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OF WESTERN AUSTRALIA,

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Colonial Secretary's Office,
Perth, 12th March, 1885.

HIS Excellency the Administrator directs the publication of the following Report for general information.

By Command,
MALCOLM FRASER,
Colonial Secretary.

WESTERN AUSTRALIA.

Admiralty Survey,
Perth, 31st December, 1884.

SIR,

I have the honor to furnish Your Excellency with the Annual Report of the work carried out during the past season, by the joint Admiralty and Colonial Marine Survey.

I have, &c.,

J. E. COGHLAN,
Staff Commander, R.N.,
In charge of Admiralty Survey.

To His Excellency the Administrator,
Perth, Western Australia.

1. The surveying schooner "Meda" sailed from Fremantle on the 15th April, 1884, bound for Hampton Harbor and other ports on the North-west coast, to survey and report upon them as requested by the Local Government.

2. During the passage from Fremantle to Hampton Harbor and back, deep-sea soundings were obtained as opportunities offered, with a view to further defining the bank of coast soundings.

3. Additional information was obtained concerning Shark Bay. The limit of the shoal ground, which extends some five or six miles off shore to the southward of the Gascoyne River, was approximately determined.

4. The position of a shoal off Charles Point, upon which the steam-ship "Natal" was reported to have struck, was sounded over, without obtaining any indications of shoal water in the assigned position. The "Natal" was nearer to the shore than was estimated at the time she touched.

5. The delineation of the northern portion of Shark Bay, obtained from the surveys of the French (under Freycinet, in 1819), has during the last four years received important corrections both from the Admiralty and Colonial surveyors. Charles Point (the North-east entrance point of Shark Bay), as now laid down in its correct position, is placed about twenty miles seaward of the coast line taken from the early French charts; and practically about seven hundred square miles of land have been reclaimed from the sea on the charts of Shark Bay.

6. Proceeding northward, a running survey was made of portions of the coast between Charles and Cloates Points, embracing Cape Cuvier of the French (Freycinet) and Cape Cuvier of the English (King). These two capes, bearing the same name, are about seventeen miles apart and quite distinct in appearance, that of Freycinet falling in cliffs about four hundred feet high of a light-red color, conspicuous when seen from the northward, while the Cape Cuvier of King is a bold headland with an escarpment of a deep-red color. This portion of the coast is not only exposed to the South-west swell but also defended by rocky ledges, which extend from two to three miles off shore, rendering landing impracticable.

7. Cloates Point, an important projection of the coast, was ascertained to be about 11 miles out in latitude. The positions of the known dangers in this neighborhood were determined in relation with Cloates Point.

8. The position of Strathmore Rock, reported in 1873 by the ketch of that name to lie about eleven miles westward of Cloates Point, was again passed over; no indications, however, of the danger were seen in or adjacent to (within a radius of six miles from aloft) the position assigned. The ketch touched during the night, probably upon the outer portion of the coast reef, which extends about five miles from the shore in this neighborhood.

9. Between the North-west Cape and Dampier Archipelago, proceeding by the inner passages, several dangers not previously known were ascertained to exist.

10. The Mary Anne and Passage Groups of Islands were adjusted relatively with the Dampier Archipelago.

11. A plan was made of Hampton Harbor, and its approach by Mermaid Strait was also surveyed.

12. Delambre Reef, a formidable danger with only twelve feet water on it, lying in the track of vessels calling at Cossack, was searched for and its correct position and extent determined.

13. A plan was made of Fortescue Road by Lieutenants Dixon and Dockrell, during my absence in Cambridge Gulf. This chart should prove most useful to vessels of heavy draught (such as the wool ships) calling at the Fortescue.

14. A plan was made of Dongara Road (Port Denison) by Lieutenants Dixon and Dockrell, acting under my instructions. Some of the reefs in this neighborhood lie eight miles from the shore. The navigable approach to Dongara Road (Port Denison) should, under ordinary circumstances, offer no difficulty to a steamship. The holding ground of the port is reported to consist of a thin layer of sand over sandstone rock, which would probably render the anchorage insecure during North-west gales. A steamship, however, should have no difficulty in entering Dongara Road by the Main Passage, and be able to remain at anchor for short periods, even during the season of bad weather or North-west gales. The approach of a North-west gale is so well indicated on this coast by off-shore winds, falling barometer, current setting to the southward, and by the raising of the ordinary sea-level, that a vessel (especially a steamship) calling temporarily at the port should have ample time to put to sea.

15. During the season of fine weather or South-east winds, Dongara Road (Port Denison) affords smooth water.

16. There is a depth of eight-and-a-half feet alongside the end of the jetty (November, 1884), and at about thirty feet outside, in the line of the jetty, a depth of only eight feet. To obtain a depth of twelve feet at low water (during off-shore winds), the present jetty would have to be extended 300 feet, or about one-half of its present length.

17. A pinnacle rock with 9 feet water on it, and 16 feet close around, lies with the lamp on the present jetty end (1884) bearing S.E. $\frac{1}{2}$ S., distant 1 cable or about 100 feet to the South-westward of the present position (December, 1884) of the black mooring or hauling-off buoy.

18. The rapid extension of settlement towards the Northern Ports of the Colony rendered it desirable to ascertain the practicability of making Cambridge Gulf a Port of shipment and head quarters of settlement. His Excellency the Governor in a minute addressed to the Honorable the Colonial Secretary, dated 6th February, 1884, stated:—"In connection with the survey work of the coming season, I am communicating with Captain Coghlan, to ascertain whether it will be advisable to visit Cambridge Gulf, where a port and seat of magistracy will probably require to be established, at no distant date, judging from the favorable results of the late journey of Mr. O'Donnell, and the stock-taking operations in progress upon the Ord River." The difficulties of reaching this remote portion of the Colony from Fremantle in a sailing surveying schooner, mainly against head winds, coupled with the fact that the "Meda" carried a very limited supply of fresh water, caused me to submit to His Excellency a memorandum pointing out the "Meda's" unfitness for the task, for the reasons indicated. The fact that Commander P. P. King, R.N., had explored Cambridge Gulf in a sailing surveying vessel did not alter my view of the case, inasmuch as Captain King had approached the Gulf by way of Torres Strait, carrying a fair monsoon; and his vessel was, also, specially fitted to carry a large supply of fresh water. The "Meda's" time would be principally occupied in making passages to and from the surveying ground.

19. The Governor was pleased to approve of my suggestions; but I was desirous to carry out, should an opportunity offer, His Excellency's wishes, and report upon the capabilities of Cambridge Gulf as a port.

20. The opportunity presented itself by the arrival of the steam-yacht "Cushie Doo" at Port Walcott during the "Meda's" visit to that port. The owner of the yacht was part owner of a cattle station near the confluence of the Ord and Negri rivers, and he was bound to Cambridge Gulf as the best spot for disembarking the necessary horses to enable him to inspect his station, some two hundred and forty miles inland from the head of that fine arm of the sea.

21. A passage was granted to myself and a trained leadsman from the "Meda," with the understanding that a boat should be placed at my disposal during such time as the yacht should be at anchor in the Gulf, while the owner was visiting his station. As, however, the owner of the yacht did not visit his station, that arrangement could not be carried out. Notwithstanding, I venture to hope that Your Excellency will find the data I have been able to obtain of some interest and service.

22. We sailed from Port Walcott (Cossack) on the 30th June, 1884. When abreast of Bedoubt Island, a strong easterly monsoon was experienced, against which the vessel attempted to work under canvas, with but little success. She finally had to get steam up, and proceeded to Lagrange Bay. During the stay in Lagrange Bay (ten days) the time was occupied in watering ship (which unfortunately had not been done in Port Walcott); and the water had to be brought off in boats, a distance of some five or six miles, from a well on Mr. Cowan's station.

23. From Lagrange Bay northward the vessel proceeded under steam between the Lacepede Islands and the main land, experiencing light winds and very fine weather.

24. A reef (Panton Reef) was ascertained to exist about five miles westward of Cape Baskerville, thus adding another to the many dangers previously laid down in the charts of this neighborhood.

