Mr. E. W. Moriarty's Report, of July, 1868, wherein are embodied also calculations as to the discharge of the river at various points, while the question of Flood Prevention has been dealt with at length in the Reports of the Royal Commission of 1870; Mr. G. Gordon in 1890; Mr. H. D. Walsh in 1894; Mr. E. B. Price in 1897; Mr. C. Napier Bell in 1899; and Mr. C. W. Darley when the question of Hunter River Flood Prevention was dealt with by the Public Works Committee in 1901.

None of these reports have for their basis any gaugings of the river by means of current meters, and the figures given for discharges are therefore more or less assumptions, though in some instances apparently near the truth. During the period between 16th May and 6th August this year extensive current meter measurements have been made by officers of the River Gauging Branch of the Water Conservation and Irrigation Commission, (Appendix A), and information collected with regard to the recent flood at various points on the Hunter and Goulburn Rivers, and the following information has been prepared as a record to be used in connection with any scheme of Flood Prevention which may be investigated in the future.

CATCHMENT AREA.

The catchment area of the Hunter River above Singleton comprises an area of about 6,580 square miles, of which about 3,100 square miles is represented by the Goulburn River, which unites with the Upper Hunter, 1,790 square miles catchment,

in the vicinity of Denman, above Singleton. So far as area is concerned the Goulburn is the more important stream of the two, but the run off from the Upper Hunter catchment is superior, area for area, to the Goulburn catchment, much of which contributes but very little to the flow of the river in ordinary seasons.

Between the junction of the two rivers and Maitland, there are several important contributing streams. The total catchment area above the Walka Pumping Station, West Maitland, is about 7,090 square miles. At Hinton, which is below Maitland, the Hunter is joined by the Paterson River, and lower still, at Raymond Terrace, by the Williams River. The catchment area of these two streams is about 857 square miles.

RAINFALL PRODUCING FLOOD.

The first week of May, 1913, was showery over the greater part of the catchment. On the 7th and 8th May there were some heavy falls on the portion of the catchment below Singleton, with light to moderate falls over the remainder. From ton, with light to moderate falls over the remainder. From the 9th to the 12th but little rain fell. The rainfall which was principally responsible for the flood was that which fell on the four consecutive days, 13th to 16th May, chiefly on the 14th and 15th May. The mean depth over the whole catchment above Maitland during these days, as registered at 38 stations, amounted to 6 inches, the heaviest falls being on the Upper Hunter, where, at Stewart's Brook, a total of 10.10 inches was registered.

The mean fall over the Goulburn River catchment, derived from 13 stations, was 4.43 inches during the four days.

HISTORY OF FLOOD.

The normal water levels, as compared with the gauged heights of the flood are as under:—

	Normal Height on Gauge	Maximum Height of 1913 Flood.
At Singleton	2ft. 6in. (not tidal)	.. 46ft. 6in.
„ Belmore Bridge	2ft. 6in. (not now tidal)	.. 37ft. 0in.
„ Morpeth	3ft. 6in. (mean tide)	.. 20ft. 2in.

On the afternoon of the 14th May the Hunter River at Muswellbrook commenced to rise very rapidly, and by 5 a.m. on the following morning had reached its maximum of 30 feet on the gauge, a rise of 20 feet in 14½ hours (Plate 2). By 10.30 a.m. the river had fallen to 29½ feet, after which it fell rapidly, until at 7 a.m. on the following morning it had receded to 13 feet 6 inches, or at the rate of 15 feet 6 inches in 20½ hours.

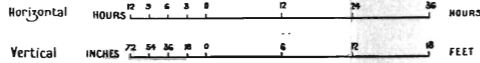
Shewing height of Flood in Hunter River - May 1913.

