

Society, in which I have every confidence, takes any action in this matter, I have no wish to participate in the controversy, and have but little doubt that the simple publication in your columns of the enclosed correspondence, without any comment from me, will be quite sufficient to enable the readers of NATURE to form a correct opinion as to the manner in which my book has been made to serve the purposes of the Victoria Street Anti-Vivisection Society.

PERCY F. FRANKLAND.

University College, Dundee, July 15.

"The committee of the Victoria Street Anti-Vivisection Society have issued the following protest to the members of the Society for the Promotion of Christian Knowledge against a work recently published by that Society, and concerning which the Lord Chief Justice has written the letter appended:—

20, Victoria Street, London, S.W., July 1893.

Sir (or Madam),—The attention of the Committee of the above society has lately been drawn to a book issued by the Society for Promoting Christian Knowledge entitled "Our Secret Friends and Foes," the author of which, Dr. Percy Faraday Frankland, held a license last year as a practical vivisector.

My committee consider that the following extracts sufficiently show that the book is calculated to encourage the unjustifiable and demoralising practice of experimenting on living animals:—

"Nicolaier was the first to discover that certain bacilli, widely distributed in the superficial layers of soil, were capable when subcutaneously inoculated into mice, guinea-pigs, and rabbits, of setting up symptoms typical of tetanus from which they subsequently died." (Page 123.)

"Rabbits and guinea-pigs inoculated with some (spider's) web . . . died under particularly well-defined symptoms of tetanus." (Page 126.)

Again, with regard to the Pasteur methods, which, from their nature, must involve great torture of animals, we read:—

"Numerous investigators have succeeded in calling forth many of the symptoms of a disease by injecting the products of these organisms" (Page 140.)

On page 148 there is the following passage referring to the establishment of Pasteur Institutes:—

"Such institutions have been established in Russia, Hungary, Italy, Sicily, Brazil, Mexico, Turkey, the United States, and Roumania, whilst in Great Britain, to our unutterable disgrace, we are in this respect behind the unspeakable Turk, and the semi-barbarous subjects of the Czar."

That a Pasteur Institute has not yet been established in England, in spite of repeated efforts on the part of the vivisection school, is greatly to the credit of this country, for such an institution would result in an enormous increase in the number of painful experiments on God's innocent creatures.

My committee are of opinion that the teaching of this book is opposed to the objects of the Society for Promoting Christian Knowledge, and I am directed earnestly to urge you, if you consider the objections to the book are valid, to write the Secretary, Editorial Department, S.P.C.K., Northumberland Avenue, London, W.C., and protest against the continued publication of it.—I am, Sir (or Madam), your obedient servant,

BENJN. BRYAN, Secretary.

The following is the letter from the Lord Chief Justice of England:—

1, Sussex Square, W., June 27.

Madam,—I have signed this paper, not exactly with pleasure, for the whole subject is utterly odious to me, but with great willingness. I have never seen any reason to change or qualify the opinions I expressed many years ago in an article on vivisection which your society reprinted. Should the book in question not be withdrawn by the Society for Promoting Christian Knowledge, I shall at once withdraw myself from it, as it will, in my judgment, become a Society for the Promotion of Unchristian Knowledge. Very good men, I am quite aware, take a different view, and will continue to support the society; but a man, however obscure, must act upon his convictions, especially when they have not been hastily taken up and are not quite ignorantly maintained.—I am, Madam, your obedient servant (Signed) COLERIDGE. Miss Monro."

Oyster-Culture and Temperature.

It may interest some of your readers to know that there has been an unusually heavy deposit of oyster spat just now on the collectors (tiles) along this west coast of France. Some of the

tiles I have seen during the last few days have been very densely crowded over with the little amber-coloured scales. The oyster breeders both at Arcachon and at Point de Chapus, men of long experience, attribute the special abundance of the spat this season to the continuous hot weather.

The calmness of the sea at the time when the embryos were set free may also have had something to do with an unusually large number passing safely through the critical larval stages.

The temperature of the sea on various parts of the oyster "parcs" at Arcachon last Monday was from 80° to 90° F., and out in the open to-day, half-way between the islands of Oleron and Ré, I find it is 72° F. However, it may be hoped that although temperatures like these may be favourable, they are not necessary for successful oyster breeding.

W. A. HERDMAN.

St. Pierre Ile d'Oleron, France, July 7.

The Diffusion Photometer.

IN the discussion before the Physical Society of June 9, a photometer made of paraffin blocks is mentioned as "The Jolly Photometer." I think, however, that this is the photometer described by me in the *Philosophical Magazine* some two or three years ago; also in the proceedings of the Royal Dublin Society, and exhibited before the British Association on the occasion of their meeting at Bath. I cannot now give exact references, but I must be pardoned for calling attention to the mistake, as it has been made before by a high authority, and seems likely to be perpetuated in England.