25. Having determined the position of Panton Reef, the vessel steamed northward, keeping the land on board until abreast of King Sound. Thence a course was shaped for Browse Island, which was sighted on the 24th July. An attempt was made to find anchorage under it, but the strong easterly monsoon prevented us from doing so, and the heavy surf rendered our efforts fruitless to effect a landing upon the Island from the boats. Browse Island is defended by a coral reef, which is very steep-to, and in the breakers extending from the eastern shore we noticed the remains of a large iron vessel. The island was discovered by Mr. Browse, master of the schooner *Lynher* (attached to Captain Grey), in January, 1838. It is sandy, of small extent, about twenty feet high. The crews of the vessels engaged in removing guano (some years ago) have constructed three huts, and also near the centre of the Island a tower or mound (apparently a reservoir) about ten feet above the surface and thirty feet above high water, which forms a good landmark.

26. I regretted that we were unable to effect a landing, as it prevented me from verifying the noon position of the island by star observations. I wished also to plant some seeds of the *Pinus Haliensis* (kindly given to me by Dr. Barnett, of Fremantle), which is, I understand, a sturdy and quick-growing plant, and when full grown would form an excellent landmark on these low off-lying islands.

27. Unable to land on, or anchor under Browse Island, a course was shaped, under steam, for the northern edge of the Holothuria Banks, which extend some forty-five miles northward from Cape Bougainville. We passed within a mile of the positions assigned to the outer dangers of the cluster, but saw no breakers or other indications of shoal water (within a radius of six miles from aloft), the lead giving 36 fathoms; sand and coral bottom. When closely surveyed, the Holothuria Banks may be found to be not so extensive as laid down on the authority of the early French Charts. The patches of discolored water met with in this neighborhood render it very difficult to detect real from apparent shoal water except by the test of the deep sea-lead.

28. We tried, unsuccessfully, to catch some of the swimming crabs we saw in the neighborhood of the Holothuria Banks, but they swam too deep, and apparently only come to the surface during smooth water and fine weather.

29. When abreast of the Holothuria Banks, the easterly monsoon again blew very fresh, raising a troublesome head sea. The vessel's supply of coal and fresh water were nearly exhausted, and therefore she could not attempt to enter Cambridge Gulf but determined to make for Port Darwin. Under close-reefed fore and aft sails and steam, she was able to work up under the lee of the land; but without the aid of steam, I believe she would have been compelled to keep away for Koepang.

30. We arrived at Port Darwin on the 1st August, short of fuel and water, having been thirty-three days making the passage from Port Walcott (Cossack). Although aided by steam power, this long passage confirmed my opinion as to the difficulties a sailing schooner like the "Meda" would encounter making the passage to Cambridge Gulf from Fremantle *via* the North-west Cape in the teeth of the Easterly monsoon.

31. Had the "Cushie Doo" proceeded from Melbourne to Port Darwin by the Eastern route, *via* Torres Strait, she could have made the passage in about half the time she was occupied in proceeding from Port Walcott (Cossack) to Port Darwin, and also would have avoided the wear and tear and discomfort experienced in making the Western passage, *via* Cape Leeuwin and the North-west Cape. At Port Darwin, Mr. Panton, Police Magistrate of Melbourne, an enthusiastic geographer, who had accompanied the "Cushie Doo" from Melbourne, was, to my great regret, compelled to return to his duties without accompanying the vessel to Cambridge Gulf.

32. The vessel remained at Port Darwin until the 17th August, awaiting the arrival of a steamer bound for China with coals. Having completed coals and water and taken some horses on board, she steamed out of harbor on the 18th of August and shaped a course for Cambridge Gulf.

33. Approaching Cambridge Gulf, the vessel steamed through many miles of what Captain Cook called "sea saw-dust," some of which was collected, but under the microscope it showed no signs of life, and merely looked like broken lucifer matches. Although yellow in appearance when first brought on board, upon being kept for some time in a bottle, it gave the water a pink tint.

34. When within fifty miles of the Gulf, the sea became very turbid, of a rusty color, rendering it almost impossible to distinguish by the eye alone the shoals from the channels.

35. Strong easterly winds prevailed at this time and the usual haze which accompanies them hung over the land, making it difficult to ascertain by bearings if we were to the eastward or not of the Medusa Bank, which stretches across the mouth of the Gulf in a N.W. and S.E. direction.

36. After rounding the North-west extreme of the Medusa Bank, the water became comparatively smooth, showing that, with strong easterly winds, the bank acts as a natural break-water for the Gulf.

37. The strong ebb tide (5 knots) carried the vessel to the North-westward and enabled us to ascertain the existence of an extensive shoal, not laid down in the charts, which lies about seven miles westward of the Medusa Bank. The North-west (outer) extreme of this danger lies with the summit of

Lacrosse Island bearing S.E. by S., distant about 15 miles, and Buckle Head bearing W. by N., distant about 19 miles. Thence the shoal takes a S.E. by S. direction, for about 9 miles, its eastern edge (red sand) being just awash at low water spring-tides. It was named King Shoal after Commander (afterwards Admiral) P. P. King, R.N., the celebrated Surveyor and discoverer of Cambridge Gulf. Lacrosse Island, at the mouth of the Gulf, forms a good landmark, and its summit bearing S. by E. $\frac{1}{2}$ E. leads nearly in mid-channel between King Shoal and Medusa Bank.

38. The vessel having passed between Cape Dussejour and Lacrosse Island, anchored under the S.E. side of the latter, and although blowing very fresh from the eastward, found smooth water. The bank extending from the island is steep-to, shoaling rather suddenly from 10 to 2 fathoms, and necessitates caution in taking up this anchorage.

39. The shores of Lacrosse Island consist chiefly of a reddish fine-grained sandstone, or quartzite, the strata rising towards the N.W. at an angle of about 30° with the horizon. The summit of the island is six hundred feet high. The eastern extreme of Lacrosse Island has been formed by a comparatively recent deposit of sand and shingle. This beach is evidently a favorite resort of turtle, judging by the number of turtle shells we found on it.

40. A meridian distance furnished by two chronometers, almost exactly agreeing, measured from Port Darwin, placed Lacrosse Island 41 seconds of arc eastward of its lately amended position, or $7' 21''$ East of Commander King's longitude. This data should prove of service to the land surveyors when determining the position of our boundary line.

41. On the occasion of our first visit, we saw no signs of natives on Lacrosse Island; but, when finally leaving the Gulf, on the 12th October, the island was ablaze with native fires, they having fired the grass upon seeing the vessel approach the island. We did not interfere with them; and their fires formed an excellent beacon as the vessel steamed out of the Gulf by night. The natives evidently visit Lacrosse Island in October to obtain turtle upon the beach before mentioned; but to reach the island they must, apparently, swim a distance of not less than five miles, in a straight line through strong tides. We saw no signs of any raft or catamaran upon Lacrosse Island. Viewed from Lacrosse Island, Cambridge Gulf has the appearance of a magnificent river, from six to twelve miles wide, with a straight reach of about twenty-five miles in the direction of Adolphus Island. The Western shore consists of comparatively high sandstone hills (from eight hundred to one thousand feet), fronted in parts by a low foreshore of mangroves. The eastern side of the Gulf is low and marshy, with dense mangroves lining the foreshore, the back ground consisting of what appears to be scattered hillocks, but in reality are the summits of a range of distant hills (Onslow hills). Distant about twenty-two miles from Lacrosse Island, and when first seen appearing as a continuation of the hills forming the western shore of the gulf, is Adolphus Island (about seven hundred feet high), which divides the Gulf into two branches, known respectively as the West and East Arms. The West Arm is the principal navigable channel, but until the low eastern shore is distinguished, a vessel entering Cambridge Gulf for the first time would be disposed to steer for the East Arm, in the direction of a well-defined conical hill. Flat-top Hill in line with the northern fall of the high land of Adolphus Island, bearing S.S.W. $\frac{1}{2}$ W., leads through the Gulf, clear of the shoals on the Western shore. Upon nearing Adolphus Island, the low land forming its North-west extreme (Nicholls Point) will be distinguished, and the main channel, westward of Adolphus Island (West Arm), readily discerned. From the mouth of the Gulf to Landslip Point (the North-west extreme of View Hill), a distance of thirty-five miles, the water is deep and available for an ocean-going steamship.