HUNTER RIVER FLOOD MAY 1913 AT MAITLAND

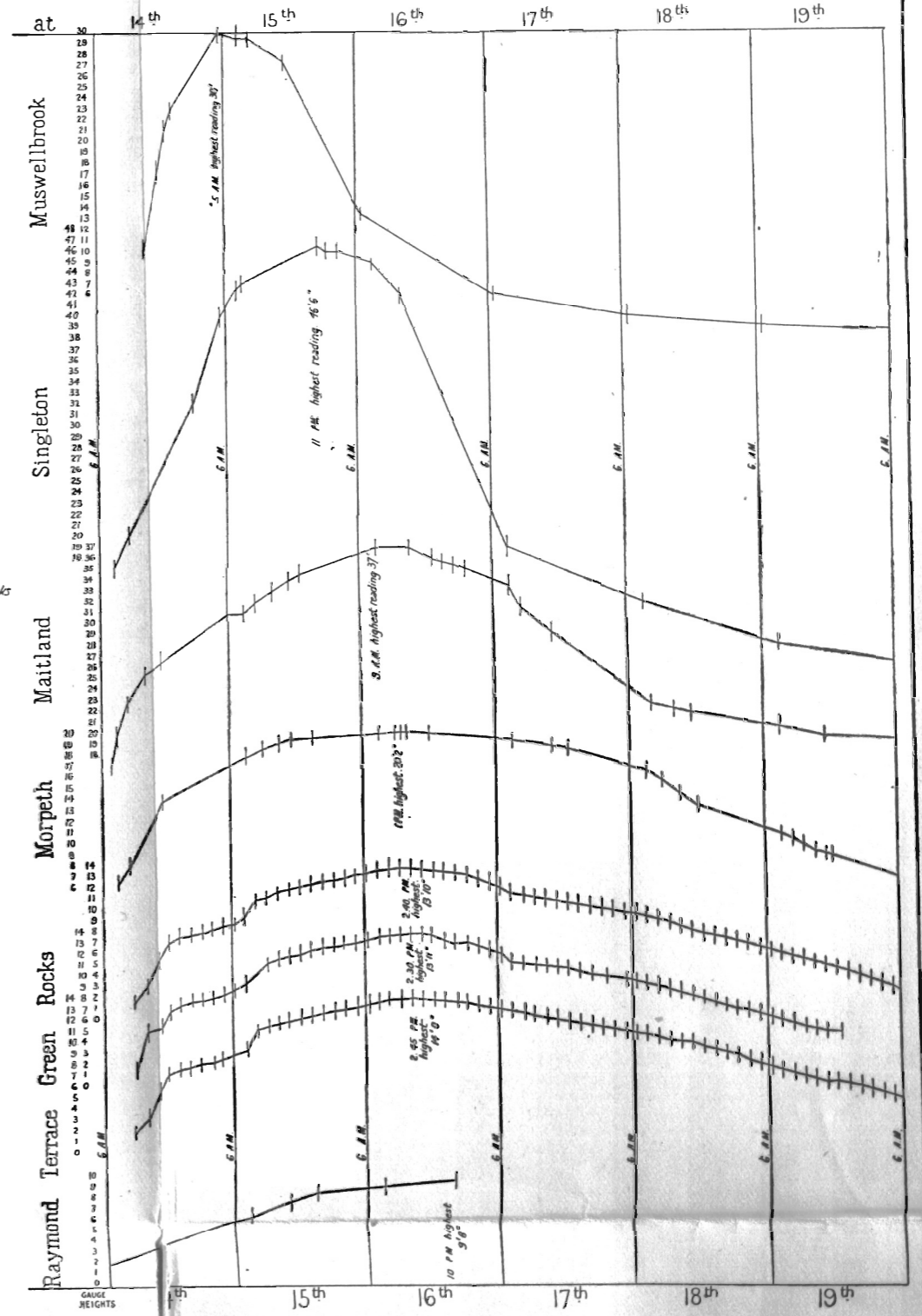
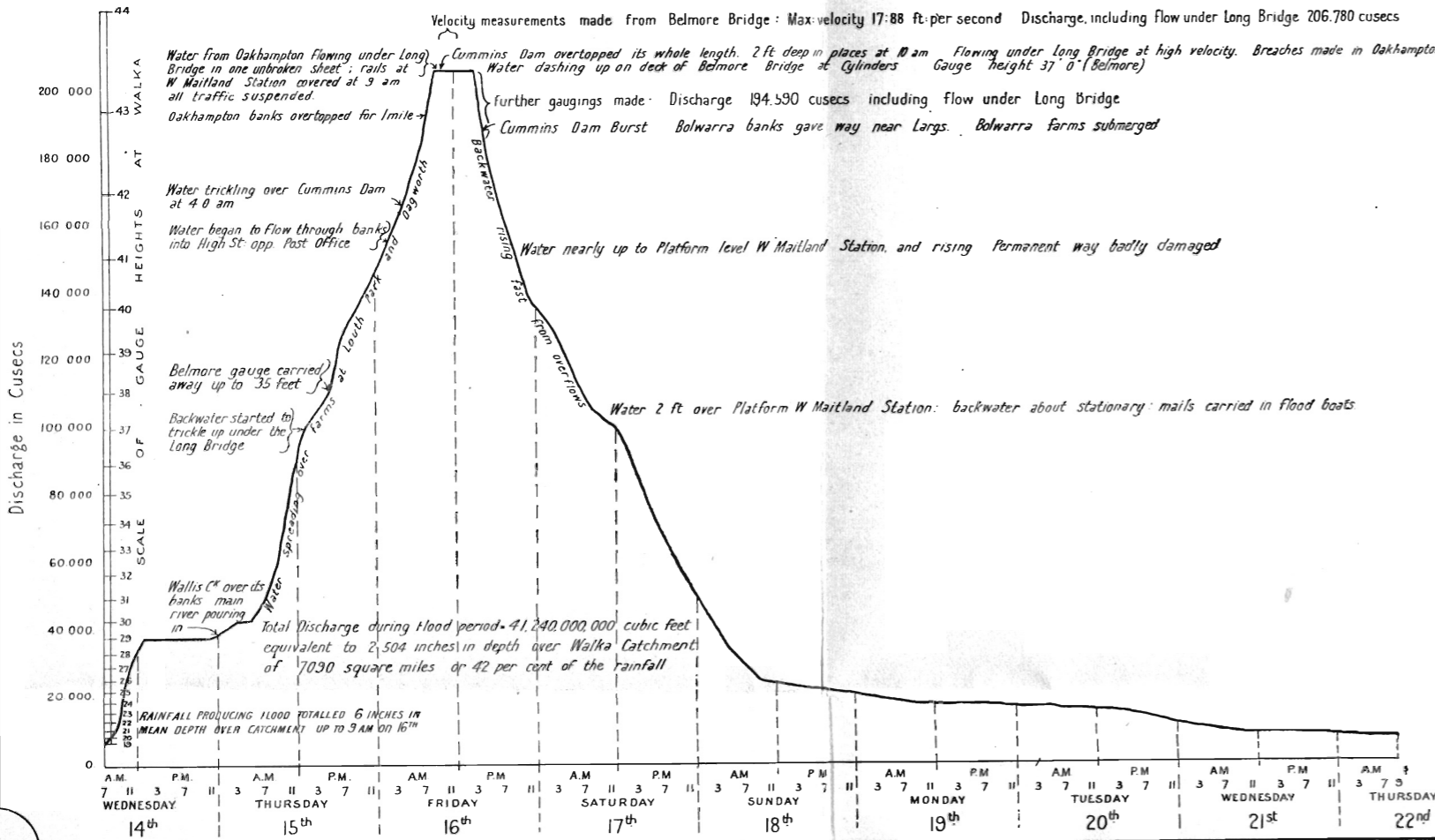
Diagram shewing the discharge in cusecs every 2 hours during the progress of the Flood - estimated from current meter measurements at Belmore Bridge, and Walka G. Sites

