THE FORMS OF FLOWERS.*

A naturalist like Mr. Darwin, who has devoted his whole life to natural science, and has selected his facts from so wide a range as his books indicate, is deserving of all attention. His industry is confessed. His observations are careful and minute. The mass of information which he has stored up is literally overwhelming. We are only disposed to dissent from him when he deserts the field of experiment and deduces inferences and weaves theories which seem to us unwarranted by the facts collected, and when he makes deductions which depend upon observations yet to be submitted to a more rigorous investigation, and to be verified by naturalists unwarped by the conclusion to which he had attained prior to his investigation of the nature and habits of plants and animals. Apart from this, the mass of notes which he has here accumulated will be of advantage to the student of natural science, provided he can distinguish between the patient observations of Mr. Darwin and the probabilities and possibilities which he is too much disposed to reason from as though they were ascertained facts, and to use as though they were accepted as axioms of the science of which they are only at present possibilities. In short, if the student discriminates between the indicative mood of the observer and the subjunctive mood of the theorist, this and other volumes of Mr. Darwin will furnish him with information of the most varied character, and be useful to him in his researches into the nature and habits of the various kingdoms of organic life.

The theory of Lamark, that life in its rich variety of forms arises from spontaneous generation, if we may use a Hibernianism, without which this theory is unintelligible, finds no support in either the observations or the deductions of Mr. Darwin. Setting out from the assumption —for it is an assumption—that animal life and

* *The Different Forms of Flowers on Plants of the same Species.* By Charles Darwin, M.A., F.R.S.—London: John Murray.

vegetable life, indeed organic life in its wide extent, is evolved from a primordial seed, itself imperfect but invested with the potentiality of attaining to perfection of the most contrariant character, Mr. Darwin attempts to show that this process is ever going on, and that the plants around us, and the animals with which we are familiar, are all changing, or—without changing the original type, for on this we have no consistent view—are throwing off new forms and new species. To support so large an inference, it is surely not enough to suggest or assert that a primrose sometimes may give birth to an oxlip, or a violet wither and die and be replaced by a pansy. We await the proof of such changes, and demur to the conclusion even should such a proof be forthcoming. But, in fact, the experiments conducted by Mr. Darwin, of which he summarises the result in the present volume, are in themselves by no means satisfactory. Most of the observations of the writer were made, it would seem, on plants in his own garden; whereas all experiments made, and all observations tabulated, would be more satisfactory if made on plants in a state of nature. Again, when we remember how the whole soil of the globe teems with the seeds of plants and vegetables, we can never feel confident that the plants which spring up in the garden may not be derived from a germ long latent in the earth, and not from the seed scattered by the experimenter. This is a caution which Mr. Darwin would be the first to urge against the believer in the theories of Lamark or the long-forgotten and startling fancies of Mr. Crosse; it is as necessary that we should remember it when we are considering his own theories.

It would seem as if some additions to our scientific terminology cannot well be avoided. New facts necessitate new words. These, however, are only to be excused or permitted when they are the result of obvious necessity. Such terms as *heterostyle dimorphic* and *heterostyle trimorphic*, cannot, perhaps, be well avoided; and should Mr. Darwin's observations be verified by future botanists, they may be admitted for their obvious utility. Perhaps, however, some such periphrasis as "double-shaped style of two (*or* of three) "forms," might be more easily intelligible to botanists unfamiliar with Greek terminology. Botany is sufficiently encumbered with long-drawn words and hybrids composed of Latin and Greek, with Latinised forms of English, German, and French proper names; and when the increase of such a repulsive heterostyle terminology can be avoided, it were a merit if they were strenuously rejected.

Mr. Darwin has the honesty to confess that since much of the present volume appeared in the pages of a periodical, some of his statements have had to be recalled and some of his deductions cancelled. We are sure that others will have to be modified, recalled, or, in the same way, cancelled. At page 5, for instance, we have a statement as to the way in which the ray-florets fold, which further observation on his part, we are convinced, will cause him to withdraw. It is not correct to say that these florets always fold inward. So far is this from being invariably the case that in many plants, and even in such common plants as the Bramble (*Rubus*) and the Michaelmas-daisy (*Anthemis*), their ray-florets droop and converge downward so as to protect the seed vessels. This is only one out of many instances of a hasty generalisation which future observation will lead Mr. Darwin to discard; and it is one out of many instances which compel us to feel more respect for the industry with which the facts have been collected than for the deduction which he has made from these partial facts, every one of which, it must be borne in mind, have been made under the influence of a foregone conclusion, which has necessarily warped his judgment and must needs have influenced his experiments.

