



## The Baudin Expedition to Australia 1800-1804

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In 1800, Nicolas Baudin was ordered by Napoleon Bonaparte to lead a scientific expedition to explore Australia, the expedition included about 20 scientists from a number of disciplines. With much risk and effort, and at the cost of deaths and injuries and a number of desertions, the resulting collection was exceptional. Concerning hydrography and cartography, the Baudin expedition covered the enormous area of the unexplored western and southern coasts of Australia, reaching as far as Sydney. The methods of Beautemps-Beaupré were strictly adhered to. Baudin died of tuberculosis and exhaustion, on the Ile de France (Mauritius), on September 16, 1803, during the journey home.

*"I haven't learnt the sea at school, nor the natural sciences in laboratories. I have crossed the oceans on merchant ships, and I have picked up plants in the Americas and New-Holland myself." Nicolas Baudin*

### Glance at the Life of an Unrecognised Navigator

#### The Political Context

On 19 October 1800, two ships of the French navy, *Geographe* and *Naturaliste*, left from Le Havre, for a long scientific voyage, which led them to explore a great part of the Australian coast. Curiously, the chief of this expedition is only recognised in France by a few specialists, while he is quite well-known in Australia, where his place in Australian history is taught in schools. The recent publication of his journal, but so far not printed in France, and the anniversary of his departure, provide a good reason to recall the numerous episodes of a voyage full of difficulties and dramatic events, but which brought back many discoveries in various scientific disciplines.

Many voyages of exploration were organised during the second half of the XVIII century, both by France and England, the most famous ones being those of Cook, Bougainville, Lapérouse, and D'Entrecasteaux. In 1792 – 1793, D'Entrecasteaux had explored, the western part of the southern coast of New Holland (Australia), from Cape Leeuwin to Cape Adieu, and then the channel named after him in the southern part of Van Diemen's Land (Tasmania). The geography of the Pacific Ocean, at the time mostly unexplored, owes those navigators a great deal. In France, revolution and external wars had halted all expeditions. It was up to a navigator, Nicolas Baudin, recently appointed Captain in the Navy of the Republic (5 August 1798), to propose to the Minister, an ambitious programme of exploration in the Pacific. The government of the day, called the Directoire, had other matters to deal with, and although the project was supported by the naturalists Jussieu

and Lacépède, it did not obtain the necessary budget. The arrival of Bonaparte brought new conditions, and on 7 March 1800 Baudin presented, a new, and even more ambitious, project centred on research in the Natural Sciences. With a delegation of members of the Institute, Baudin met the First Consul Napoléon Bonaparte, and the Minister of Marine, Forfait, at the Palace of Tuileries. Putting forward his experience in the Pacific and Indian Oceans, the Cape of Good Hope and in the West Indies, he explained to Bonaparte the national need for France to catch up and to further its scientific domains, particularly in the natural sciences. Bonaparte accepted the idea of the proposed expedition to New Holland (Australia), but reduced it greatly in size.

Based on the knowledge of the English and of d'Entrecasteaux, the Minister of Marine, Forfait, defined as the objective for Baudin the detailed coverage of south-eastern, western, and northern coasts of New Holland. Taking into account the weather conditions, he advised him to start with the south, and not to delay after the end of June. After the failures of Cook and Vancouver to find a north-west route to the Far-East, and the difficulties the monsoon imposed on navigators reaching China, there was an interest in using the route around the south of Australia to go to Canton. This is why the south of New Holland, and Van Diemen's Land, where Baudin was sent to explore, was so important. This is also why, at the arrival of the *Geographe* in Port Jackson (Sydney) (20 June 1802), François Peron, the geologist of the expedition, wrote to the Marine Minister to inform him about the English colony and about the natural defences of Port Jackson, "the nicest port of the world".

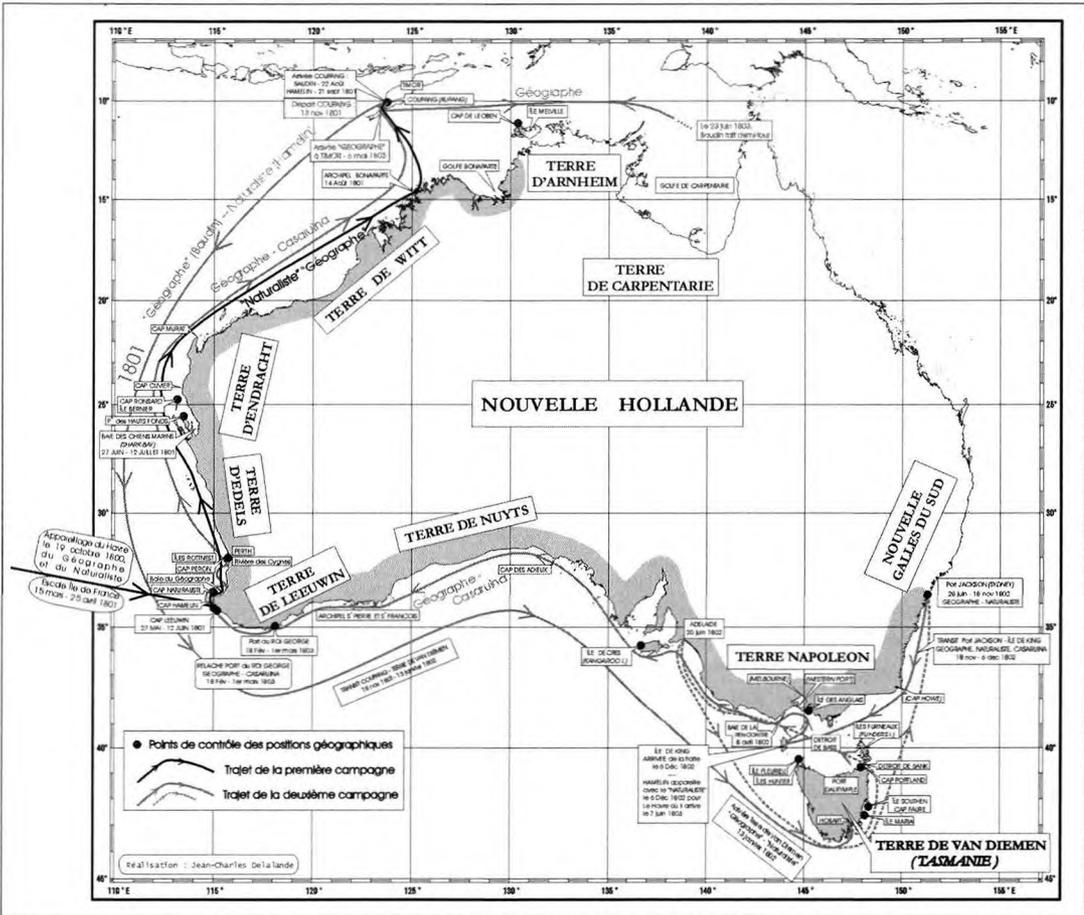
#### Who Was Nicolas Baudin?