It is correctly described in Wiedemann and Ebert's "Physikalisches Praktikum," recently published (p. 217).

Bonn, July 12.

J. JOLY.

P.S.—I have no objection to the prefix if written with a small letter.

[We followed the spelling of the word contained in the official report of the Physical Society.—Ed.]

ALPHONSE DE CANDOLLE.

THOUGH this notice is somewhat belated, the passing away of a figure so conspicuous as De Candolle in the European world of science cannot be permitted to receive no more sympathetic notice than a bare record of the fact.

Alphonse Louis Pierre Pyramus de Candolle, to give him his full name, died on April 4 at his house in the Cour de St. Pierre at Geneva, in the eighty-seventh year of his age. If his bodily vigour had of late somewhat failed, he preserved his scientific interests and mental activity up to the last. Only the week before his death I received a letter from him, in which there was no indication of failing vitality, and in which he wrote without anxiety of the work that he had in hand.

So many of us have grown up under the shadow of De Candolle, that it seems almost a kind of impiety to sit down and coldly measure his stature. To me it seems that in a manner his death closes an epoch. With him passes away the last great representative of the French School of Botanical Taxonomy—to which, through Bentham, the English was in a great measure affiliated—and which had its root in Lamarck, whom the world in general scarcely realises as a botanist.

Geneva has long been remarkable as the home of a number of families whose members have cultivated science with distinction. These are for the most part descendants of French Protestants who have emigrated from the south of France. Amongst these the De Candolles stand out in pre-eminence; the third generation still sees them in the front rank of the scientific world.

Alphonse de Candolle's father, Augustin Pyramus, was a man who would have been remarkable in any age. Gifted with astonishing energy and enthusiasm, a singular power of grasping and co-ordinating large masses of detail, and indefatigable industry, his buoyant charm of manner inspired even the citizens of Geneva with interest and conviction in the supreme importance of taxonomic studies.

I know nothing in scientific literature more entertaining and instructive than his *Mémoires* and *Souvenirs*. They supply a striking instance of his irresistible influence. The return of an important collection of original drawings of Mexican plants was demanded by the lender. De Candolle roused the whole of Geneva society to his aid; the city was almost in a ferment till by united co-operation every one of the 1200 drawings had been copied.

The facts to be told of Alphonse de Candolle's life are simple. Born October 27, 1806, at Paris, he took the degree of Bachelor of Science at Geneva in 1825, and of Doctor of Laws with great distinction in 1829. The influence of his legal training probably gave an impress to his work and character all through life. In 1831 he began to assist his father in his duties as Professor of Botany, and he succeeded him in the chair in 1835. He held it till 1850, when he left it, owing to political events. The remainder of his life he passed as a private man of science. But during middle life he fulfilled with dignity, and not without influence, the duties of a citizen which his character and social position in some sort imposed upon him. After serving as a member of the Representative Council of Geneva, he was a member of the Grand Council from 1862 to 1866. He was the first to advocate the "referendum" in political affairs; he exerted himself to effect numerous reforms in economic and sanitary matters; and by obtaining the use of postage-stamps for his Canton he appears to have paved the way for their general introduction into Switzerland.

The earliest and perhaps the best of De Candolle's botanical works is his Monograph of the *Campfanulacææ*, published in 1831. It has stood its ground more solidly than is often the case with the taxonomic work of the time, and its conclusions have been in the main adopted in the later revision of the order by Bentham and Hooker.

In 1841 De Candolle's father died. He had commenced the publication of the *Prodromus* in 1824. The object of this vast undertaking was to give brief diagnostic descriptions of all known plants. Its publication finally settled the question which had long agitated the scientific world as to the supersession of the artificial Linnean system by a natural one. What is called the Candollean sequence is still in general use, though it is confessedly in some respects itself artificial, and only an approximation to a truly natural arrangement. The father had published seven volumes of this classical and indispensable work. The son carried it down to the completion of the Dicotyledons in the seventeenth volume, published in 1873. He saw that no one man could carry out the task single-handed. While formulating a uniform plan and method of procedure, he managed to summon to his aid the systematic botanists of all Europe. In 1847 he was able to claim that he had contributors from England to the Tyrol, and from Montpellier to the Baltic. He took himself no mean share of the work, and if this kind of research affords comparatively little opportunity for the display of genius, Alphonse de Candolle's work is always characterised by qualities of workmanlike accuracy and scholarly finish.

