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François Péron, Charles-Alexandre Lesueur and the first classification of Medusae

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François Péron (1775–1810) and Charles-Alexandre Lesueur (1778–1846) sailed with Captain Nicolas Baudin on the great French expedition to Australia from 1800 to 1804. The results of their work were published in 1807 (Péron, 1807), translated into English in 1809 and have been very well analyzed recently by Wallace (1984) with the remark: "Péron is a figure of equal importance to James Cook".

During and after the voyage Péron and Lesueur became pioneers in the study of Medusae. At the beginning of the nineteenth century, the jellyfishes were still a puzzle to scientists. Three species placed within the single genus *Medusa* without specific names but numbered as follows: *Medusa* 1286, *Medusa* 1287, *Medusa* 1288, were placed by Linnaeus (1746) among the Vermes. *Medusa* was placed among the molluscs by Bruguière (1791), and with the echinoderms by Cuvier (1817) and Lamarck (1816).

In 1799, Cuvier furthered the work of Réaumur (1710) and separated the genus *Rhizostome* using the shape and number of mouths as characters. This last character was used by Péron and Lesueur to produce their work and separate the groups of the one-mouthed medusae and many-mouthed medusae. The structure of the mouth was the only character used at that time. The work of Péron and Lesueur was the first to show the diversity of the medusae with a description of 122 species and 29 genera.

Their work was first read to the Academy of Sciences in 1808, and a table was published in the *Annales du Muséum* (Péron and Lesueur, 1810). It consisted of very specific descriptions which were made from the highly accurate Lesueur drawings. However, neither the drawings, except for the first 14 plates which were of some damaged animals (Lesueur, 1815), nor most of the manuscript notes of Péron were ever published. After the death of Péron in 1810, this immense work did not stand up to critical review by non-specialist scientists.

However, in 1980, some 170 years later, the text published in *Annales du Muséum d'Histoire naturelle*, Paris (Péron and Lesueur, 1809, 1810), the 96 plates painted by Lesueur and the 400-page unpublished manuscript prepared by Péron were finally brought together. Lesueur's plates and Péron's manuscript are deposited in the Muséum d'Histoire naturelle at Le Havre (France) with the reference numbers 70001 to 70062 and 68325 to 68839.

At the outset of the expedition neither Péron nor Lesueur were regarded as zoologists; Péron was enrolled as a medical doctor and Lesueur as an assistant gunner. As the jellyfishes were dominant in the catch in quantity, diversity, coloration and bioluminescence, they became attracted to them. However, since they were not special-