The results of Mr. Darwin's observations and experiments, as detailed at the end of the fifth chapter, afford strong grounds for adhering to the old Linnæan system of botany which is entirely based upon the arrangements of the fructifying organs. Everything, both in what Mr. Darwin terms legitimate and illegitimate unions, as well as in the hybrids derived from crossing some plants and in the impossibility of crossing others, seems to depend exclusively upon functional differences and powers in the sexual elements, the stamens and pistils and their pollen. The natural system of botany, so far as it is only based upon general resemblances, loses sight of these all-important arrangements of nature, and is therefore so far unreliable and inaccurate. It will thus be seen that, whilst the Linnæan system may possibly be harmonised with the theories of Mr. Darwin—it is only, however, possible that this may be so—it entirely overthrows the Lamarkian theory of evolution or spontaneous biogenesis from mere matter. In a word, the facts collected, and the discoveries made, or at least tabulated, by Mr. Darwin and by recent and eminent foreign botanists, clearly point to the foresight and wondrous providence of the Great Architect of the Universe, the All-Maker, who has stored up in the simplest forms of nature—the minutest insect, the seemingly most imperfect type of animal life, as well as in the smallest weed on which we tread—wondrous capacities for the perpetuation of the various species which teem on the face of the whole world or swarm in the waters which cover so large a part of the surface of the globe.

We end as we began. We are glad to receive the result of Mr. Darwin's observations; we admire his industry; we feel that his facts add to the sum of our knowledge, and we rejoice in every extension of that knowledge of the works of the All-Maker. We can afford to wait the verification of some of these facts, and thus to comprehend heir significancy. We are not disturbed by the large theories and wide assumptions which the author bases on his experiments and on the facts, perfectly or imperfectly understood as they may be, which he has noted, and we only regret that the pre-occupation of the mind of the writer with such theories should sometimes beget a blindness to opposing facts and induce an inability to grasp the teaching of the marvellous array of beneficent contrivances with which the whole nature of created things is fulfilled.

THE GUANO REPUBLIC.*

"Peru in the Golden Age," was the subject of the valuable and interesting volume by Mr. Squier which we noticed some time since, and which dealt in so admirable a manner with the antiquities of that remarkable country. He, however, touched but lightly on its present condition, preferring the bygone glories of the Incas to the present discredit of its Republicanism tempered by revolutions. The little volume now before us, as its name implies, deals with the latter and less pleasant subject, and *Peru in the Guano Age* may be regarded as a sort of supplement to Mr. Squier's work. The picture which is drawn in it, is by no means a pleasant one; and, except in the matter of hospitality, Mr. Duffield has not a good word to say for the modern Peruvians. Though he repudiates having set down aught in malice, we can hardly believe in the justice of so sweeping a condemnation, and should have preferred to have seen the colours laid on a little less thickly. Small comfort will be derived by the unhappy holder of Peruvian bonds from Mr. Duffield's pages, though he is of opinion that the country could quite easily pay its debts. But it would be nessary, as a preliminary, for a revolution to take place of a kind not yet made in Peru—one in the interests of its honour and uprightness. The great resource on which the country has based its financial system, as our readers are aware—some of them it may be to their cost—is its guano supply. This guano, or *huano* as it is spelt in Peru, had been known long before the Spanish conquest, and the Incas used it in their farming. How prominent a part it has played in the fortunes of their present successors is known to every Stock Exchange in Europe. As, during the time the country has been a vendor of the precious commodity, twenty millions of tons have been sold at a price averaging from £12 to £13 a ton, in addition to the amount which has been borrowed upon the security of it, Peru has, as Mr. Duffield expresses it, "turned a pretty penny by the transaction;" but neither morally nor physically can it be said with truth "non olet," and dealings in guano seem to have the same effect in the New World on the honesty of those engaged in them as dealings in horses have in the Old World. The object of Mr. Duffield's visit to Peru was to investigate the present state of the guano fields and ascertain the actual amount of the existing deposits. This is variously stated; some asserting that there is not more than two millions of tons in the whole Republic, while others make estimates as far in excess of the probable store as that estimate falls below it. Mr. Duffield's own investigations have led him to the belief that Peru had in 1876 in her possession in round numbers 7,500,000 tons of guano, of 2,240lb. to the ton. This computation did not take into account possible stores yet remaining to be discovered, of which our author believes there are unmistakable indications on the slopes of the southern shore. What these indications are he keeps as his own secret, to be made available at some future time; but support is given to his view by the reported discovery, in the province of Tarapaca of fresh guano deposits estimated at three million of tons.