Maximum Gauge height Belmore Bridge 37' 0"
Walka 43' 3"

Scale of Diagram



Chief Engineer
Water Conservation & Irrigation
1-SEP 1913.



At Singleton the river rose 26 feet in the 24 hours between 9 a.m. on the 14th and 15th May, and continued rising until it attained its maximum of 46 feet 6 inches on the gauge at 11 p.m. on the 15th May. By 9 a.m. on the 16th it had fallen to 45 feet; at 2.40 p.m. the telegraphic report gave 42 feet 3 inches, falling slowly. This reading appears doubtful, since at 9 a.m. on the following morning the gauge reader reported the reading as 19 feet on the gauge.

At West Maitland the river at 8 a.m. on the 14th May stood at 17 feet on the gauge. By 9 a.m. on the 15th it had risen to 31 feet and continued rising until it reached its maximum of 37 feet at 9 a.m. on the 16th. By 9 a.m. on the following day it had fallen to 33 feet 6 inches only, but after that the fall was more rapid, and by 10 a.m. on the 18th the water was down to 22 feet 9 inches on the gauge.

At Morpeth the maximum height recorded was 20 feet 2 inches at 1 p.m. on the 16th, a rise of 13 feet 8 inches from 9 a.m. on 14th May.

Plate 2 shows the curves of river heights between 14th and 19th May for these stations, and for Green Rocks, on the lower river, below the junction of the Paterson; and also for Raymond Terrace, which is below the junction of the Williams River.

Most complete readings were taken at the three stations at Green Rocks by Gauger Smith, to whom great credit is due.

The following brief particulars of the flood have been abstracted from the columns of the "Maitland Mercury":—

15th May.—Wallis Creek overflowed in the vicinity of Louth Park at 11.30 p.m. on the previous night, and the flood waters on the 15th were pouring into Louth Park in great volume. At daylight there was a vast sheet of water on the farms at Dagworth and Louth Park. Fishery Creek also overflowed in several places, and on the morning of the 15th there was a great sheet of water on the farms at the rear of South Maitland, reaching as far as the East Greta Railway line on the west, and on to St. Peters, and as far as the eye could reach, away past Dagworth, in the direction of Mulbring. The water from Fishery Creek quickly found a level, and began to flow through the railway viaducts into Baldwin's Hollow. On the afternoon of the 15th the water started to trickle under Long Bridge. The Paterson had overflowed at Woodville and Dunmore.

16th May.—In the early hours the river reached a height of 36 feet, and began to flow through several places in High Street. The water at 4 a.m. began to trickle over the top of Cummins' Dam, and at 10 a.m., was flowing over the whole length of the dam several inches deep. At 10 a.m. there was a strong stream flowing under the whole length of the Long Bridge.

The Oakhampton embankments were topped at 9 p.m. on the 15th at the back of Beavis'. This break was temporarily stopped, but at 10.30 p.m. all attempts to check the flood were abandoned.

At 8 a.m. on the 16th the water was pouring over the banks along the Oakhampton Road for practically the whole length, from Hall's Creek to Bruncker's Gate, a distance of about a mile.

At 4.30 p.m. on the 16th Cummins' dam burst.

With the bursting of the Cummins' dam the danger of flooding of the main portion of the town passed. Relief was given to a very large body of water, which left the river through this breach, and through the breaks in the Oakhamton embankments. An approximation of the amount of water abstracted from the river by the back channel, fed from these sources and passing under Long Bridge, places it at about 25,000 cubic feet per second when the flood was at its height.

Further relief was also afforded by the breaking of the Bolwarra embankment near Largs, which released a large volume of water and gave a better escape for the river below West Maitland.

The river in the main channel at Belmore Bridge was at its maximum height of 37 feet from 9 a.m. to 3 p.m. on the 16th, but by 7 p.m. had fallen a foot, and from that time onwards continued to fall, until on 21st May it was down to 17 feet 4 inches.

FLOODS OF JUNE AND JULY, 1913.

During the latter part of May and June rain fell in moderate quantities over a number of days, and on the 31st May and 13th June the river rose again to 23 feet 7 inches and 25 feet 5 inches (Plate 4) on the Walka gauge, while on the 3rd July there was a further sharp rise to 31 feet 5 inches, or within 11 feet 10 inches of the maximum of 43 feet 3 inches recorded at that station on 16th May. On the latter occasion it fortunately happened that the rainfall on the Goulburn catchment was light, or otherwise a severe flood would have resulted, as the flood on the Upper Hunter on this occasion was at some stations the highest on record.

MAY FLOOD AS COMPARED WITH PREVIOUS FLOODS.

For purposes of comparison the curves of flood heights at Singleton, West Maitland, and Morpeth have been plotted, where the information is available, for the floods of 1857, 1861, 1864, 1867, 1870, 1893 and 1913 (Plate 3). In studying these curves it should be remembered that in 1870 Cummins' Dam, and a number of the embankments since erected, were not in existence, so that the main river channel had great relief owing to