Anser segetum, *Steph.*
Mareca Penelope, *Selb.*
Anas crecca, *Linn.*
*Sterna hirundo, *Linn.*
—— nigra, *Linn.*
—— Dougalli, *Mont.*
*Larus argentatus, *Brunn.*
—— tridactylus, *Lath.*
Lestris cataractes, *Temm.*
Colymbus glacialis, *Linn.*
Sula alba, *Temm.*
Procellaria mollis, *Gould.*
—— Pacifica, *Aud.*
*Puffinus major, *Temm.*
*—— Anglorum, *Temm.*
*—— obscurus, *Temm.*
*Thalassidroma Bulwerii, *Jard.*
*—— Leachii, *Temm.*
—— pelagica, *Temm.*

I have the honour to remain, Gentlemen,
Your obedient servant,
EDWARD VERNON HARCOURT.

20 Portland Place, London,
May 11, 1855.

XXXIX.—*On the Characters which distinguish the Vegetation of a Country.* By M. ALPHONSE DECANDOLLE*.

THE vegetation of any particular country or district always presents more or less important and distinct characters. These are numerous; and few authors in writing Floras, or memoirs on botanical geography, ever think of enumerating the whole of them, still less of regarding them according to their actual degree of importance.

These characters relate to the conditions of the classes, or great divisions of the vegetable kingdom, the families, genera and species, in the country treated of, and also to the analogies and differences presented by them in comparison with other regions. The following enumeration will show the multiplicity of these points.

I. ENUMERATION OF THE CHARACTERS.

1. *Characters relating to Classes.*

Proportion of Phanerogamia and Cryptogamia.—In the actual state of our knowledge it is of very little use to seek to determine this proportion; and, moreover, if we knew it elsewhere than in Europe, it is doubtful whether it would present any true interest. The *species* being ill-defined and imperfectly known amongst the Cryptogamia, and the structure, appearance and position of these plants being extremely diverse, and usually without analogy with those of the Phanerogamia, it is difficult to say what would be the object or the result of such a comparison.

Proportion of Dicotyledones and Monocotyledones.—Few numerical data are so frequently given in botanical geography, and yet this proportion is usually inexact, and not very important to be known.

* From the Bibliothèque Universelle de Genève for December 1854.

It is not always correct, seeing that the Cyperaceæ and Gramineæ, which constitute the greater portion of the Monocotyledones in most countries, and the Orchideæ in some warm and moist regions, are precisely the families of the exact number of which we know least. There are many Floras, even of European countries, in which the number of Cyperaceæ is very incomplete. As a general rule, the more completely the Flora of a district or province is known, the more does the proportion of Monocotyledones increase; but this is probably not the case with the Floras of very extensive countries, from another cause to which I shall refer hereafter, a cause which has escaped the attention of authors who are generally very judicious.

The comparison of the numbers must not be made between countries of unequal extent, because the average area* of the species of Monocotyledones is much larger, at least in our temperate and northern regions, than the average area of the Dicotyledones. In the Flora of a province we meet with the greater part of the Gramineæ, Cyperaceæ, and Juncaceæ which exist in an extensive region around this province. The more extended the space under consideration, the more are local species added to the Flora, and these are most frequently Dicotyledones. The following are a few examples in confirmation of this:—

The Flora of the department of Maine-et-Loire, by M. Guépin (ed. 3), shows the proportion of the Monocotyledones to the Dicotyledones to be 1 : 3·2. The Flora of the same department, with several others of the centre of France, by M. Boreau, gives the proportion 1 : 3·5; and that of the whole of France, according to the Botanicon of M. Duby, = 1 : 4·3. To give these fractions in a more complete and logical form, I will say that in the department of Maine-et-Loire the Monocotyledones constitute 23·7 per cent. of the phanerogamous plants, in the central departments of France (including the preceding) 22·2 per cent., and in the whole of France 18·8†.

If we could extend our observations to the whole of Europe,

* The *area*, in botanical geography, is the surface occupied by a species, a genus, or a family.