42. Having steamed through the West Arm against the last of the ebb tide (running about 7 knots), the vessel attempted to enter the South-east Arm (which may be considered as the estuary of the Ord River, and is separated from West Arm by the View Hill Peninsula), with the view of proceeding as far as the confluence of the fresh and salt water, near House-roof Hill, which had been reported by Mr. O'Donnell as a practicable landing place for stock. In attempting to pass between the South shore of Adolphus Island and the Mangrove Islets a sandbank, dry at low water springs, was discovered to extend nearly across the channel; but, by keeping close alongside the mangroves which fringe the South shore of Adolphus Island, a very narrow channel, carrying 7 and 8 fathoms, was found.

43. After proceeding up the estuary for some distance, the vessel had to anchor, and then steam back again, as a sand bar, carrying only one fathom over it, at low water springs, was found to extend across from the eastern Mangrove Islets to the South-east extreme of Adolphus Island, in the position where 9 fathoms is given on Commander P. P. King's chart. As was to be expected, an enormous body of water, such as is brought down by the Ord and its affluents during the rainy season, carrying a large percentage of earthy matter in suspension, had, after a period of sixty-five years, caused great alterations in the channels.

44. The vessel having been anchored in a good berth under the South-east shore of Adolphus Island, the cutter was lowered and equipped, with a view of tracing out the channel and reaching the fresh water of the Ord River.

45. The South-east Arm was found to preserve an average width of about one-and-a-half mile for about fourteen miles, the shores consisting chiefly of various species of mangroves, so dense as to be impenetrable. Nearly in mid-channel are three islands (Panton, Fossil, and Table islets), about four

miles apart, the shores of which are also chiefly of mangroves. But the usual monotony of a tropical river is relieved by a background of picturesque hills. The principal of these, House-roof Hill, commands a view of the estuary from the mouth, through all its tortuous reaches until it winds round the western foot of the hill. The navigable portion of the river (for a boat) terminated, in September, 1884, with House-roof Hill bearing N. by E., distant about two miles. At about sixteen miles above Adolphus Island, the estuary contracts into a narrow stream, whose mouth is fronted by a cluster of sand banks, extending nearly from shore to shore, and we found difficulty in crossing this barrier of sand in the boat, even at high water spring tides (September, 1884). During the rainy season, however, the current would doubtless cut navigable channels through this bar. It, however, proved so great an obstacle to the tide, at the time of our inspection, as to delay the time of high water by two hours for the places eastward as compared with those westward of the bar, and also reduced the rise and fall from 16 feet to 5 feet respectively. Immediately the whole of the sands became covered (about high water), the stream ran into the narrow channel to the eastward at great speed (almost like the crested wave of a bore), quickly placing about three feet of water upon what was previously the dry bed of the river. Above this position, the banks of the Ord were only from thirty to fifty yards apart, and the channel became very tortuous, almost doubling back at times. Although this was the end of the dry season, in no case was either bank of the river more than twenty feet above the level of the water. Mr. O'Donnell's impression, therefore, that the banks of the Ord were one hundred feet high, as also that the river in this position was half-a-mile wide and navigable for ships, was very erroneous.

46. As we drew near the head of boat navigation, the bed of the river became choked with snags, and the water changed from a turbid rusty color to a bright blue tint (though still remaining quite salt), with numerous very beautiful Medusæ swimming in it. They had probably found their way in from the Medusa Bank, at the mouth of the Gulf, but had hitherto not been visible on account of the rusty color of the water.

47. With House-roof Hill bearing N. by E., distant about two miles, a ledge of rocks about two feet above high-water mark extended from shore to shore, and stopped further progress.

48. In this position, while debating what had best be done, attention was drawn by one of the men to what seemed to be the sound of a waterfall, and which we supposed to be the fresh water of the Ord falling over a cliff; but it was subsequently ascertained that the tide did not reach beyond this bar of rocks at this (the dry) season, and that the first fresh water pool in the bed of the Ord river was about fifteen miles higher up.

49. As the tides were taking off and we had proceeded for some miles with the boat's keel scraping the ground, at high water, we reluctantly turned back and made the best of our way down the river, remaining during the night on the barrier of sand before mentioned. Having kept the eastern side of the estuary coming up, we took the western going down, and on the whole found deeper water.

50. We camped one night on an island in the middle of the estuary, named by me Fossil Islet. We landed at low water, but in the middle of the night were nearly flooded out, the water having risen twenty-one feet, and washing close up to our camp fires.

51. Early next morning, at low water, I noticed several white objects protruding from the steep wall of mud which forms the south shore of the island, and upon examination found them to be cray-fish claws wrapped up in balls of a flint-like substance embedded in the soft mud-bank. The claws and tails were in a good state of preservation, and the body of the fish had become petrified. Although these cray-fish have probably become fossilised at a comparatively recent date they are very interesting, and I was able to bring back to Perth some specimens almost uninjured. We found no live cray-fish in Cambridge Gulf.

52. What looks like a winding sheet of petrified mud surrounding the body of the fish was possibly caused by the cray-fish being rolled over and over in a sudden freshet and then buried under successive deposits of mud brought down by later freshets. Everywhere along the banks evidence could be seen of the force with which the freshets of the Ord River come down; the steep muddy mangrove shores are in places cut away as smoothly as if done by machinery. That portion of Fossil Island where the cray-fish were discovered had in a similar manner been cut through by a freshet, leaving a depth of five fathoms alongside the steep wall of mud, and exposing at low water the cray-fish buried under twenty-one feet of deposit. There was distinct evidence that during the rainy season the water in the Ord Estuary rises about fifteen feet above the ordinary high water level of springs, or thirty-six feet above the low water level of the dry season. This additional rise of tide would place many miles of the plains on either bank of the river (seen by us as dry and encrusted with salt) several feet under water at high water during the rainy season.

53. Having seen no suitable landing place for cattle in the Ord Estuary above Mount Connection (though a more extended examination than we were able to give, especially on the eastern shore, may reveal one), we returned on board.

54. A suitable site seemed available under the eastern side of View Hill, and as the stock of fodder on board was exhausted the vessel got under weigh, and steaming round the sandspit which extends off the western extreme of the Mangrove Islets anchored under View Hill, about one hundred

yards from the shore, in 8 fathoms, abreast of a stony point which lies between two patches of muddy mangrove shore.

55. The only danger to be apprehended here is a rock (Alligator Rock) which covers four feet at high water springs, and lies about half-a-cable from the shore, with deep water close around the rock. When covered, Alligator Rock indicates its position by strong ripples and eddies. In taking up this berth, a vessel should keep well over to the shore under View Hill to avoid a Sand-bank which dries nearly in mid-channel, until a sugar loaf hill (forming the south extreme of Mount Connection) is in line with the Eastern extreme of the Eastern Mangrove Islet, bearing S.E. by E. $\frac{3}{4}$ E., which mark should be steered for until the southern fall of the high land of Adolphus Island is touching the Western extreme of the Western Mangrove Islet, and then anchor. The best time of tide is low water, and vessels having much stock to discharge would probably find it convenient to moor head and stern.

56. A vessel laden with stock (carrying the necessary appliances such as flats, &c.) could I believe land them easily at the View Hill landing. The horses brought from Port Darwin were swam ashore without difficulty, although the ebb tide was running with some strength at the time.

57. A patch of boggy ground about fifty yards long lies between the stony ground of the landing place and the hard ground which skirts the foot of View Hill. This obstacle was overcome in our case, by sending some planks on shore from the vessel and walking the horses across them. But with the requisite labor, a good causeway could be quickly thrown across the swamp as there is an abundance of material to hand on the side of the adjoining hill.