In early life the writings of Humboldt inspired De Candolle, as they have done many young men, with the impulse to travel. Family circumstances, however, forbade it. But the fascination of phyto-geographical problems had taken possession of him, and the vast assemblage of specific forms which continually passed through his hands must have supplied him with inexhaustible food for reflection.

In 1855 appeared his *Géographie botanique raisonnée*, which was the most important work of his life. It would be impossible in a short space to appreciate this justly. It has been complained that it led to no direct conclusion; and it is all but inexplicable that the author missed seeing that the immense mass of facts he had collected really

pointed directly to evolution as the key to its explanation. But the character of the man is an element which must not be overlooked. Essentially in method a statistician, he believed these facts, properly marshalled, would evolve their own law. But scientific method, like other calculating machines, will not evolve more than is implicitly put into it. De Candolle, it must be admitted, neither possessed nor had much sympathy with that touch of imagination akin to inspiration, which by some unconscious cerebral integration sees an even wider principle underlying the facts which are contemplated than by any method of manipulation can be deduced from them. But it may be doubted whether a study of the Distribution problem would ever have led to evolution directly. The essence of the Darwinian theory was the discovery of a possible, at any rate conceivable, *modus operandi*. This was the result of an attack from the biological side. The phenomena on a large scale which geographical distribution present are too remote from their ultimate cause to immediately suggest it; yet when the principle is grasped they are immediately susceptible of deductive explanation.

Nevertheless, I cannot but regard the *Géographie*, if not as an actual precursor, yet as one of the inevitable foundation-stones of the modern evolution-principle. In the first place, De Candolle dealt more than one heavy blow to Lamarckism. Botanists were impregnated with the idea that plant-distribution was a mere matter of temperature. Adanson had supposed that there was a simple numerical relation between it and growth. Boussingault had gone further and stated that the product of the period of growth multiplied into the mean temperature was a constant. That within limits there is truth in these statements, I myself believe, and for cultural staples the problem is still worth fresh investigation. But the facts will not bear generalisation, and in the field of nature De Candolle saw that they explained little. Other factors, such as light and moisture, must also be taken into account; if he had gone a little further he would have met the "Struggle for Existence."

But De Candolle's most fertile conclusion was the derivative nature of existing floras, and he cites with approval the classical speculations of Edward Forbes on the flora of Western Europe. De Candolle at any rate brought together a mine of accurate information, collected with vast labour without prepossession and marshalled with consummate judgment. He has furnished an armoury from which it will be long before successive students of the subject cease to draw their weapons. Had he taken narrow and pedantic views of specific limitations, he would have left the subject more confused than he found it. But by treating, for example, the aquatic Ranunculi as a group of variable forms of a single species, *Ranunculus aquatilis*, he supplies facts in a shape at once available for the Darwinian student.

De Candolle met Darwin in 1839, and though he maintained a correspondence with him, they did not meet again till 1880, when the former paid a visit to town. Of this he published a touching and in some degree pathetic account in 1882. He makes his submission to the inevitable. I will translate a few words:—

"The existing distribution of species, especially in islands, compelled me to admit, as early as 1855, four years before the appearance of the "Origin of Species," the creation, in certain cases, of new specific forms derived from older ones. I proved to demonstration that the majority of species ascend to periods far more remote than is generally supposed, and that they have passed through both geological and climatic changes. Lyell accustomed geologists to consider small causes, operating through long periods, as competent to produce large effects. The astronomical conception of indefinite time had penetrated natural science. Five or six thousand years counted for little in the history of organised beings. . . . Uncertainty

was everywhere. The facts of classification, of palæontology, of geographical distribution, of organogeny ceased to be intelligible. It was necessary to tread through the barrier of a limited time, and of the belief in the permanence of specific forms. *Alors parut Darwin.*"

The influence of Darwin was conspicuously shown in the remarkable book which De Candolle published in 1873, under the title of "Histoire des Savants." He lays botany aside, and going back to the studies of his academic life, starts afresh under the inspiration of the new ideas. But he does this with the same reserve and almost sceptical spirit which characterises all his writings. The facts must evolve their own consequences. He is reported to have said that "he was a botanist by inheritance and a statistician by birth." But he applies to the treatment of his data a statistical method which is positively fascinating in the skill with which it is employed, and the interest of the results to which it leads. I must content myself with a single conclusion, the undoubted validity of which, it seems to me, is often overlooked.

"Heredity neither gives scientific men special nor extraordinary powers; but only that combination of moral and intellectual qualities which may be directed according to circumstances and the choice of the individual to scientific study or to any other serious or definite object." If we slightly enlarge this conclusion by regarding extraordinary aptitude for particular branches of scientific discovery (or any other field of intellectual or artistic activity), as a sort of exceptional sport from an already specialised race, it appears to me that we have the whole root of the matter. A very distinguished man of science has been known to hazard the opinion that if he had turned his attention to law, he would probably have become Lord Chancellor. I think that he only erred on the side of modesty, and that he would equally likely have been Prime Minister.