† The cultivated species are excluded from these numbers. We find the same differences in taking separate portions and the whole of the German Floras, between the Adriatic and the Baltic. Thus, in Dalmatia, the proportion is 1 : 3·5, according to M. Visiani's Flora (vol. iii. p. 390); in Lower Austria, 1 : 3·7 (Neilr. Fl. Wien. p. xxxi); in Wurtemberg, 1 : 3·1 (Schübler and Martens, p. xv); in the Kingdom of Saxony, 1 : 3·5 (Reichb. Fl. Sax. ed. 1844); in Silesia, 1 : 3·2 (Wimm. and Grab. Fl. 2. p. 95); in the province of Prussia, 1 : 3·2 (E. Mey. Fl.). For the whole of Germany the proportion, according to Fürnrohr (Fl. de Ratisb. p. xxxi), is 1 : 3·7, or including the Austrian possessions on the shores of the Adriatic (Koch, Syn. ed. 1. p. lx), 1 : 3·8.

we should probably find a still greater proportion of Dicotyledonous species; for, without speaking of the secondary families, there are many more Gramineæ and Cyperaceæ common to the two extremities of this vast region, than Compositæ or Leguminosæ. It is true that, in taking the proportion from very limited Floras, such as those of the environs of towns, we may sometimes find the amount of Dicotyledones nearly as great, or even greater, than in the entire province in which the town is situated*; but the environs of a town do not usually present all the varieties of station which are indispensable to species, and hence arise accidental causes which prevent the exemplification of the law. A town surrounded by hills or mountains will have more Dicotyledones, and one environed by moist meadows more Monocotyledones, than the general conditions of the region would lead one to expect.

Of the two causes of error to which I have just referred, the former, the imperfect knowledge of the Monocotyledones of partially explored countries, is usually the most serious. The second, the unequal extension of the species, is of less importance; and it may, moreover, be got rid of by taking care only to compare countries of nearly similar extent.

But there are more serious objections to the calculations in question. The Monocotyledones are far from being homogeneous. What conclusions can be drawn from a number which includes Orchideæ or Irideæ, Palms, Gramineæ, Cyperaceæ or Juncaceæ, in very different quantities according to the countries, to be afterwards brought into comparison with the Dicotyledones? Are the thousands of Orchideæ, or the hundreds of Palms of Brazil, analogous to the Cyperaceæ or Liliaceæ of our regions? and nevertheless it is to these, under the common name of Monocotyledones, that the Dicotyledones of different countries are compared. The error is still further augmented by the custom of regarding the number of Monocotyledones as unity with regard to that of the Dicotyledones; for this apparent unity varies, and the elements composing it in some regions have the value of plants with a simple, in others with a complex organization; in one place they are insignificant herbaceous plants, in another woody plants, or even large trees. I may also remark, that the frequency of the individual plants, and their influence on the vegetation of a country, have no relation with the number of species in each group.

From all these causes, therefore, the proportion of the species of Monocotyledones and Dicotyledones is an abstract fact,

* Round Ratisbon the proportion is 1 : 3·5 (Fürnrohr); round Vienna, 1 : 3·6 (Neilreich); round Strasburg, 1 : 3·4 (Kirschl. in Flora, 1843, vol. i. p. 196); round Wurtzburg, 1 : 3·3 (Schenk, Flora, 1849, p. 61).

which may be calculated from Floras, but which *is not evident in nature*. I defy the most practised botanist to determine at the first glance what is the proportion of the two classes, even in a limited district. On the contrary, it is easy, at first sight, to say whether the Compositæ, the Leguminosæ, or evergreen plants predominate in a region, because these groups are more homogeneous, more easily seized in their totality and compared to one another. It would at least be necessary, to give any importance to the proportion of the two great classes, that the composition of each should be added, particularly in the case of the Monocotyledones, the forms of which are so very different.

Proportions of the Natural Groups superior to the Families, but inferior to the Classes.—Botanists have endeavoured to associate the families in groups inferior to the great divisions of the vegetable kingdom, but still founded upon positive characters; but these attempts are as yet too recent and too imperfect to be capable of employment in botanical geography. It would be premature to calculate the proportions of the species in these groups, which are only provisional, or at all events ill-defined. Other associations, of rather small botanical value, but which still repose upon very apparent characters, merit more of the attention of the geographical botanist.