Born on 19 February 1754<sup>1</sup> in St-Martin-de-Ré on the Ile de Ré, in a family of merchants, he had not had a straightforward career. He first volunteered on a royal ship in 1775, in which he sailed to the Indian Ocean and to Pondichery, where he joined the French India Company's Regiment. Back in France the following year, he became an auxiliary officer in the Royal Navy at the beginning of the American war, but only succeeded in getting into the corps of naval officers in 1786 from which he resigned immediately to go to Louisiana, where he chartered a ship to go to Ile de France. During a call at Cape of Good Hope, at the beginning of 1787, Baudin met Franz Boos, chief gardener of the Emperor Joseph II of Austria, who was looking for exotic plants for the gardens of Schönbrunn, and he took him along to Ile de France, where they both met and became friends with the botanist Céré. From that time, Baudin showed an interest in that science. After a short journey to Mozambique for slave trading, he left Port Louis in December 1787 to go to Trieste in order to take the specimens collected by Boos, and he sailed under the Austrian flag. In 1789, he became the commander of *la Jardinière*, which was assigned to plant collecting in the Far-East. Shipwrecked in the Mariannas Islands, in the Pacific Ocean, he came back to Europe on a Spanish ship, and was appointed a captain in the Austrian navy. He then left again aboard a new *Jardinière* to collect plants in the Indian Ocean.

#### New-Holland (Australia) in 1800

What was known of Australia in 1800? In the first half of the XVII century, the Dutch had seen, generally from a distance, the north, north-west, west and south-west coasts of Australia, and had given them the names of the discoverers: Arnheim, Witt, Endracht, Edels, Leeuwin and Nuys. Nuys, had gone far to the east along the south coast, had concluded that Australia was a part of the southern continent. In 1642, the governor of Dutch Indies, Van Diemen, sent his agent Abel Tasman to make a reconnaissance. Passing south of Van Diemen's Land (Tasmania) and New Zealand, Tasman confirmed that Australia was indeed an island. In 1600, the Spanish Torres had shown that Australia and New-Guinea were separated by a strait. James Cook discovered the eastern coast in 1770, and the penal colony at Port Jackson (Sydney) was established in 1788. D'Entrecasteaux, at the end of 1792, explored the western part of Australia, from Cape Leeuwin to Cape Adieu (Nuys Land). The first circumnavigation of Van Diemen's Land (Tasmania) was achieved by Flinders and Bass, between 7 October 1798 and 12 January 1799.

<sup>1</sup>In some texts referred to as 17 February 1754)



Map of New Holland showing the voyages of Geographe, Naturaliste and Casuarina

After reaching the eastern coasts of New Holland, he returned to the Persian Gulf and was wrecked again near Cape of Good Hope. Back in France in 1795, he contacted the Natural History Museum and proposed to Admiral Truguet, Marine Minister, various projects for scientific expeditions. In September 1795, he left for the West Indies for a botanical voyage, and was wrecked on the Canary Islands, but came back in 1797 with an important collection of plants for which he was congratulated by the scientists of the Museum.

**A Carefully Prepared Expedition**

Such an expedition had to be carefully prepared. The Institute of France, recently created to replace the former academies, abolished by the replaced government (la Convention), played a predominant role by forming a special commission of experts: Lacépède, Jussieu, Laplace, Cuvier, Bougainville, Fleurieu, Bernardin-de-st-Pierre, and some others less famous. It was the first time in the history of discovery that such a panel of scientists had contributed to the preparation of the instructions given to the leader of an expedition. Another novelty was the importance given to the anthropologic questions. In the move to create new scientific committees the Society of the Observers of Man was born, which had for objectives the establishment of a programme for the young ethnographers for observation and drawing of the people met during the expeditions. To achieve a complex programme involving a variety of sciences, required the provision of robust ships and a carefully selected team. Concerning the ships, the choice was made on two corvettes, the *Galathée* and *la Menaçante*, which were quickly renamed the *Géographe* and the *Naturaliste*, in keeping with the purely scientific purpose of the mission. The ships were of recent construction, with a double bottom in copper, and of

1,000 tons burden, but were different in performance, the *Géographe* being faster than the *Naturaliste*, which became a problem during long-distance transits and in conducting hydrography. Taken into account the experience of previous voyages, both ships were modified to provide the best conditions for the natural history collections. One of the collections was already reserved to the wife of the First Consul, with the aim of enriching her park of Malmaison. Supplies of all kind, such as food and equipment, as noted in the journal of Commandant Baudin were also carefully chosen. The outfit of equipment was as complete as required by the techniques of this period, and even included a still to de-salinate sea-water to make it drinkable.