58. Fresh water was observed trickling from the sandstone cliff at the back of the boggy patch. Having crossed the strip of bog, there was no difficulty (at the end of the dry season) in reaching a spring of fresh water, distant about four miles from the landing place. The position of the spring is indicated by the clumps of screw-pine trees growing around it. Wherever we met clumps of these trees, fresh water was found either on the surface or within six feet of the ground. If several wells were dug in this neighborhood, I believe a good supply of fresh water could be obtained. But the one well (made by natives) gave out when some thirty horses were watered from it. These cattle had, therefore, to be taken to some brackish lagoons on the plain, distant about eighteen miles from the spring, which lie with Quoin Hill just open eastward of the eastern Bastion Hill and Flat-top Hill (or the mouth of West Arm) seen over the middle of the plain between the East and West Bastion Hills. From the brackish lagoons the fresh water lagoon (which lies to the eastward) is distant about seven miles, and thence the pools in the bed of the Ord can be easily reached. The horses sent to the station, distant about two hundred and forty miles by the track, went up in twelve days and returned in ten days. They kept mainly to the eastern side of the Ord, and found travelling in the bed of the river very difficult at times. Mr. McMaugh and his party were thus able to demonstrate for the first time that it was practicable for pack horses to proceed from the View Hill landing, mainly following the course of the Ord River, as far as the Negri, at a mean rate of about twenty-five miles a day. A better and more direct route may yet be discovered, westward of the ranges forming the Western bank of the Ord River.

59. Neither the Ord nor its affluents (Fraser, &c.) were running (Sept., 1884), but this was at the end of the dry season. The geological formation of the country was reported to change eastward of House-roof Hill, and to give good indications of being auriferous; so much so, that at the end of the wet season 1884-5 several prospecting parties intended to search the bed of the Ord River.

60. The steamship "Whamboa" entered Cambridge Gulf about a month after us, and anchored in 17 fathoms, just Southward of Black Cliff Point, in the West Arm, abreast of the North-west extreme of Adolphus Island. Twenty-four horses were landed from this position without difficulty in less than two hours. The party from the "Whamboa" found fresh water among the adjoining hills. But if the horses or stock were intended for the Ord River, by landing them at Black Cliff Point, they would have to proceed round the whole of the West Arm, and, judging by the experiences of Messieurs Durack and O'Donnell, must travel over a good deal of rough country before reaching the Ord River. I believe, however, that Mr. Stockdale and his party intended to explore the Leopold ranges only, and not the Ord River country. In the absence of any known practicable landing place on the eastern shore of the South-east Arm, the next best site for landing stock bound for the Ord would undoubtedly be in the West Arm (at or about the foot of the Bastion Hills). The fore-shore of the Bastion Hills, unfortunately, consists of mangroves, with the usual frontage of soft mud, though only for a short distance. Some difficulty would, therefore, be experienced in attempting to land stock there, unless special appliances were at hand. So far as one could ascertain, the landing under View Hill is always practicable during the dry season.

61. While the party from the vessel were communicating with the Ord-Negri Station, we steamed round to Cape Londonderry and inspected the bays Westward of it (*see* paragraph 94). Upon our return to the Gulf, the vessel proceeded up the West Arm, and anchored under the Bastion Hills.

62. Considerable alterations were ascertained to have taken place in this branch of the Gulf since Commander P. P. King's survey in 1819. Between the foot of the Bastion Hills and the Eastern entrance point to the West Arm, the low mangrove shore had extended to the Westward as much as 2 miles in some places. Nearly in mid-channel, a sand-bank which dries 10 feet at low-water springs had

formed. This danger lies with the following limits:—Quoin Hill (North extreme) bearing from E. by S. to E. by N., and the Western fall of the Bastion Hills bearing from S. $\frac{1}{2}$ W. to S. by W. It was named Roe Bank after Lieutenant (afterwards Commander) J. S. Roe, R.N. (Captain King's able assistant and subsequently first Surveyor General of Western Australia), the officer who had first explored West Arm. The alterations ascertained in the configuration of the coast and channels bore evidence to the enormous quantity of earthy matter brought down from the plains at the head of the Gulf during the rainy season. A channel about a cable's length wide, carrying depths of 7 to 9 fathoms, passes close Westward of the bank. This channel will require careful navigation.

63. A vessel proceeding up the West Arm should endeavor to do so towards low water when Roe Bank is well uncovered and marks the Eastern side of the navigable channel. Having kept a mid-channel course between the islands at the mouth of the West Arm, from a position a cable's length Westward of the southernmost island, a course of S. $\frac{3}{4}$ E. should be steered (allowing for tide) towards the westernmost high portion of the Bastion Hills, which is a general guide through the channel. The conspicuous gap in the summit of Mount Cockburn in line with a small hillock at the Eastern extreme of the ridge forming the Eastern entrance of the gut, leads Eastward of Roe Bank. Thence the channel runs towards the tangent of the low point under the Bastion Hills. The shoals are somewhat steep-to, but the lead will give indication if carefully attended to.

64. It is high water at Full and Change about 7h. 30m.; springs rise and fall (during the dry season) about twenty-one feet. During the week after Full and Change, the tides run strong (from 6 to 7 knots in places) but the rise and fall is regular. During the week preceding Full and Change the range is very irregular (September and October, 1884, occasionally only 4 feet). In the West Arm, between Bluff Point and Adolphus Island, the streams run at the rate of 7 and 8 knots at springs. The flood sets directly on to Landslip Point (under View Hill) and thence towards the Western shore, among the islands with great strength at springs, causing a heavy race off the Western entrance point of the Pool abreast of the southernmost island.

65. While the vessel remained at anchor under the Bastion Hills, a boat proceeded up the stream (King River) which discharges on the eastern shore of the principal branch of the Gulf (West Arm) about midway between the Bastion Hills and the mouth of the sheet of water at the head of West Arm, called the Gut.

66. An attack of malarial fever (of which we had several cases on board) prevented me from accompanying the boat. From the master of the vessel, Captain Hayes, I ascertained that the King River was a very tortuous stream (as might be expected from the flat ground and nature of the soil), and that after many windings to the eastward it finally trended to the southward, through a deep gorge between Mount Cockburn and the adjoining eastern range (Erskine Hills), where the head of boat navigation ended. So tortuous is King River, that although the party estimated they had ascended 50 miles, they had only made good about 10 miles in a direct line. During and just after the rainy season, King River would probably be navigable for small craft for several miles; and, if the banks were not too swampy, would prove a suitable place for landing stock, as the distance between the eastern reach of the King River and the fresh water lagoons on the Ord would probably be found to be not more than 5 or 6 miles. My own impression is, that at the end of the rainy season the banks of King River would be found to be very marshy. Failing, however, to land stock in the neighborhood of the Bastion Hills or on the banks of King River, a vessel could easily return in one tide, to the landing under View Hill.

67. The sheet of water called the Gut when explored added little to our previous information, and merely confirmed Commander P. P. King's description. The river falling into the head of the Gut (which I take to be the stream called by Mr. Durack the "Pentecost,") and the river on its western shore (called by Mr. Pentecost the "Durack") were both ascertained to be tortuous, shallow streams (with an occasional deeper pool) fit only for boat navigation, winding between low marshy islets and banks, and in general configuration similar to the other streams which fall into the Gulf.

68. A river on the Western shore abreast of Roe Bank (unnamed on the Chart) was named Forrest River, after the Hon. John Forrest, C.M.G., Surveyor General of the Colony. This stream has a sand-bar at its mouth, which is about half-a-mile wide, but contracts rapidly, and was therefore not explored. It may extend many miles inland, in a westerly direction, but its mouth is blocked at low water (October, 1884). However, with a rise and fall of 21 feet, this river may be found to be navigable for small vessels for many miles at high water.