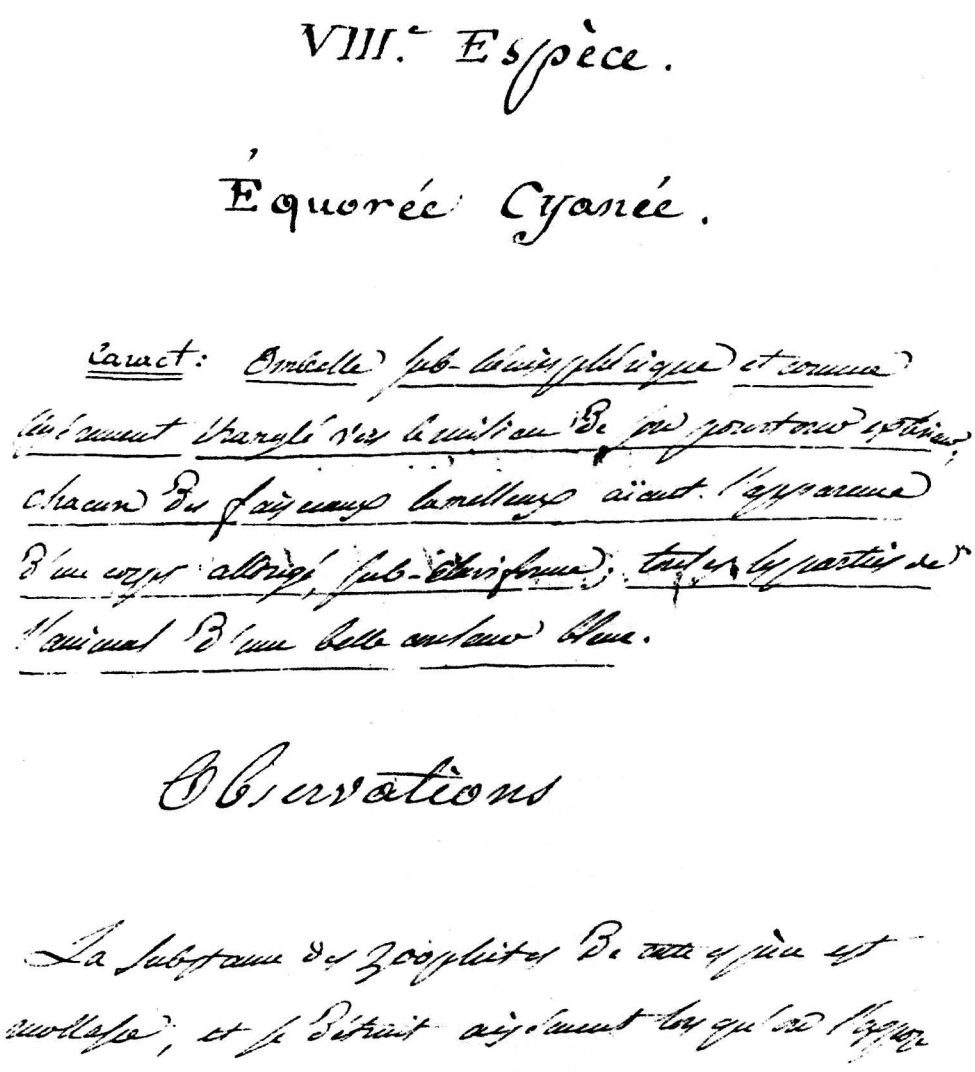

Figure 1. "Histoire du genre Equorée", in Histoire générale des Méduses, unpublished manuscript of Péron (folio 68384) deposited in the Museum of natural History at Le Havre (France).

ists they described everything caught, including damaged specimens. Because these damaged specimens appeared to be very simplified, lacking peduncle (manubrium), arms (lips very elongated) and tentacles, they were described as species placed low in the classification.

With great care, they described all the variations in shape and coloration because they failed to recognize the changes occurring during ontogeny (increases in the number of radial canals and tentacles) or the sexual variations of coloration (as in *Aequorea* and *Laodicea*). They also described as many species as the number of spec-

imens that they observed, hence the numerous synonyms they created (for example in *Chrysaora*) which later caused many nomenclatural difficulties and thus much criticism.

The first section of agastric medusae included some of the damaged specimens but also included some well-described genera, such as *Berenix euchroma* (= *Cuvieria carisochroma* Péron, 1807) and *Berenix thalassina* (= *Toxorchis thalassinus* (Péron and Lesueur, 1810)) in which the manubrium is barely visible (the same condition exists in *Aequorea*); *Geryonia dinema* (= *Eutima gracilis* (Forbes and Goodsir, 1853)) and *Geryonia hexaphylla* (= *Geryonia proboscidalis* (Forsskål, 1775)) in which the location of the stomach was clearly described by Péron and Lesueur as a false stomach at the tip of the peduncle.

The second section separated the one-mouthed forms from the multi-mouthed ones and almost corresponded to the present-day division between the Hydromedusae and the Scyphomedusae with a few exceptions: *Periphylla* and *Pelagia* were placed in the first group. *Obelia* was placed in the second group because ovaries were first described as stomachs, but in the unpublished manuscript Péron contradicted his table by repositioning the four ovaries in relation to the radial canals.