The proportions of the *woody* and *herbaceous* species, or of *annual, biennial, perennial* and *woody* species, whether *monocarpous* or *polycarpous*; the proportion of species with *fleshy* leaves or stalks, or succulent plants; that of the species with *compound,* or with *persistent* and *deciduous* leaves,—these are elements that should be ascertained in every assemblage of plants. Each of these groups includes plants of various families or classes; but their importance in nature is evident. The number of woody species, trees especially, has an actual value, by reason of the aspect of forests and their positive action upon herbaceous plants. In this point of view, statistical observations upon the extent of the forests in a country are by no means without value. I may even say, that a statistical table, showing the proportion of forests, cultivated land, meadows, marshes, &c., will give more information regarding the general vegetation of a country, than certain Floras which exhibit a great deal of learning, and which are in high estimation amongst botanists.

Some attempts have been made to arrange the forms of plants in certain categories, answering to the aspects they bear in nature. Von Humboldt*, and after him Meyen†, have distin-

* Essai sur la Géographie des Plantes, 4to, p. 31, and Tableaux de la Nature, 1851, ii. p. 22.

† Grundriss der Pflanzengeogr. iii. p. 117.

guished in this manner from fifteen to twenty of what may be called *physiognomic* groups of plants. This is a means of facilitating the descriptions of travellers. There is certainly a great number of forms which are not sufficiently marked to enter into any one of these categories in particular; or rather, there are forms which are so abundant and common, that they include the great majority of the species of every Flora. Hence perhaps the little practical use that can be made of these divisions.

2. *Characters relating to the Families.*

Proportions of the Species of different Families to the Phanerogamia.—The calculation usually made to express the proportions of the families in a country, supposes implicitly that the species of different families are equally abundant in individuals in the same country. This, however, is not the case, and we should probably arrive at a more correct idea by ascertaining what are the commonest species, and calculating the proportions of the families from these species. Unfortunately, the collection of data as to degrees of frequency is a difficult matter; where existing they are rather vague, and, for most countries, they are entirely wanting.

Besides, the average area of the species varies according to the families and regions. Thus, under similar conditions, the more extended the space under consideration, the greater is the addition of different species belonging to certain families in which the specific areas are limited in comparison with other families in which the areas are larger. In a central region of Europe, for example, we meet with a small proportion of the Leguminosæ, Labiatæ, or Compositæ, which exist in the whole of Europe, but with a large proportion of the Cyperaceæ, Juncaceæ, or Gramineæ; consequently, the proportions of these families will be very different, according as we regard the supposed central region or the entire continent. The former of these families will have a greater number in the whole of Europe; but, nevertheless, in the particular district, they will be of no greater importance than is shown by the local Floras. Let us see how serious this cause of error may be. We can only appreciate it in Europe, as elsewhere the enumerations of species of regions included within others are either wanting or defective.

I shall confine myself to the comparison of the Leguminosæ, Compositæ and Gramineæ, as the Cyperaceæ are often incomplete, even in European Floras, and the other families are not sufficiently rich in species to render the proportions independent of errors and local circumstances. I shall take my examples of countries from the continent and under the middle latitudes.

I shall first compare the department of Maine-et-Loire ac-

cording to the Flora of M. Guépin, the departments of the centre of France according to the Flora of M. Boreau, and the whole of France according to the Botanicon of M. Duby. The cultivated species are excluded throughout*.

	Maine-et-Loire. (1304 Phan.)		Centre of France. (1530 Phan.)		France. (3615 Phan.)	
	Species.	Proportion to the Phanerog	Species.	Proportion to the Phanerog.	Species.	Proportion to the Phanerog.
Leguminosæ . .	92	0·070	109	0·071	325	0·087
Compositæ . .	123	0·094	156	0·102	478	0·132
Gramineæ . . .	110	0·084	119	0·077	249	0·069

It will be seen from this how incorrect it would be to make a comparison between the proportions of the families in a department of France and in a country of the size of Germany, and still more in an immense region such as the United States or New Holland.

By ascertaining the proportions of the Compositæ, Gramineæ or Leguminosæ as compared with the Phanerogamia in all the departments of France successively, and taking the averages, we should not obtain the same proportions that would be found from the Flora of the whole of France; and the error would be sometimes in one direction, sometimes in the other, according to the relative specific areas of the three families.

The following is another example, taken from Alsace and Germany. I shall compare, 1. the Flora of Strasburg by Kirschleger; 2. that of Baden, Alsace, Rhenish Bavaria, and Schaffhausen by Grisselich; and, 3. that of Germany, including Istria and Switzerland, according to Koch, deducting the cultivated species.