69. The scenery in the West Arm is remarkable, viewed from a position under the Bastion Hills. The mountains consist of fine-grained sandstone, similar in formation to Lacrosse Island. The strata rises to the North-west, good examples being furnished by Quoin and View Hills. A number of hills of about the same height (seven hundred to eight hundred feet) have flat tops. But the most striking elevation is Mount Cockburn, which bears an extraordinary resemblance to an enormous fortress, reminding one of the illustrations of Metz. The bastions (consisting apparently of the debris of the mountain top) rise at angle of about forty-five degrees, meeting an almost perpendicular mass of what appeared to be a quartzose sandstone broken into blocks in form resembling columnar basalt; thence a sort of shelf juts outward and gradually rounds back, forming the summit of the mountain, which

(roughly estimated) is from 1,500 to 1,800 feet high. Without special appliances, I believe Mount Cockburn would be as inaccessible from the North-westward as is the celebrated Pieter Both mountain at Mauritius.

70. During the vessel's stay in Cambridge Gulf the natives appeared to closely watch our movements. As the boat ascended the Ord they lighted many bush fires along the banks of the river, and fired the North-west side and summit of House-roof Hill. But otherwise we were not molested by them, and had they wished to attack us they had every facility for doing so, as in many of the reaches of the river, the banks were comparatively high and a spear could have been thrown from shore to shore. On the Daly River, across the boundary, at this period, several white men were treacherously murdered by the blacks.

71. The upper portion of Cambridge Gulf (and especially the estuary of the Ord River) abounds with alligators. We rarely obtained a shot at them, as they slid down the mud banks immediately they saw or heard the boat approaching. They floated down the stream with their bodies well submerged, exposing only the tips of the snout and tail, and we mistook them at first for the branches of dead trees. On one occasion the real branch of a dead tree was so like an alligator that (brought by the tide near the boat's bow) it caused much excitement to the bowman and an unnecessary expenditure of ammunition. One large alligator swam round the vessel for several days, appearing with great regularity, but avoided the line of fire of a carronade loaded with grape. A horse belonging to Mr. McMaugh's party was attacked during the night by an alligator, which apparently tried to drag the horse down, inflicting two severe wounds with the fore feet on the hind quarters of the animal. Very few fishes were seen, except the mud-fish. These were larger than I had before met with, some being from nine to twelve inches long, their semi-transparent silvery bodies reminding one of large smelts. They abounded in the neighborhood of the sand barrier before mentioned (Ord Estuary), and appeared to leap with a frog-like movement upon their pectoral fins, with equal facility over water and dry land. We failed to catch any, as they hid themselves instantly, when pursued.

72. The trammel net was set occasionally, without much success, a few small bream being the only haul. A fine specimen of the "sawfish" was caught in the trammel net off Lacrosse Island. This fish, from its formation, would seem to lie on the bottom like a "stingray," its "saw" projecting obliquely from its flat head. This was the first live specimen of the "saw-fish" I had seen. Several very large sharks were seen as far up the Gulf as Adolphus Island. A scaleless fish, weighing about eight pounds, leapt into the gig one evening. Except that its snout turned up and teeth were small, it was not unlike a schnapper in appearance. It proved a wholesome well-flavored fish.

73. Numerous birds were seen along the banks of the Ord River: Pelicans; storks (in appearance like the red and the white ibis); various pigeons; the whistling and the Burdekin duck; pigmy geese; a brown bird, with a long snipe-like bill curving downward, larger in size than, but with the cry of, the curlew. A swallow, in appearance like the Java swallow (which furnishes the Chinese with the "edible bird's nest"), flew on board. A variety of birds were met with (including ducks and sparrows) having white breasts and throats, with a distinguishing black ring (occasionally two) round the throat. I regretted that one had not the means for preserving specimens.

74. Flying-foxes or Fruit-bats are numerous on the shores of the Gulf. The only specimen we obtained was very fierce, and died on board after two days confinement in a cage. When pulling down the Ord River, the noise disturbed some flying-foxes, which rose silently from the mangroves in an immense flock and remained hovering over the point until the tide quickly carried the boat out of sight of them. They would probably prove a pest, should fruit be grown on the banks of the Ord. We also met with the bowers or play-ground of the Bower bird. Mr. Hardman (Government Geologist) assures me that the Bower birds (males) seen by him on the Fitzroy River are dove-colored, with a blue crest; but the bird pointed out to me as the Bower bird had a glossy black satin-like plumage, and must be quite different in appearance to the birds seen by Mr. Hardman.

75. Kangaroo and wallabi are plentiful on the shores of Cambridge Gulf. They are of a reddish brown or cinnamon color, as a rule; but a larger species of kangaroo (called I believe Wallaroo) was met with, of a dark brown color. A fine specimen of the hooded-lizard was seen, but could not be caught.

76. The principal trees seen were the gouty-stem, cotton, and red gum. Cambridge Gulf seems to be the special home of the gouty-stem tree. The natives apparently do not trouble themselves to gather the fruit. Numbers of the trees were heavily laden with the last season's fruit. As a rule, the trees I measured averaged about twenty-five feet in girth round the bottle portion of the stem; but a fine specimen, with three buttresses, measured forty-three feet round including the buttresses. Commander Stokes, R.N., who saw the gouty-stem tree in bloom, in 1836, on the Victoria River (and I believe was the first to describe it) states that the blossom has the perfume and color of white jasmine and scents the atmosphere for long distances. The silk-cotton trees, with their yellow blossoms and last season's fruit, were attractive and plentiful along the shores of the Gulf.

77. The fan and cabbage palms were also met with. The screw-pine (*Pandanus*) was always a welcome sight, for we invariably found fresh water near where it grew in clumps. Captain Hayes informed me that the natives of the Marshall Islands pound the sweet inner portion of its fruit (somewhat resembling a large ruddy pine-apple with many sections) into a paste and dry it, which furnishes

them with a wholesome food not unlike date paste in flavour. The natives of this portion of the North-west coast appear to eat the fruit of the screw-pine in preference to the fruit of the gouty-stem tree, as we always found portions of the roasted fruit of the former (but not of the latter) around their fire places. I regret that I was unable to make a botanical collection. As opportunities offered I made geological collections from the shores of the Gulf and other places visited, in the hope that they might prove of some slight service in connection with Mr. Hardman's labors up the country. Mr. Hardman has kindly consented to classify the specimens for me.

78. Upon our first arrival in Cambridge Gulf (August) the climate was pleasant, a cool land wind blew down the Gulf from about 3 a.m. to 11 a.m. and was succeeded about 1 p.m. by a sea-breeze. After the middle of September, however, the climate became trying and the heat oppressive. The radiation from the hills made the upper portion of the Gulf even hotter by night than by day; and the thermometer reached 96° F. During October and November (before the rains have set in and when the land and sea breezes are more or less suspended), the climate of Cambridge Gulf cannot be pleasant.

79. The dry season (easterly monsoon) is from May to September, and the wet season (westerly monsoon) from October to April. The prevailing direction of the wind during the former period is from E.S.E. hauling during the afternoons to E.N.E. In October and November heavy thunder-storms ("bulls-eye squalls") occur, in violence resembling tornadoes. In December the westerly monsoon gains strength, the atmosphere becomes thoroughly saturated with moisture, and rain falls almost daily,—an agreeable change after the intensely hot weather experienced in October and November. About the middle of March hot weather and thunderstorms again set in, being succeeded at the end of April by the easterly monsoon and cool weather.

80. No rain fell in Cambridge Gulf during August, September, and October (1884). The average annual rainfall at Port Darwin is 63 inches, but the quantity diminishes rapidly inland, there being only thirty-five inches at Pine Creek, distant about one hundred and fifty miles from Port Darwin, or an average loss of rainfall of one inch per five miles of distance from the coast. In the absence of recorded observations, the rainfall in Cambridge Gulf may be taken to be the same as that of Port Darwin.