Was the choice of Captain Baudin judicious to lead such a long expedition? He certainly was the initiator of the project, and it was difficult to then deny him the command, but his background was a psychological handicap for his subordinates. Self educated, an amateur naturalist, he had considerable sailing experience, but having just re-joined the French Navy, he was still considered a newcomer, and nowhere in any such corps could this kind of promotion be appreciated. Baudin had belonged only for a brief time to the Royal Navy and most of his career had been achieved under a foreign flag, and for most of it the enemy's flag. He would have needed a lot a diplomacy to have himself accepted by his subordinates. Unfortunately, he was totally lacking of this quality. All witnesses agree, his personality was dictatorial, cold, and vindictive. The officers, the crew, and the scientists, all criticised his stubbornness, his lack of compassion towards the suffering of the crew, his indifference to hygienic precautions, and with the aim of completion of a big scientific project under high pressure. The young astronomer Pierre Bernier, wrote about him: 'serious, and solitary, he repulsed everybody with his brusque and rude manners'.

The captain of the *Naturaliste*, Emmanuel Hamelin, was on the contrary, a pleasant character, and was able to impose on board an atmosphere of order, discipline, and even fraternity, which was quite in contrast with the ill feeling aboard the *Géographe*.

The officers, and crew had been chosen with extreme care (the young H. Bougainville, (the son of the circum navigator) just graduated from the Polytechnic School was an example). It was the same for all the civil scientists, among whom were two astronomers, two geographers, one naval engineer, five zoologists (among whom François Péron, zoologist and doctor, student of Cuvier), three botanists, and three draughtsmen. From this staff of about 60 people for the two vessels were some outstanding names: the brothers Louis and Henri de Freycinet, the mineralogist J.C. Bailly, the astronomer P.F. Bernier, who died at sea, the naval cadet H. Bougainville, the geographer Ch.P. Boulanger, the geographer X. Faure, the botanist Cl. Leschenault, the natural history painter Ch. Lesueur, the zoologist and doctor François Péron, and the naval engineer F. Ronsard.

In this era, members of past great expeditions, were selected to become the best of French Hydrography: this was the case of J.F. Hamelin who became director of the 'Dépôt General de la Marine', of Hyacinthe de Bougainville who led his own world navigation, of the Freycinet brothers who pursued great careers.

### **Chronicle of a Journey to Hell**

18 October 1800

Le Havre *Géographe* (Post Captain Baudin) and of *Naturaliste* (Captain Hamelin).get under way.

2-13 November 1800

Call of 11 days at Santa Cruz of Teneriffe.

12 December 1800

Passing the Equator at 22.5° West longitude (from Paris).

The optimum sailing route to the Indian Ocean makes an equator crossing closer to Brazil, between

30 and 33° West. The route chosen by Baudin caused him to lose about a month and a half compared to a typical journey of that time, from le Havre to Ile de France (Mauritius).

Note: Baudin had reported an 'island of sand', dangerous for navigation, located by the Tropic of Cancer, at around 20° longitude.

3 February 1801

Doubling Cape of Good Hope.

15 March 1801

Arrival at Ile de France, 122 days after departure from Le Havre.

The delay taken in the journey from Le Havre to Mauritius greatly contributed to the deterioration of the morale on board, which resulted in the disembarkation of ten scientists (the young astronomer Bissy, replaced by Bernier, two zoologists, two botanists, two gardeners and three draftsmen and painters), and the desertion of 21 crew. All were very unhappy, and some were sent to the hospital and were unable to continue the voyage.

The warehouses of the colony were empty. The war against England which started in 1793, had disrupted the links with the main land. The uncooperative local authorities forced the expedition to use the services of Danish captains present at the port for the provisioning. On departure on 25 April 1801, the ships have a bad local beverage instead of wine, and spoiled goods. Fresh bread, wine and fresh meat were then just a memory.

25 April 1801

Getting under way from Ile de France.

The expedition left Ile de France with a bad atmosphere on board, and the fact that Baudin kept secret his plans for the following leg of the journey made it even worse. The crossing of the Indian Ocean was done without incident and fairly rapidly, and both ships arrived in view of the New Holland coasts, near Cape Leeuwin at the southwestern extremity of Australia, on 25 May.

27 May 1801

The *Géographe* and the *Naturaliste* arrive at Cape Leeuwin, seven months after departure from France, and not at Van Diemen's Land, as instructed originally. Baudin found the season too late to be able to follow the instructions of the programme, and decided to initially start the hydrography on the north-west coast. He sails northwards.

30 May 1801

*Géographe* and the *Naturaliste* at anchor north of Cape Leeuwin, in a bay to which Baudin has given

### **The Western Coasts of Australia: Beautemps-Beaupré and Flinders**

The French predecessor of Nicolas Baudin on the western coasts of Australia in 1792 was D'Entrecasteaux, who recognized the western part of Australia, from Cape Leeuwin to Cape Adieu (Nuyts Land). Baudin was the first, in 1801 and later in 1803, to exactly position Cape Leeuwin.

Matthew Flinders (*A voyage to Terra Australis*) gave credit to Beautemps-Beaupré for the drawing of this part of this coastline: "the tracing of the coastline from Cape Leeuwin to longitude 132° (Cape Adieu) was so well drawn, and the maps were so detailed, that there was not much left for the following visitors to discover".