	Strasburg. (960 Phan.)		Baden, Alsace, &c. (1352 Phan.)		Germany. (3131 Phan.)	
	Species.	Proportion to the Phanerog.	Species.	Proportion to the Phanerog.	Species.	Proportion to the Phanerog
Leguminosæ . .	51	0·053	70	0·052	212	0·067
Compositæ . .	105	0·109	154	0·114	404	0·129
Gramineæ . . .	80	0·083	107	0·079	215	0·069

The variations are the same as in the preceding case; that is

* To avoid a departure from custom, in a circumstance where it was a matter of indifference, I have allowed the weeds of cultivated lands to remain, although they are not, properly speaking, spontaneous, and still less aboriginal species.

to say, in the same direction, and with a not very different intensity.

It may be objected that the addition to Germany of very different countries, such as Istria, throws too much weight into the scale of the Leguminosæ and Compositæ. There will always be some analogous circumstance in the consideration of a very extensive country, but the following proportions show that without quitting Germany the same facts may be observed. M. Fürnrohr compares the proportions of the families in the environs of Ratisbon and in Germany proper, that is to say, not including Switzerland, Istria, and the province of Prussia. The proportions are as follows, when put into the form here adopted:—

	Ratisbon. (1063 Phanerog.)		Germany. (2906 Phanerog.)	
	Species.	Proportions.	Species.	Proportions.
Leguminosæ. . . .	58	0·054	177	0·061
Compositæ	115	0·108	352	0·121
Gramineæ	80	0·073	205	0·070

Authors sometimes compare the proportions of the families in regions as extensive as the whole of Europe, or even still larger. If they happen to compare one of these immense regions with the environs of a town, or with a small island, the error resulting from the relative area of the species may rise to 4 or 5 per cent., or probably even more in some exceptional regions and for certain families. The influence of this cause will be particularly great in countries where the species change rapidly from one district to the other, as for instance at the Cape, Brazil, Mexico, &c.

Notwithstanding this cause of error and that arising from the unequal degree of frequency of the species, it is certain that for countries of nearly similar extent, and for families in which the average area of the species is not very different, these proportions possess some interest and deserve comparison.

We may also ascertain that certain families have the greater part of their species collected together in a particular region of the globe, without taking any trouble about the proportion which they bear to the whole of the Phanerogamia in each region. This is a mode of looking at the question which sometimes leads to different results.

As a general rule, two characters which it is essential to know may be derived from the study of the families:—

1. In every country certain families *predominate* as regards the proportion of their species. This is the case with the Gramineæ and Compositæ in Europe, the Leguminosæ in the West Indies and most countries in the neighbourhood of the Equator, and the Proteaceæ or Myrtaceæ in Australia.

2. Certain families are *characteristic* by being peculiar to the region under consideration, or at least presenting a greater proportion than in other regions, either with regard to the Phanerogamia of the same region or to the species of each family. Thus, the Berberideæ are characteristic of Chili; the Stylidieæ of New Holland; the Resedaceæ of the Mediterranean and adjacent region; the Cactaceæ of Mexico; and the Oxalideæ of Brazil and of the Cape; &c.

The total or nearly total absence of a family in a region, especially when the conditions of climate might lead one to expect that it would occur there, is also a character that must not be neglected.

Lastly, the combination of the families deserves notice, as well as the characters belonging to each in particular. Thus, the vegetation of the island of Juan Fernandez, consisting essentially of Compositæ and Ferns, must present a very different aspect to a vegetation in which the Compositæ are associated with the Leguminosæ, or the Ferns mixed with Aroïdeæ or Orchideæ; and as the principal families combine by threes, fours, &c., Floras of excessively various characters are produced.

3. *Characters relating to the Genera.*

The indication of the genera which include the greatest number of species, or which are most apparent from the number of individuals, is also a mode of depicting the *ensemble* of the vegetation of a country, to which many, even superficial, travellers have paid attention. Unfortunately this character is not susceptible of great precision, and is applied with difficulty to the comparison of one country with another in consequence of the multitude of genera, the want of a complete enumeration of the species of many regions, and the great number of genera which occur in two or more adjacent or even distant regions.

Here, as with the families, we may remark the *predominating* and the *characteristic* genera.

4. *Characters relating to the Species.*

The presence of a species in a country is always a character in itself, but the number of the species is so great, that it is impossible to attend to all the facts of this nature. It is sufficient in general to ascertain,—

1. *The commonest indigenous species*, paying particular attention to the trees and to the species which predominate in the principal stations of the region under consideration.