81. I was unable to detect any indications of a hurricane having recently visited Cambridge Gulf. If sugar-cane be one day grown on the banks of the Ord River, its immunity from hurricanes should tell greatly in favor of the district. It is certain, however, that on the 27th November, 1839, Commander Stokes experienced very bad weather on the Victoria River (about ninety miles eastward of the Gulf) and that, at the same date, a hurricane passed over Port Essington, distant about one hundred and twenty miles eastward of Port Darwin, and about two hundred and seventy miles North-eastward of Commander Stokes' position. The natives at Port Essington stated that they had not experienced such a visitation before. But the cyclone was so violent as to blow H.M.S. "Pelorous" over on her beam ends (drowning twelve men), her starboard side being buried nine feet in the mud and leaving the keel three feet out of the ground. By the skill and perseverance of Captain (after Admiral Sir Leopold) Kuper, the vessel was ultimately dug out of the mud and got afloat again. Cyclones, therefore, do occasionally, though rarely, visit this portion of the Coast of Australia.

82. Port Darwin, though lying between the Victoria River and Port Essington, is stated to be free from hurricanes; but extremely bad weather was experienced there during the first week of January, 1877, with violent squalls, at times equal in strength to a hurricane, accompanied by heavy rain and vivid lightning, the wind shifting from S.W. to West and N. W.

83. I believe Cambridge Gulf may be considered a healthy climate. We had some cases of fever and ague, but all the men attacked (including myself) had had intermittent fever before in other parts of the world. Sleeping in the boat at night, up mangrove creeks, probably caused these attacks. The cool weather season is the sickly season on this coast; the malaria is supposed to be brought down from the inland swamps by the easterly winds which pass over them.

84. I have endeavored to lay before Your Excellency all the evidence (hydrographical and general) I could obtain, from personal observation and otherwise, relating to Cambridge Gulf. Of its being an excellent harbor there can be no doubt (equal in that respect to Port Darwin), and, as a port for vessels of large draught, possesses several advantages over the Victoria River.

85. It would, I believe, be quite impracticable for an ocean-going steamship of the "Whampoa's" draught to navigate the Victoria River (unless an elaborate system of buoyage was introduced) with anything like the facility with which that vessel navigated Cambridge Gulf. An inspection of Commander Stokes' Survey (published Admiralty Chart No. 1705) will indicate the intricate navigation of the Victoria River as compared with Cambridge Gulf. I have also had the advantage, in Sydney, of obtaining Commander Howard's opinion (the officer who re-examined the Victoria River, and a trained Admiralty Surveyor). Our opinions about the navigation of the Victoria River for vessels of heavy draught agree.

86. The banks of the Victoria, as far up as Holdfast Reach, consist chiefly of high rocky hills and cliffs, and are therefore unsuitable as landing places for stock as compared with the shores of Cambridge Gulf. A depôt called "Fisherton" has been established in the neighborhood of Holdfast Reach, for supplying the up-country stations owned by Messrs. Fisher and Lyons. The supplies are taken up to the depôt in small vessels, and thence are transhipped into light-draught boats and tided up across the shallows, at high water, to a position near the mouth of Baines River, whence a practicable

dray-road communicates with the up-country stations. Until the upper Ord country is more extensively settled than at present, it is not improbable that supplies for the stations in that neighborhood will enter *via* Port Darwin and the Victoria River. Still, as a water-way, Victoria River is not equal to Cambridge Gulf.

87. A firm of merchants, however, at Port Darwin informed me that they intended to form a *dépôt* in Cambridge Gulf at an early date, and also keep up regular steam communication between Port Darwin and the Gulf, and extend it if necessary as far as King Sound. They had received trustworthy information (so I understood) of gold having been found on or near the shores of Cambridge Gulf.

88. Should gold actually exist on, or adjacent to the shores of Cambridge Gulf, there will doubtless soon be a considerable population on its shores. The fine vessels of the China Steam Navigation Company, and other ocean-going steam ships, which call at Port Darwin, would bring thousands of Chinese into the Gulf in a short time, to work as miners and agriculturists, in addition to a white mining population.

89. With reference to the cultivation of the sugar-cane along the banks of the Ord, there is no doubt that hitherto in the Northern Territory of South Australia the industry has not proved a success. I was informed that this result is not due to climatical reasons, but to the poverty of the soil of the site selected for the experiment. The Delissaville estate, close to Port Darwin, of ten thousand acres, produced only five tons of sugar during the past year, at an expenditure of £20,000. The banks of the Daly and other rivers of the Northern Territory of South Australia are stated to be well adapted for the cultivation of sugar-cane, and so probably will be the banks of the Ord and rivers flowing into Cambridge Gulf.

90. In any case Cambridge Gulf will always claim rank as a splendid port for landing or shipping stock. With regard to a townsite, from a nautical point of view, I should suggest that, in the neighborhood of the Bastion Hills and thence southward as far as the Eastern entrance point of the Gut (embracing the mouth of King River) would be the most eligible site. But until this position has been seen during, and at the end of, the rainy season, I should hesitate to recommend it as the best possible site. The next best position appeared to me to be on the eastern side of View Hill.

91. The surveyor conducting the land survey of Cambridge Gulf will have better opportunities afforded him for inspecting the ground and the nature of the approaches by land than I had. In the meantime I would suggest that the land in the neighborhood of the Bastion Hills, and also the frontage for some six miles on the Eastern side of View Hill (embracing the springs before mentioned) be kept for the present by the Government as a reserve.

92. Lacrosse Island, at the mouth of Cambridge Gulf, is distant by steamer track—

From Port Darwin	about	210	sea miles ;
„ King Sound (Derby)	„	480	„
„ Cossack	„	930	„
„ Fremantle	„	1850	„
„ Batavia (by Sunda Strait)	„	1450	„
„ Singapore	„	1950	„
„ Hong Kong	„	3300	„
„ Colombo	„	3200	„
„ Mauritius (Port Louis)	„	4000	„

Cossack is therefore, practically, about half-way between Fremantle and Cambridge Gulf, and King Sound about half-way between Cossack and the Gulf.

93. Your Excellency will have gathered from the data I have had the honor to submit that, although Cambridge Gulf does not permit of large vessels navigating the Ord estuary to the confluence of the fresh and salt water (contrary to the conjectures of Mr. O'Donnell), still, on the other hand, the Gulf does not deserve in the least the strictures which appear in a History of Australia by the Reverend Tennison Woods, namely, that Commander King turned away from its shores as from “a place upon which the curse of God had fallen.” Commander P. P. King was disappointed at not finding fresh water on the shores of Cambridge Gulf. His description, however, of the locality for the month of September, 1819, was quite applicable to the month of September, 1884, and is strictly accurate.

94. During the absence of the overland party, consisting of Mr. McMaugh, a seaman named Card, and two blacks from Port Darwin, the vessel proceeded out of the Gulf and thence round Cape Londonderry, anchoring off the eastern side of Eclipse Islands, distant about one hundred and fifty miles from the Gulf. She filled up with fresh water from a well dug about half-a-mile back from the beach, near the north-eastern extreme of the southernmost Eclipse Island. The position of this fresh water (as in nearly every instance on this portion of the coast) was indicated by clumps of the screw-pine tree growing around it. The surface of the island consisted chiefly of iron-stone (“pudding stone”) and sandstones resembling those found in Cambridge Gulf, together with a quartzose pea grit.

95. The watering parties from the vessels loading guano at Jones Island had had, what they termed, a “brush” with the natives on this island. Our watering parties, however, were in no way molested by the blacks, the only one met with being a very old man returning from fishing. He seemed greatly alarmed at seeing us (as we had walked across the thickly wooded island and he could not see the vessel) and appeared to think our party were evil spirits, judging by his gestures and cries, beckoning us back into the earth from which he seemed to think we had suddenly arisen. None of the party moved towards him, and he was permitted to creep close up to a rocky point whence he disappeared suddenly

into the bush. Their huts (*mia mia*'s) were not unlike the straw bee-hives in shape, formed of reeds about two feet high, with the entrance facing inland or to the eastward. They color their faces red with a soft sandstone, pieces of which were found inside their huts.