However, the mistake of Beautemps-Beaupré in confusing Cape Beaufort for Cape Leeuwin in bad weather should to be noted. The coordinates given by Beautemps-Beaupré of Cape Leeuwin were 34°25'50"S, 115°35'14"E (Greenwich) while the exact coordinates are: 34°22'S and 115°08'E, giving a difference of 3'50" in latitude and 27' in longitude.

the name of his ship. He ordered the survey of the bay and sent ashore a party of naturalists 'to observe the countryside and try to communicate with the savages'. In fact, they encountered a group of yelling and excited natives, waving their spears, quite different from what was expected from the theories of Rousseau. The Frenchmen's calm avoids any problem and allows them to make their first observations on the way of life of the natives of Australia. During this experience, a strong westerly wind, announcing the coming of the bad season, drove *Géographe*'s long boat ashore and damaged it, beyond repair. Hamelin, conscious of the danger, returned to his long-boat to get some help, but it took more than 24 hours of exhausting rowing to finally reach his ship. The 25 men stranded on land were able to rejoin their ship three days later. Vasse from the *Naturaliste* drowned during this phase. This incident was the first serious setback. The cause was the very bad weather. During all this period of work in the Geographe Bay, the sailors were astonished by the abundance of fish and whales.

9 June 1801

*Géographe* and *Naturaliste* (losing 2 anchors) depart from the Géographe Bay. Both ships leave during bad weather. They lose each other during the storm. *Naturaliste* goes to Rottneest Island, which was the first pre-arranged meeting spot decided upon in such a case, *Géographe* passed the islands during bad weather on 18 June, 1801. Baudin continues northwards, towards the Shark Bay, assuming that Hamelin must have gone to the second meeting spot. He gives up any visit to Rottneest Island and the exploration of the Swan River to go directly to the Shark Bay, where he stays from 27 June to 12 July, and conducts detailed exploration and a hydrographic survey. The bay is full of sea-snakes and whales ; the islands are populated with kangaroos. With no news from *Naturaliste*, Baudin leaves the Shark Bay on 12 July 1801, going along the de Witt's Land (discovered by Guillaume de Witt in 1616, 1623, or 1628, and visited by Dampier in 1699), of which he does a quick reconnaissance, before getting into the Bonaparte Archipelago, which is full of reefs and completely sterile, on 14 August 1801, four months after departure from Ile de France. Deprivations of the crew, shortage of water (impossible to get since the loss of the long-boat), numerous cases of scurvy amongst the crew, and the still missing *Naturaliste*, push Baudin to leave for Timor, which was the third meeting spot planned in case of separation.

22 August 1801

Arrival of *Géographe* at Coupang (Kupang, Timor).

9 June 1801

A backward glance towards the *Naturaliste* Account.

Meanwhile *Naturaliste* finally got away from Géographe Bay, and reaches Rottneest Island, makes a hydrographic survey and recognises the Swan River, the site of the present day city of Perth. During an expedition on shore for exploration and provisioning, the long-boats are damaged in separate incidents, and are absent for three days. No source of water can be found on land. *Géographe* is seen going away, so Hamelin decides to leave for the Shark Bay which he reaches on July 16, four days after the departure of Baudin. While the hydrographic survey is performed, the naturalists collect a great number of plants, flowers, fruits, seeds, birds, shells, and various animals. In the north of the Péron Peninsula, the group ashore is attacked by about thirty natives, who are scared by just a gun shot in the air. Also to be noted is the testing of sea-water distillation through a still, a solution so far neglected. Hamelin decides to go to Timor, where he arrives on 21 September.

21 September 1801

Hamelin arrives in Coupang, where he finds Baudin who has been there since August 22. The stay in Timor, in the Dutch part of the island, lasts until November 13. The naturalists were able to continue their collections of birds, insects, reptiles, and shells. However, scientists as well as crew were affected by diseases. The cause of much disease were the living-conditions on board, the bad quality of food and water. Fevers, scurvy, caused by a lack of vitamins in the food, and dysentery, mostly experienced

on the *Géographe*. Two gardeners and two zoologists die, and Leschenault the botanist is so ill that he must be disembarked. The new long-boat of the *Géographe*, to replace the one lost, was built before departure.

12 November 1801

Commanders Baudin and Hamelin present their respects to the Dutch governor of Coupang before leaving.

13 November 1801

*Géographe* and the *Naturaliste* leave Timor on 13 November to go around New Holland by the west and the south, and without making any call, arrive in Tasmania, named at the time Van Diemen's Land. Seven bodies were buried at sea on passage.

### **New Holland and Van Diemen's Land: Beautemps-Beaupré, Flinders, and Baudin**

Dalrymple at the Hydrographic Office shows Matthew Flinders copies of the maps drawn by Beautemps-Beaupré in October 1796. Then, Flinders has copies of the hand-drawn maps of Beautemps-Beaupré during his expedition around New Holland (1801-1803), and especially for the southern coast of western Australia, which he surveyed early 1802, at the same time as Baudin. The latter gives him a map of Beautemps-Beaupré to which he gives credit to: 'the maps of the bays, ports, peninsulas, of the south-eastern end of the Van Diemen's Land, which have been drawn during this expedition (d'Entrecasteaux and Beautemps-Beaupré), seem to have a scientific accuracy and a detailed minutia, together with a high clarity. These maps constitute some of the best examples of hydrographic surveys ever taken in newly discovered areas.'

Note: Recall here the improper detention of Flinders on Ile de France (Mauritius) for 6 years and 178 days (16 December 1803-13 June 1810).

13 January 1802

Call on Van Diemen Land by *Géographe* and *Naturaliste*.