These deposits date from ages of which we have no record, when the guano islands were "the "home of millions of happy birds, the resort of a "hundred times more millions of fishes, of sea "lions, and other creatures whose names are not "so common," and those who believe guano to be a mineral substance would be speedily undeceived by a visit to Lobos de Afuera:—

> There they will see the whole process of guano making and storing carried on with the greatest activity, regularity, and despatch. The birds make their nests quite close together: as close and regular, in fact, as wash-hand basins laid out in a row for sale in a market-place; are about the same size, and stand as high from the ground. These nests are made by the joint efforts of the male and female birds; for there is no moss, or lichen, or grass, or twig, or weed, available, or within a hundred miles and more: even the sea does not yield a leaf. As a rule, about one hundred and fifty nests form a farm. It has been computed by a close observer that the heguiro will contribute from 4oz. to 6oz. per day of nesty material, the pelican twice as much. When there are millions of these active beings living in undisturbed retirement, with abundance of appropriate food within reach, it does not require a very vivid imagination to realise in how, comparatively, short a time a great deposit of guano can be stored.

The "heguiro," to which reference is here made, is thus described by Mr. Duffield:—

> The heguiro is a large bird of the gull and booby species, but twice the size of these, with blue stockings and also blue shoes. It does not appear to possess much natural intelligence, and its education has evidently been left uncared for. It will defend its young with real courage, but will fly from its nest and its one or two eggs on the least alarm. This, however, is not always the case. But in a most insane manner if it spies a white umbrella approaching, it sets up a painful shriek. Had it kept its mouth shut, the umbrella had travelled in another direction. As the noise came from a peculiar cave-like aperture in the high rocks, I sat down in front, watched the movements of the bird, who kept up a dismal noise, evidently resenting my intrusion on her private affairs. After a brief space I marched slowly up to the bird, who, when she saw me determined to come on, deliberately rose from her nest, and became engaged in some frantic effort, the meaning of which I could not guess. When I approached within ten yards of her, she sprang into the sky and began sailing above my head, trying by every means in her pow
> the nest. I found t
> little fishes! Th
> stomach in order t
> discovery or outra
> visit to her mansic

Next to the pre
question of mo
holders is what
millions derived
as covering both
holders. Mr. I
to give on th
150,000,000 doll
but nothing else
internal improv
resources of the
according to hi
of folly which
"and bring in r
"that they w
"national accou
Mr. Duffield i
should he revis
received with th
said, he states t
of virtue amon
ments, howeve
attention of tho
lingly admits th
reputation of th

For This Cau
It is like Mr. F
going to go an
as if it were go
The unpardona
pervade it to t
inspires us wit
ters fail in any
scenes which d
provoking, and
more wearisom
title of the boo
which husband
each other. T
married a man
that her mone
parts from him
to be reconciled
else puts before
gether intellig
wifely duties.
arguments add
to her own mi
this very invol
which they are
and meaning.
suggest that th
of the home v
more than M
bringing her t

Miss Georgi
tolerably well-
"ll y a toujour
"aimer," is the
to illustrate;
monotonous, th
to lure the reac
the frequency
story called '
unhappy, disa
jealous selfish
ship he wishe
he admired, b
love he accepte
a return. At
of her idol, N
advent of a fas
love, opens he
his heart. F
annoyance at
breach at all;
meagre affecti
humblest subm
ence to her fee
denly withdra
towards her l
demeanour unt
what he so lig
authoress's own
"—but was h
negative answ
unsatisfactory
conduct is so b
out, his behavi
—if one may
ungentlemanly
pity, but cannc
of the widow
perhaps, her u
overdone, and
carry out. Th
like what M
possesses a full
and pleasant s
remarkable.
more common
is the story of
fatal mistake
conquering all
to soften the l
only possible
Alice and he
siderable pow
solemnity of
always loved
"new, proud t
"her eyes.

* *Peru in the Guano Age.* By A. J. Duffield.—London: R. Bentley and Son, 1877.

* *For This C*
Vols.

† *Two Tales o*
and M. C. Stir
and Blackett, 18