96. A present of flour and tomahawks had been left at the well by someone from Jones Island, in the hope of conciliating these savages. They had utilised the heads of the tomahawks for breaking off the hardest portions of the quartzite rocks for spear heads (selecting unerringly the positions of the hardest rock), and the tomahawk blades had been used for chopping a hard yellowish mangrove wood for spear (or throwing) sticks (perhaps in anticipation of future watering parties). They did not steal or disturb anything belonging to us left temporarily upon the island.

97. Having completed water (under difficulties, the swarms of flies proving a greater annoyance than we had met with on any other portion of this coast), the vessel proceeded into Vansittart Bay, and anchored in Encounter Cove. Our progress was indicated by many native "smokes" both on the islands and on the mainland.

98. On anchoring in the cove (as Commander P. P. King had been attacked there and driven to his boat), a blank cartridge was fired from a small carronade, which caused a remarkable echo, and probably alarmed the blacks, as we saw none during our stay. Encounter Cove proved an excellent haven. One boat proceeded to inspect the eastern shore of Vansittart Bay, and two unnavigable streams were ascertained to discharge there. Two springs of fresh water exist in the north-west and south-west corners respectively of Encounter Cove. It would be difficult for a boat to water at the former, but the latter offers every facility. As usual, groups of the screw-pine tree indicated the position of the fresh water.

99. The shores of the Bougainville Peninsula, as far as the head of Encounter Cove, are thickly wooded with a species of stunted eucalyptus tree. The valleys were well grassed (October, 1884), and I believe there is a plentiful supply of fresh water throughout the Peninsula. The geological formation is similar to that of Cambridge Gulf. A species of green-stone with adhering quartz was also found. While searching for geological specimens, I came across what appeared to be a native burial ground. There were ten graves, about twelve feet long and three feet wide, distant about fifteen feet from each other. The surface of each grave was effectually protected by sharp pieces of quartzite rock packed close together. The heads of the graves were marked by a single tree, which had apparently been planted in accordance with a native custom.

100. While ascending the hill from which Commander King had been repulsed, I saw several native tracks and camping places but no natives. Mounds of a small black oyster shell (which grows plentifully upon the mangroves in Encounter Cove) were found around the fire places. The natives appear to prefer this shell fish to the cockles which are also plentiful in the cove. Kangaroo and Wallabi were seen. But the most interesting track (seen by Mr. Guthrie, myself, and some of the boat's crew) was that of a large animal like a water buffalo. The water had receded since the animal had crossed the swamp, leaving the impression of the hoof quite hard and semi-fossilised. Some kangaroo tracks were also semi-fossilised. On the next day Mr. Guthrie and myself took chisels and hammers to obtain a specimen of the spoor; but having delayed too long in tracing a rivulet of fresh water to its source we missed the track. On the following day, unfortunately, the vessel sailed and thus prevented us from obtaining specimens of the fossilised hoof prints. It is possible that buffalo may have strayed from the old settlement at Port Essington (1825) as far as Vansittart Bay. Herds of large wild buffalo are met with along the Western shore of the Gulf of Carpentaria, as far as the Roper River, which have strayed from Port Essington. Vansittart Bay is about as far West as the Roper is East of Port Essington.

101. The present Sir George Grey saw similar tracks in the country southward of Vansittart Bay, (Prince Regent and Glenelg Rivers). He states—"I have still to record the remarkable fact of the existence in these parts of a large quadruped with a divided hoof; this animal I have never seen, but twice came upon its traces. On one occasion, I followed its track for above a mile and a half, and at last altogether lost it in rocky ground. The footmarks exceeded in size those of a large buffalo, and it was apparently much larger, for, where it had passed through brushwood, shrubs of considerable size in its way had been broken down, and from the opening there left, I could form some comparative estimate of its bulk. These tracks were first seen by a man of the name of Mustard, who had joined me at the Cape, and who had there been on the frontier during the Caffre war; he told me that he had seen the *spur* of a buffalo, imagining that they were here as plentiful as in Africa. I conceived, at the time, that he had made some mistake and paid no attention to him until I afterwards saw the same traces myself" (Grey's Journals, Volume I, page 242). Captain Grey's description is precisely what we remarked in Vansittart Bay.

102. The examination of Encounter Cove and the shores of Vansittart Bay being completed, the vessel weighed and proceeded for Jones Island. Immediately she had passed the entrance points of the Cove, bush fires were lighted along the Peninsula, showing that the blacks, though hidden, had been closely watching our movements.

103. Passing between the Eclipse Islands and Troughton Island, I was able to (approximately) define on the chart the Western edge of the extensive reef which connects Jones Island with the Eclipse group.

104. Two vessels, the "Ernst" and the "Pioneer," were at anchor off the Western side of Jones Island, loading guano. Two others, the "Sulietilma" and the "Hugo," had loaded and sailed for Hamburg. The total quantity of guano shipped by the four vessels was about six thousand tons. A portion of the dead surface guano only had been taken away. Beneath was a layer of hard guano, and beneath that again a softer layer. Jones, Stewart, and Leseur Islands (in the neighborhood of Cape Londonderry) have been, I understand, rented by Mr. Beaver, of Melbourne, and his enterprise deserves to succeed. About forty Chinese were employed on Jones Island. A copy of the regulations relating to working hours was placed in a conspicuous position; and the work appeared to be done systematically. The guano is packed in sacks and conveyed by tramway to the jetty, where it is put on board by the ship's boats, the bags being emptied and returned to the shore to be refilled. The boats can only cross the reef about the time of high water,—which causes some delay in loading. A small schooner, the "Black Hawk," with a crew of Kanakas (Lord Howe Islanders), kept up communication between Jones Island and Port Darwin.

105. It is not improbable that other guano islands exist on the North-West Coast between King Sound and Cambridge Gulf. This dead guano, unless one has seen it before, is difficult to detect, and might easily be mistaken for ordinary earth.

106. We were informed at Jones Island that a watering party from one of the vessels had found among the grass a few yards from high-water mark, under Cape Bougainville, a small brass cannon apparently of ancient construction. The Master of the "Hugo" obtained this interesting piece of ordnance, and it will probably be presented to a German instead of to a Colonial Museum.

107. The wreck of a small vessel supposed to be the "Swan" had been found by the "Black Hawk" on the coast reef off Cape Londonderry abreast of Stewart Island. Assuming it to be the wreck of the "Swan," the unfortunate master, Mr. Isaac Doust, must have made a voyage of about three hundred miles in his dingy to the mouth of King Sound before being murdered by his native crew.

108. From Jones Island the vessel stood into the bay which lies close Southward of Cape Talbot, with a view of ascertaining if any river of importance fell into it. Sir George Grey had conjectured that the Northern watershed of the (since called) Leopold Ranges was drained by a river which fell into the sea somewhere between the Prince Regent River and Cambridge Gulf.

109. As no river of importance discharges either into Admiralty Gulf or Vansittart Bay, the only probable site left unexamined was the bay under Cape Talbot.

110. Commander P. P. King had neither entered nor named this splendid sheet of water; it was, therefore, named "Napier Broome Bay," in compliment to His Excellency Sir Frederick Napier Broome, K.C.M.G., Governor of Western Australia.

111. Napier Broome Bay was ascertained (approximately) to be about twenty miles long and fifteen miles wide. The Sir Graham Moore and Mary Islands lie at the mouth of the bay, and around its shores are four coves, each of them, apparently, a harbor. Two groups of islands lie towards the eastern and western sides of the bay, near its mouth, distant about five miles south-east and south-west, respectively, from the south (largest) Sir Graham Moore Island. The shores of the bay are chiefly low and wooded, the western being formed by a long narrow peninsula, distant about three miles across from Vansittart Bay. No stream of importance was found by us to discharge into the bay; but there are several minor streams. I believe that a closer examination than we were able to make, may ascertain the existence of a river on the eastern shore of Napier Broome Bay, between Cape Talbot and Sir Frederick Hills. The shores are well grassed in places, and suitable for cattle, which could be easily shipped. At the head of the bay, a background of hills with flat tops forms an amphitheatre, a conspicuous conical peak marking the western extreme of the range. Judging by the numbers of bush fires, the shores must be thickly populated. At present (1884) the blacks appear to be fierce and intractable, and decline all offers of friendship. The schooner "Ivy," commanded by Captain Moon (formerly of the mail steamer "Otway"), anchored in Napier Broome Bay, during our visit. From Captain Moon I learnt that in Admiralty Gulf a party, consisting of Messrs. O'Grady, Captain Moon, and the mate of the "Ivy," had been attacked by the natives. By breaking off the branches of trees and placing them suggestively on the ground, they had persuaded the blacks to sit down with their spears beside them, and they subsequently gave them sugar and damper (which were tasted but not eaten).