A few days later, both ships enter the d'Entrecasteaux Channel, which was discovered by d'Entrecasteaux on 1 May 1792, and which forms a large strait in the southern part of Van Diemen's Land. Important hydrographic work was undertaken in the vicinity, as well as investigations among the natives. The corvettes then proceed along the eastern coast, while Boulanger and Midshipman Maurouard, from the *Géographe*, on 6 March are ordered, to take a boat (cutter) to go north to make a reconnaissance, and return to the *Géographe* every night. They lose contact with the ship during bad weather. An English brig finds them in Banks Strait, offers hospitality to Boulanger and Maurouard, and returns them to the *Naturaliste* on 10 March 1802. The *Géographe* has missed the rendezvous because of strong winds around the Furneaux Islands, and starts an exploration of the eastern part of the south coast of New Holland, which is renamed Terre Napoléon.

8 April 1802

Meeting of Baudin and Flinders.

On 8 April, 1802, while *Géographe* was in a bay south-east of the present city of Adelaïde, a ship appears on the horizon running up the English flag. It was Captain Flinders on board the *Investigator* who had left Europe in August 1801, and who had been in the Nuyts Land for three months. The bay is named Encounter Bay.

Early May, at the beginning of the bad weather season, the unsanitary state of the ship requires a pause. Half of the crew is incapacitated, and several have already been buried at sea. The spoiled

water is in very short supply: 'the biscuit is full of weevils, the salted goods are rotten, with such an unbearable taste and smell that even the most starving ones are throwing their meal away, even in front of the commandant.'

8 May 1802

Decision of Baudin to visit to Port Jackson.

Because of the lack of drinking water, and of the spread of disease among the crew, Baudin gives the order to set courses for Port Jackson, not by the shortest way, but by the roughest route, around the south of Van Diemen's Land. Arriving off the entrance and with the help of a strong long-boat sent by the English governor, Baudin and the *Géographe* finally enter Port Jackson on 20 June 1802.

20 June 1802

Arrival of *Géographe* in Port Jackson.

For her part, *Naturaliste* has continued working on the east coast of Van Diemen's Land, and in the Bass Strait, surveying Port Dalrymple and Western Port, before going to Port Jackson for a first time to 'refresh', and a second time to make the rendez-vous with *Geographe* on 28 June 1802.

28 June 1802

Meeting of the *Géographe* and the *Naturaliste* at Port Jackson (Sydney).

*Géographe* and *Naturaliste* stay 5 months at Port Jackson, where the exhausted crews are very well treated by the English colony. Founded in 1788, a few days before the coming of Lapérouse, the town is already quite flourishing. While Bernier is establishing his observatory on land, the naturalists start their investigations, and Péron studies the process of colonisation. Taken into account the reduction of the crews due to death and diseases, Baudin decides to send *Naturaliste* back to France, and to replace her by a light schooner of 30 tons, called *Casuarina* [name of the tree, the timber from which the vessel was constructed], under construction locally. On board *Naturaliste* Hamelin takes back the collections of natural history, the maps, memoirs, and observations already completed, as well as three midshipmen for whom Post Captain Baudin had developed a strong dislike, and who nevertheless are promoted to officer grade on return to France.

18 November 1802

Port Jackson.

*Géographe*, *Casuarina*, and *Naturaliste* got underway with plans to rendez-vous on 6 December at King island (at the western end of the Bass Strait), from where *Naturaliste* left to go back to Le Havre, where she arrived on 7 June 1803. King Island appeared to the crews like a paradise, with water, vegetation, and animals (wombats, kangaroos, cassowaries, sea-lions). From then on, Sub-lieutenant Louis de

### Van Diemen's Land: Bass Strait

Before its discovery, very few people believed in the existence of the strait, the Bass Strait, between New Holland and Van Diemen's Land: The naval-surgeon George Bass, who left Port Jackson (Sydney) in a whale-boat in January 1797, explored the south coast of New South Wales, passed Cape Howe and then he encountered a strong south westerly swell, which left him in no doubt of the existence of a strait. In September 1798, Governor Hunter, dispatched Matthew Flinders, in command of the sloop 'Norfolk', with Bass also on board, and the first circum-navigation of Van Diemen's occurred between 7 October 1798 and 12 January 1799,. It was an occasion to name the estuary on the north coast, Port Dalrymple, and to verify the work of Beautemps-beaupré in the d'Entrecasteaux Channel, which is located at the entrance of the estuary of the Derwent River, where Matthew Flinders stayed in December 1798. Governor Hunter officially named the Bass Strait after this circumnavigation of Van Diemen's Land by Flinders.

Freycinet had command of the *Casuarina*. He is ordered to complete the hydrographic survey around the Hunter Islands, which he accomplishes extremely well (inspired by the chart of the Beautemps-Beaupré's Santa Cruz Islands, described in the appendices of his expedition report), but was a day late on the programme given by Baudin. From there, Freycinet will achieve alone a reconnaissance of the gulfs of the Terre Napoléon, on the south coast of Australia. After 26 days of waiting for the new long-boat to replace the one lost on the arrival at King Island, Baudin sailed from Kangaroo Island without having waited for Freycinet. Freycinet looked for his chief at the St-Pierre and St-François Islands, without success, and decided to go to King George Sound, where Baudin joins him five days later.

18 February 1803

Meeting between Freycinet (*Casuarina*) and Baudin (*Géographe*) at King George Sound. The mystical straits, located at the eastern end of the land discovered by Nuyts in 1627, have not been found.

1 March 1803

*Géographe* and *Casuarina* leave King George Sound to pass Cape Leeuwin and return up the western coast (Endracht Land and Witt Land) to sail to Timor, where *Géographe* arrives on 6 May 1803.

6 May 1803

Arrival of *Géographe* at Timor.