As far as the list of species is concerned, ignoring some of the ambiguities described above, there was a considerable amount of logic. The critical advances were as follows:

— All the Aequoreidae were placed in a large genus *Aequorea*.
— All the Narcomedusae were placed in the two closely-related genera of *Foveolia* and *Pegasia*.
— In the heterogeneous genus *Oceania*, the three species of Pandeidae were described in sequence, clearly showing that Péron and Lesueur understood their relationship.
— *Cyanea* and *Chrysaora* were placed together in a group that corresponds to the present Semeostomidae.
— Finally, all the Scyphomedusae were placed at the end of the table, reflecting their present position. Furthermore *Cephea* and *Rhizostoma* were placed in the same sub-section corresponding to the present-day Rhizostomidae.

The first conclusion is that this table only includes jellyfishes (while in the subsequent edition of the *Règne Animal*, the Ctenaria *Beroe* and the Thaliacea *Doliolum* were included in Acalèphes by Cuvier in 1830). In their table, Péron and Lesueur described 122 species, but only 70 were examined and drawn. Of all these species, once synonyms and species based on damaged specimens are eliminated, only 30 remain actually valid: eleven were attributed to Péron and Lesueur by Kramp (1961) (*Koellikerina fasciculata, Amphinema dinema, Cuvieria carisochroma, Toxorchis thalassinus, Eirene viridula, Zygocanna pleuronota, Zygocanna purpurea, Aglaura hemistoma, Pegantha dodecagona, Periphylla periphylla, Cyanea lamarcki*) to which a further seven should be added (*Leuckartiara octona, Eutima gracilis, Rhacostoma atlanticum, Zygocanna diploconus, Pegantha cyanostylis, Cunina proboscidea, Solmissus albescens*) (Goy, 1980; 1988). These eighteen species that were new to science constituted a major advance on previous knowledge.

But more observations were in the unpublished manuscript. For example, there were dates and places of capture, the temperature of sea water—data which Péron

used to propose the first concepts of marine ecology by comparing geographic distributions and seasonality of annual variation for different species in the two hemispheres. This was novel for scientists at that time. They also made notes on the physiology of nutrition, identified the location of the ovaries, described the ocellus (in *Leuckartiara*, the *Oceania pileata* of Péron and Lesueur), described the cnidophores (in *Zanclea*, the *Oceania microscopica* of Péron and Lesueur). Wound-healing and bioluminescence were noted for all species. The three parts of this work (published table, 96 paintings of Lesueur and the unpublished manuscript) were the first synopsis on the Medusae.

It is no longer possible to ignore the medusae described by Péron and Lesueur in the *Annales du Muséum* . . . in 1810 and the fourteen plates published by Lesueur in 1815. These publications were widely used throughout the nineteenth century as the illustrations were copied, modified and re-used by many authors without proper acknowledgement. They were the basis for accounts of the medusae in many leading zoological books of the nineteenth century, namely the *Règne Animal* by Cuvier (1817, 1830), the *Histoire des Animaux sans vertèbres* by Lamarck (1816), the *Manuel d'Actinologie* by Blainville (1834), the *Histoire naturelle des Zoophytes* by Lesson (1843) and the *Recherches anatomiques et zoologiques* by Edwards (1841). Such wide use is a great tribute to the scientific value of Péron and Lesueur's work.

Some of Lesueur's illustrations have been reproduced more recently in books concerned with scientific illustration (Tristan, 1986; Goy, 1986; Pinault, 1990) and in the special edition for the bicentenary of Australia (Goy, 1987). However, only the publication of Lesueur's paintings and the 400-page unpublished manuscript would demonstrate the place that these two authors should hold in the history of scientific knowledge of this complex zoological group. The importance of this work was recognized by Forbes (1848) and his statement that "an issue of the original plates would be a great boon to science" seems as appropriate now as it was when he wrote.

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