112. The natives appeared to be quite friendly; but without warning they sprang up and hurled their spears, one of which struck the mate in the holster of his pistol, and broke short off without injuring him. No lives were lost on either side; but the treachery of these savages was exemplified.

113. On the shores of Napier Broome Bay, also, the natives came down and seized a boat from the "Ivy," employed watering at the head of the bay. They jumped into the boat and threw the gear about, yelling and gesticulating, but were unable to manipulate the oars. Finally, on hearing the report of firearms, they fled into a large canoe, about 18 or 20 feet long, and crossed over to the other side of the cove. This canoe must, from its size, have been obtained from the Malays. Tree canoes are not constructed by the natives of the northern coast of Australia, westward of Port Essington, although a few small birch bark canoes are in use at Port Darwin.

114. In the neighborhood of Napier Broome Bay the number of flat or table-topped hills is remarkable: Mount Casuarina; Sir Frederick Hills (at the head of Napier Broome Bay); Sir Graham Moore Islands (at the mouth of Napier Broome Bay); Eclipse Hill (the summit of the Western and highest Eclipse Island); Bougainville Peninsula (three flat ridges, forming the Western shore of Vansittart Bay); and in the offing Cassini, Condillac, Descartes, and Corneille Islands are each flat-topped, and interesting from a geological point of view.

115. I shot the largest water-snake I have ever seen, at the mouth of Napier Broome Bay. It was estimated to be about 15 feet long and two feet round, of a light yellow color. Owing to delay in lowering the boat, the tide carried this fine specimen away. Some beautiful ribbon-like jointed Medusæ were also seen here for the first time. Curious looking crabs and other animals were taken in the trammel net on Sir Graham Moore Island. A professional naturalist would, I believe, find much to reward him between King Sound and Cambridge Gulf—in my opinion the most interesting portion of this Colony.

116. Some large pearl shells were found on the shores of Vansittart Bay, and with a cheap supply of labor (such as should one day be obtained from the thickly populated adjoining shores), these waters will probably furnish lucrative pearling grounds. The only drawback, apparently, is the muddiness of the water. The deeper off-lying banks would require to be worked with diving dresses, but a diving apparatus is now made, I believe, which permits a diver to work freely at 35 fathoms.

117. Another industry (which should hardly be second to the Pearl Shell Fishery as a profitable speculation) in my opinion has not hitherto received the attention it deserves in this Colony. I allude to the Bêche-de-mer or Trepang fisheries. The reefs in this neighborhood (Napier Broome Bay to Admiralty Gulf) abound with the sea-slug.

118. As Your Excellency is aware, there are many varieties of trepang; we found on the reef surrounding Jones Island, three species, namely, the red, black, and thorny. The red furnished an excellent soup.

119. The very extensive "Banc des Holothuries" (a name given by Commodore Baudin during the French examination of this portion of the coast, in 1801) indicates by name its resources as a trepang fishery (trepang being a species of Holothuria). At the beginning of the present century a fleet of Malay proas annually visited this portion of the North-West Coast to obtain Bêche-de-mer. Of late years they have fished for trepang chiefly along the shores of the Northern territory of South Australia, eastward of Port Essington.

120. The authorities of the Northern territory have, recently, rigidly enforced the Pearl Shell and Trepang Fisheries Regulations. A fee of five pounds is paid by each boat of two tons burden and under, and ten shillings for every additional ton or part thereof up to fifty tons. The Malay proas have endeavored to evade the Regulations, and as a consequence their cargoes have been confiscated. It is not improbable, therefore, that as the South Australian authorities are so vigilant in compelling the Malays to comply with the Regulations, the proas may again revert to West Australian waters for trepang fishing.

121. To develop this industry a plentiful supply of cheap labor would be requisite, and the neighboring shores could apparently meet the demand if the natives were employed and treated with the consideration which I believe to be the rule in the pearling industry. Jones Island would be a good site on which to erect the drying houses until the extensive adjoining reefs had been worked out.

122. On the Queensland coast, the Great Barrier Reef has, I am informed, been nearly exhausted of bêche-de-mer. During the season from three hundred to four hundred tons was an ordinary take on the Barrier Reef. One vessel alone took forty tons, and sold it in Cooktown (where there is a considerable Chinese population) for £95 a ton.

123. The value of this dormant industry if developed to Western Australia will therefore be apparent.

124. I desire to bring to Your Excellency's notice that, in my opinion, Port Darwin, and not Fremantle, should be the base from which a hydrographical survey of the extreme northern portion of this Colony should be made.

125. The Government of the Northern Territory of South Australia desire, I understand, to have their coast surveyed (if the Admiralty will consent) by an Admiralty Surveyor, who would have at his disposal during the out-door season the Government steamer "Palmerston."

126. It would, I believe, be very advantageous to this Colony if some arrangement could be made with the Admiralty and the Government of South Australia for placing the "Palmerston" (by sharing a portion of her expenses) at the disposal of the officer conducting the Admiralty Survey during the examination of the northern waters of this Colony.

127. Port Darwin possesses great natural advantages as a harbor and base for surveying operations. Three lines of ocean-going steamships call there, namely, the "Australian," "China," and "Australia, China, Japan, and Straits Settlements" Companies' vessels. Steam launches can be hired there. A supply of coal is always on hand now that the hulk has been brought thither from Thursday Island (Torres Strait).

128. Apart from its accessibility to ocean-going vessels of the largest draught, the shores of Port Darwin in the vicinity of Palmerston seem specially adapted as the site of a large town. The projections of the coast are admirably suited for the erection of lighthouses and forts upon them. A railway is to be constructed for about one hundred and fifty miles to Pine Creek, at a cost of about a million sterling (the money has been voted), to develop the mineral country and form the northern section of the trans-continental railway. A jetty is to be built at a cost of about £50,000, which will enable vessels of the heaviest draught to lie alongside and load or discharge cargo at all states of the tide. A natural site exists for a dry dock, which is to be utilised.

129. With these material advantages there can hardly be any reasonable doubt that Port Darwin cannot fail to become the dominant port of Northern Australia. But increased prosperity to Port Darwin should also facilitate the settlement of the shores of Cambridge Gulf.

130. From the Honorable Langdon Parsons, the Government Resident in the Northern Territory, I received the greatest courtesy, and was supplied by him with valuable information. I fully share Mr. Parsons' conviction as to the great future before the Northern portion of Australia, and the commanding natural position of Port Darwin as a harbor and seat of Government.

131. Having returned to Port Darwin from Cambridge Gulf on the 13th of October, I embarked per first opportunity on the 16th in the steamship "Naples" bound southward via Torres Strait, as the most expeditious route for returning to head quarters.

132. I was unable to land at Cooktown or Townsville. At Brisbane, and Sydney, however, I found great interest was taken as to the future of Cambridge Gulf.

133. Three days after sailing from Port Darwin I was again attacked by fever, but regained my health as we reached a cooler climate.

134. I am greatly indebted to Captain Thom, commander of the "Naples," for his extreme kindness to me during my illness.

135. The captain, officers, and crew of the "Cushie Doo" on all occasions cheerfully assisted me in my work.

136. Duplicate tracings of the Surveys made during the past out-door season, together with detailed sailing directions for local use, are in hand, and will be furnished in due course.

137. Attached are portions of the Published Charts to illustrate the positions of places visited and examined; also of the probable townsites in Cambridge Gulf.

J. E. COGHLAN,
Staff Commander, R.N.,
In charge of Admiralty Survey.

31-12-84.