3 June 1803

Baudin is very tired at the arrival in Timor, and decides to rest for a month. *Géographe* and *Casuarina* sail on 3 June for the north coast of Australia towards the Torres straits.

5 June 1803

Bernier, the astronomer, dies of exhaustion. He was 24-years old. His body is buried at sea with general consternation.

23 June 1803

Baudin, reaches the Joseph Bonaparte Gulf; exhausted and ill, he decides to pack up and to sail for the Ile de France. The crew also is exhausted and lacking water.

27 August 1803

Arrival of Post Captain Baudin at Ile de France, where he dies on 16 September 1803.

16 September 1803

Death of Post Captain Baudin. He is buried with all the honours due to the rank he held in the navy.

28 September 1803

Arrival of *Casuarina* at Ile de France. Decommissioned, the crew is transferred to *Géographe*. Milius, who was the second in command of the *Naturaliste*, takes command of the *Géographe* (he was older than Freycinet) on 29 September 1803.

29 September 1803

Milius takes command of *Géographe*.

16 December 1803

*Géographe* gets under way. After a call at Cape of Good Hope, she arrives at Lorient on 25 March 1804.

25 March 1804

Arrival of the *Géographe* in Lorient, after a journey of 63,000 miles, and an expedition of 42 months.

## Hydrographic Surveys and Mapping

From a technical point of view, the hydrography of Baudin was directly inspired by Beautemps-Beaupré, from whom he obtained knowledge on the return of d'Entrecasteaux (1796). It is characterised by continuous astronomical navigation, as discussed in the 'methods for hydrographic survey and mapping' which were not published until 1808, in the appendices of the 'report on the voyage of the Admiral Bruny d'Entrecasteaux'. The running surveys are carried out, combining the astronomical and terrestrial observations with the reflecting circle, replacing the compass. The drawing of the coastlines between coastal

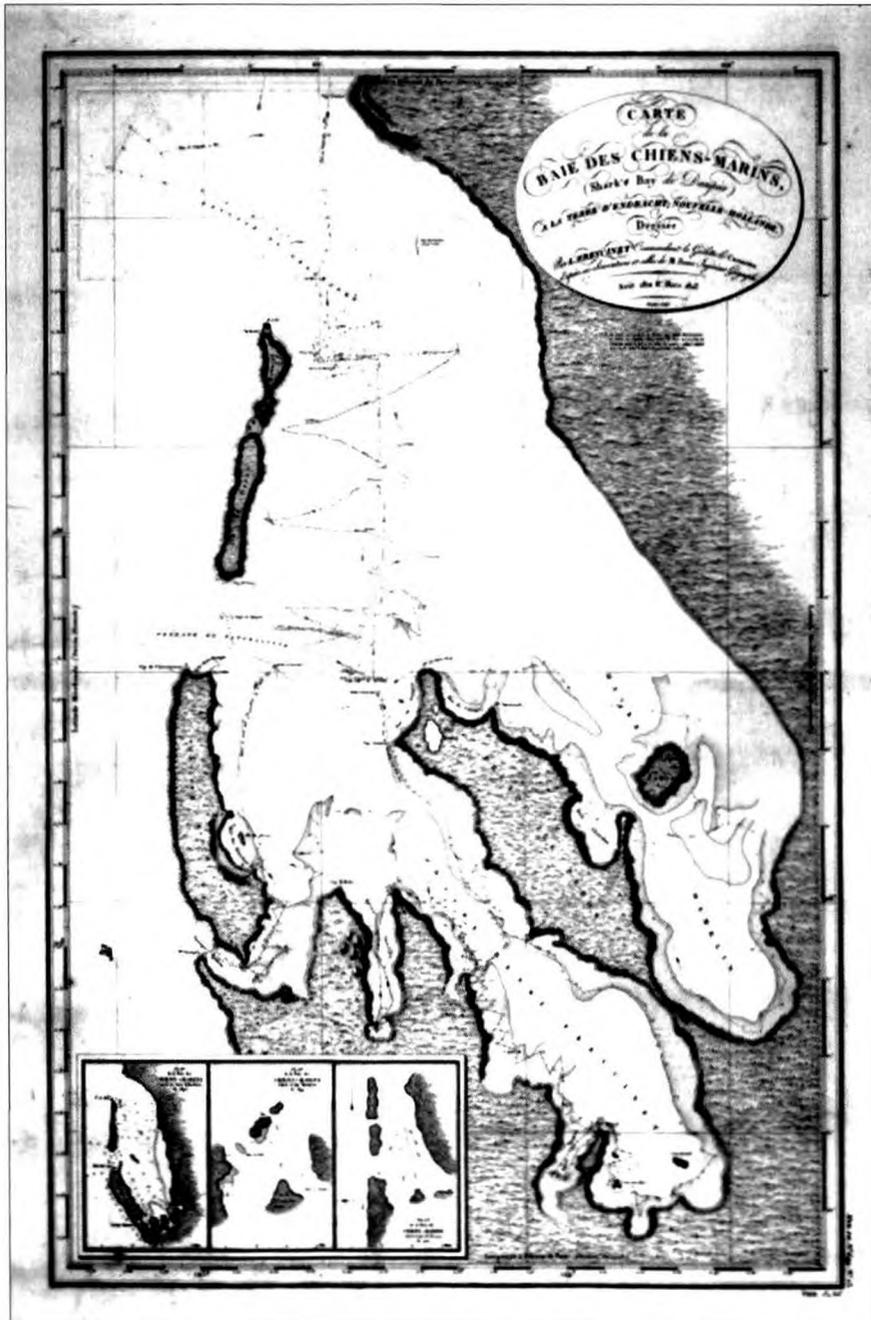


Chart of the Baie des Chiens-Marins, now called Shark Bay

stations, fixed by angular observations and the establishment of the map are performed at the same time.