But I must pass on. In 1880 De Candolle published his *Phytographie*. This is a useful book, indispensable to the taxonomic workshop. It elaborates and enforces the admirable principles of plant descriptive work laid down by Linnæus, which make the study one of no small value as an educational discipline. The book will always have its value as keeping alive an admirable tradition. Would that its example and precepts were more taken to heart by many modern botanists who fail to see that a description is one thing, a luminous and logical diagnosis a totally different one!

Finally, in 1883, De Candolle published his "Origine des Plantes Cultivées." This sprang from his preface studies for the *Géographie*. It is an altogether admirable book: not perfect certainly, or complete, and faulty perhaps more especially in the difficult matter of handling the philological evidence. Yet I know of no one who could have put together the material in a more masterly way, or who could have presented the conclusions derivable from it in a form more likely to carry conviction.

Here I must close. As I began by saying, a great figure has passed away. Distinguished in appearance, his manners though reserved, were always exquisitely urbane. If he lacked enthusiasm of a demonstrative sort he made up for it by extreme sobriety of judgment and inexorable persistence. He was singularly kind to all who were disposed to engage in botanical work; and would spare no pains to help and even aid, with his own accumulated materials, those who were willing to undertake a research. He died beloved by his family, revered by his countrymen, and loaded with distinctions. He was a Foreign Member of the Royal Society, a Gold Medallist of the Linnean Society, a D.C.L. of Oxford, and an LL.D. of Cambridge; and the possessor of the order which perhaps confers the greatest distinction on a scientific man, the "pour le mérite" of Prussia.

W. T. THISELTON-DYER.

CARL SEMPER.

A GREAT investigator has left us, and one more vacant tablet of the Hall of Fame has received its inscription.

Carl Semper, born July 6, 1832, at Altona, near Hamburg, a son of the celebrated architect, Gottfried Semper, at first destined for the Royal Navy, but afterwards student, graduate, Privat-Dozent, and for twenty-five years Professor of the University of Würzburg, has merited eminence as a traveller, a zoologist, a teacher, and an investigator.

The range of his "Thun und Schaffen"—his doing and making—is so wide that but scant justice can be paid to his labours within the short space of this article. As that of a travelled naturalist and the writer of important works of travel his name is honourably known to the geographer, while his investigations in pure zoology are among the most brilliant and weighty of the past thirty years.

Even in this field of science there was a many-sidedness about the observer, impelling him to work for the increase of knowledge in systematic zoology, comparative anatomy, embryology, comparative histology, and physiology.

His travels in the Philippine and Palau or Pelew Islands, for which he expended nearly the half of the large fortune inherited from his father, resulted in many valuable memoirs on various groups of invertebrata, the joint work of himself and others. Semper's "Holothuria," and his special studies of mollusca—a group in which he was a leading authority—may only be mentioned. His book on the "Palau-Inseln im Stillen Ocean" is unfortunately less known—at least, in this country—but in the opinion of good authorities there are few more delightful works of travel, and fewer still in which the observational powers of the naturalist find as full play.

Of Semper's molluscan work only a specialist can speak as it merits. I know not if he completed all that he intended to do, but I have a lively remembrance of the immense stores of material and drawings which he possessed ten years ago.

To experimental physiology he made many contributions in the *Existenzbedingungen der Tiere* and elsewhere.

But the works of all others which established his reputation as a university professor were undoubtedly those on comparative embryology.

Among these, "Das Uro-genitalsystem der Plagiostomen" is preeminent. In this and other priceless memoirs was laid the solid foundation on which the ten volumes of the *Arbeiten aus dem Zoologisch-zoatomischen Institut zu Würzburg* were gradually built up. The intensity and ardour with which he devoted himself to the problems of embryology also laid the beginnings of the long years of ill-health which have just closed with his death.

Though his work cannot be described as having escaped unscathed from the fierce embryological battles of recent years, most of it still stands intact, and is destined to remain, associated with the name of Semper, as part of the classic literature of vertebrate morphology.

With recapitulation embryology he had no sort of sympathy, and his polemics against Haeckel clearly defined his position as an opponent of the so-called "Law of Ontogeny." He was of those whose embryological work is based rather on the idea that organs, not organisms, repeat parts of their ancestral history in their development.

Of the departed master—"Der Chef," as his students affectionately termed him—a pupil cannot write without feeling. Long before his death the great number of his pupils, who had become occupants of University chairs,