Conforming to the teaching of Beautemps-Beaupré, the method of Baudin for the establishment of the map consisted of determining a maximum number of significant coastal points, during a first pass in front of an unknown coast. The astronomical observations and the terrestrial angular observations must be combined to succeed.

### **The Astronomical Observations**

Involves the determination of longitudes and latitudes.

The longitude was generally obtained (except for the method of observing eclipsing of the satellites of Jupiter) from the chronometers, rated on the origin meridian time (Greenwich or Paris), or from the method of the lunar distances. The sun-moon angular distance gives the longitude, by taking into account the differing rate of progression of the two from East to West in a zodiacal background. The average movement of the moon against the background of the stars being only half a degree per hour, while it is of 15 degrees for the sun. *The angular distance sun-moon can then be used to compare with the chronometer keeping in mind that the ratio of 30 (15°/0.5°) will reflect the accuracy on the measurement.* Otherwise, for a single observation of the angular distance sun-moon, with a precision of one minute, the longitude is calculated with a precision of 30 minutes. The lunar distances give the time in Paris at the instant of observation. The sun altitude gives the time at the point of observation. The method of lunar distances requires three simultaneous observations, (longitudes by the watches as Baudin says) ; the angular distance sun-moon, the altitude of the sun and the altitude of the moon. The treatment of the observations is done in four steps:

- a) Determination of the local time
- b) Correction of the lunar distance for the refraction effects and of the parallax, to bring the observation of the centre of the sun and moon to the centre of the Earth
- c) Calculation of the time of the origin meridian (Paris) from the lunar distance and the ephemerides
- d) Calculation of the longitude by difference between the local time and the time at the origin (Paris)

### **The Observations on Land**

Most of the observations made during the expedition of Baudin were from the ship. Taking into account the movement of the observer, the astronomical observations must be combined in time with the observations taken on land. Schematically, the daily observations are as follows: in the morning, when the sun is still not too high, are measured simultaneously, noting the time of the chronometers, the angular distance between the sun and an outstanding point of the coast (of which astronomical co-ordinates are already known), and the heights of the sun and of that particular point. The angular distance between the sun and the particular point cannot be directly applied, but the calculation of the azimuth, or bearing, of the sun at that time, the bearing of the particular point can be deducted, and then allows taking the bearings on the points aimed at. At the time of observation for the sun's altitude, the angular distance between all the special points of the coasts and the original salient reference point are simultaneously taken. The complete operation is repeated at least three times a day, one set of observation at midday.

The determination of the latitudes is performed at midday with the reflecting circle. The altitude of the sun must be taken at close regular intervals during the meridian passage, reading the time on the chronometers, and noting the culmination. The principle of the method of the equal altitudes is the same. The time of the sun's culmination is calculated with the average time of identical altitudes during the rising (8-10 am) and the descending sun (2-4 pm). The rates are indeed faster during these periods of the day, and the errors of the time are thus minimised.

The operations described above give knowledge of the latitude, during the passing of the meridian, and an evaluation of the longitude, by the time of the chronometer rated on the origin meridian (Paris), or rated on the local time determined with a point from which the lunar distances have been observed. The opti-

mal position to determine the latitudes was east-west from the concerned points, and to determine the longitude was north-south from those points.

### The Ephemerides

For the calculations of longitudes by lunar distances, the Nautical Almanac had published from 1760 onwards the distances moon-sun and moon-selected zodiacal stars every three hours for the whole year. Using the method of Clairault (1750, improved by La Caille in 1765) the astronomer Tobie Mayer de Göttingen had produced in 1753 tables of the movements of the moon, giving a precision greater than a degree for the measure of the longitude. The Nautical Almanac was itself producing tables of Maskelyne, suitable to the needs of sailors, to calculate the longitudes from lunar distances to the sun and to some stars. From 1767, the tables of Maskelyne, which were updated after the discovery of Laplace in 1786 concerning the secular acceleration of the moon, were also published in the 'Connaissance des Temps'. In the volume of the 'Connaissance des Temps' of time VIII (September 1799. 1800, covering the period 1800-1803 for the lunar table, it is written: calculations have generally been made with the most accurate tables found in the third edition of the Lalande Astronomy; the tables are from Lalande himself and for the others from Delambre: the lunar tables were from Mayer, corrected by Masson after the observations of Bradley; but Lalande had corrected the periods, the secular equation and the parallaxes. According to Delambre, the tables of Mayer had been published in London in 1787, and Lalande has brought some corrections in 1792. I have given in the Memoires of the Sciences Academy in 1786, the theory of the secular equation for the movement of the moon (Lalande).

For the calculations, the expedition of Baudin had: 'Modèles de calcul pour la longitude'; 'Tables horaires' of lunar distances from Lalande; the 'carte trigonométrique' from Jacques-Rémi Maingon (1797-1798) used to compensate the apparent distance sun-moon.

### The Instruments

For the work in astronomy, geodesy, topography and hydrography, the Baudin expedition had, among others, the following instruments: one astronomical clock, four chronometers, one counter, four compasses, two sextants, one astronomical angles, two graphometers. The Borda reflecting circle was the best for the astronomical angles, and particularly for the lunar distances (the wide angles were easy to measure), and for the meridian altitudes; it was also used for the angular measurements at sea, and then named hydrographic circle. The astronomical circle, also from Borda, was used on land operations for astronomy and geodesy ashore.

### The Results [Maps / Charts]

An atlas of 32 maps had been published in 1812, when the cartographic work of the Baudin expedition were compiled, with the title: 'Voyage de découvertes aux Terres Australes, exécuté par ordre de sa Majesté l'Empereur et Roi, sur les corvettes le *Géographe*, le *Naturaliste*, et la Goëlette le *Casuarina* pendant les années 1800, 1801, 1802, 1803, et 1804'.

The Atlas, part of the expedition report, is composed of only 32 maps, essentially done by Louis de Freycinet and Charles-Pierre Boulanger (hydrographer of the expedition), some were drawn by Pierre Faure (geographer of the *Naturaliste*), or the brother, Henri de Freycinet, and a few others with Pierre-François Bernier (astronomer) and Ronsard's (naval engineer officer) names on them. A surprising fact, is that the name of Nicolas Baudin, chief of the expedition, does not appear anywhere in the Atlas.

The maps have been established on the basis of four main astronomical stations: Ford Concordia in Timor (217 lunar distances); Bennelong Point at Port Jackson (186 lunar distances); Bernier Island at Shark Bay - (78 lunar distances); the observatory of Cape Delambre on Kangaroo Island (252 lunar distances). The lunar distances were not only used at stations ashore, but also at sea, as the interpolation mean to adjust the chronometers. The time angles from the chronometers have been observed regularly during the mornings and afternoons. Overall, the latitude and longitude determinations of the Baudin expedition are of the most accurate known at that time. To make some verifications, 16 sample points have been chosen on the maps of the expedition, which are also easily recognisable on present updated maps (see map

attached). For all the 16 points, the average errors and the average quadratic errors are respectively: for the latitudes  $\pm 1'.1$  and  $2'.2$  and for the longitudes  $\pm 5'.4$  and  $7'.2$ . For the 12 best determinations, which are 75 per cent of the determinations, the average errors and the average quadratic errors are respectively: for the latitudes  $\pm 1'.0$  and  $1'.3$  and for the longitudes  $\pm 2'.9$  and  $3'.6$ .

Notes: Space is lacking to talk about the observations of weather-oceanography: winds, currents, and tides, which they scrupulously observed during the entire voyage. It is the same for the water-depths measured during the passages and during the hydrographic surveys of particular areas. The names given by Louis de Freycinet in the Atlas are of the famous political and scientific personalities of that time, together with the names of the scientists and officers of the expedition. From the discoverer to the colonizer, the last one has the last word. However, the names still in use provide some record of the French involvement in western and southern Australia, as well as in Tasmania.

## **Conclusion**

The disrepute given to Commandant Baudin, by the crews of the *Géographe* and of the *Naturaliste*, has lowered the reputation of the expedition, which probably was, overall, the most exceptional of the end of the XVIII century. His name did not appear in the Atlas of the 'Voyage' published by Freycinet in 1812, and was only mentioned as 'under the commandment of the captain Baudin' in the edition of 'Voyage aux Terres Australes' of 1815. It is true that Baudin, who died of exhaustion and tuberculosis during the expedition, did not have the occasion to reply to the accusations against him. Old sailor, self taught, secret and jealous to guard his authority, he set the entire crews of the *Géographe* and of the *Naturaliste* against him, because of his inflexibility and lack of humanity, as soon as the ships got under way from Le Havre. Strongly attached to his mission along the deserted and inhospitable coasts of Australia, he imposed on his crew unbearable mental and physical pressure. His shifts of temper made him miss the three main rendez-vous planned between the *Géographe* and the *Naturaliste*. However, no matter what the loss in human life during the Baudin expedition (25 men, or 10 per cent) are far less than on the d'Entrecasteaux expedition (90 men, or 40 per cent of the total).

The difficulties encountered highlight the exceptional collection of specimens brought back by the expedition. With regard to the geography and cartography, it was the first expedition using the method of Beautemps-Beaupré (without him) over a coastline of 6,000 miles, from the south and the west of Port Jackson (Sydney) to Cape Van Diemen (Melville Island). The essential parts of the coasts of the large southern continent, in the southern and western part, were now mapped, with all the precision allowed at that time by the astronomy and the chronometers. The first ones to appreciate the work were the American whale hunters. All of the hydrographic and cartographic information was published in the Atlas of 32 maps of Louis de Freycinet of 1812. For the natural sciences, the enormous collection of 200,000 specimens, containing more than 23,000 specimens of botany, zoology, and mineralogy, which were brought to the National History Museum, was tremendous. For the botanists, 2,500 new species unknown in Europe had been collected (like the mimosa and the eucalyptus), which brought arguments between the orthodoxists like Cuvier and the evolutionists like Lamarck. Ethnology, a new science at the time, was enriched with precious information and collections concerning the natives of Australia and Tasmania.

## **Biographies**

Jean Bourgoïn, born in 1925, he enters the Polytechnic School in 1945, and graduates in 1947 to join the marine corps of hydrographers. At the beginning of his career, during about 12 years, he is sent on hydrographic surveys to France, North Africa, the French African colonies, central America. After, he becomes director of the main establishment in Brest (1976-1981), and then of the Hydrographic Office

(SHOM) in Paris. He has been involved in many scientific committees. He is member of the Naval Academy and commander of the Légion d'Honneur.

Etienne Taillemite, born in 1924. Archivist-paleographer (School of Chartes – 1944/1948). Keeper of the National Archives, in charge of the marine records. General Inspector of the Archives of France. Member of the Naval Academy. Etienne Taillemite is famous for his work on naval history and explorations, as well as for his inventories on marine and colonies. He has written several books on the naval history and the former French colonies (Bougainville at Tahiti, 1972; Tourvillet et Bévéziers, 1991; French sailors at world exploration: from Jacques Cartier to Dumont D'Urville).