2. *The remarkable and characteristic species*, that is to say, more or less abundant in the country, but of a nature to strike a botanist, and not existing in the neighbouring countries.

3. *The cultivated species*, especially those which belong to agriculture.

The number of species relatively to the surface may also be ascertained, particularly that of the species peculiar to the country under examination.

The ascertainment of these numerical elements is useful, but their employment requires some previous reflections, to which I shall now direct attention.

5. *Variety or uniformity of Vegetation.*

The vegetable forms in a country may be varied, either by the diversity which they present in different districts, or by the abundance of different forms in each district. In the former case it is advisable to distinguish different regions or zones and to consider them separately. This is done, for example, in mountainous countries, in which several degrees of elevation present plants for the most part different.

When there is an intimate mixture of vegetable forms in the country under consideration, it is necessary to employ statistical processes. The number of different species is calculated, and afterwards their proportions according to genera and families.

In order that these numbers should have an equal comparative value in different countries, and even, I may say, an absolute value, it is necessary to acquire an idea of the mode in which the extent of surface modifies the proportions. At the first glance it is seen that the numbers change according to the size of the country, and that they change in different proportions, as the species, genera and families occupy average surfaces of very different extent. Both theory and observation agree in showing that it would in fact be incorrect to compare numerical proportions founded on regions of too unequal magnitude*.

If, in the environs of a town, on a space of a hundred square leagues, for instance, we find 1000 species of Phanerogamia belonging to 400 genera and to 100 natural families, which gives 10 species, 4 genera, and 1 family for each square league, and also $2\frac{1}{2}$ species for each genus and 10 for each family,—the proportions will be quite different if the circle be extended, even supposing that there is no alteration in the character of the vegetation. We shall arrive much more quickly at the limit of some of the species than at that of the genera, and especially of the families. The species which have disappeared will be replaced by others, more rapidly than we shall meet with new genera or families, in consequence of the relative areas of these groups. Thus, taking a large province in which the supposed town is

* Many botanists, not much accustomed to the numerical methods, have fallen into this error.

situated, including, for example, an extent of 1000 square leagues, we shall have perhaps to add 200 species to the Flora, but not more than 2 or 3 genera, and hardly a family; this would give 1·2 species, 0·4 genera, and 0·1 family to the square league of the province, and 2·9 species for each genus, and 11·8 to each family. If the surface be still further extended, and we imagine for example a vast country including this province and several others, making in all 20,000 square leagues, the Flora will perhaps possess 2000 species, 500 genera, and 103 or 104 families. The proportions will be, 0·1 species, 0·02 genera, and 0·005 families to each square league, and 4 species to each genus, 19 to each family. Thus, the more extensive we suppose the surface of a country to be, the greater (the vegetation remaining homogeneous in other respects) will be the diminution in the number of species, genera and families to the square league, and this will take place more rapidly in proportion in groups of higher rank; the larger the country also, the more will the number of species in each genus and family be increased.

We might confer upon these arithmetical relations the form of more precise general laws, by employing the average values of the areas of the species, genera and families, such as our researches have shown them to be, but this would be of little use, because the different countries and different groups of phanerogamous plants always depart more or less from the average values founded upon the totality. A mathematician would perhaps see with pleasure the changes which the areas combined with the surfaces introduce into the relations, but naturalists prefer a demonstration founded upon particular cases.

With this object I shall compare these Floras, included the one within the other, and of which I have already made use; that of the department of Maine-et-Loire (the ancient Anjou) by M. Guépin (ed. 3. 1845), that of the centre of France, including this department with several others, by M. Boreau, and that of the whole of France according to the 'Botanicon Gallicum' of M. Duby.

After deducting the cultivated species from each work, and reducing the families to a uniformity with those of the 'Botanicon,' I obtain the following numbers:—

	Surface* in leagues.	Species.	Genera.	Families.
Maine-et-Loire . . .	365	1304	473	88
Centre of France . .	2600	1530	535	90
France	27,000	3615	739	103

* The surface of Maine-et-Loire, and that of the departments included in M. Boreau's Flora, are given by the authors themselves. The surface of France in leagues is derived from the new 'Geographical Dictionary' of M. Langlois.

It will be seen that if we regard the numbers of the Flora of Maine-et-Loire as unity, the augmentations are—

	Maine-et-Loire.	Centre of France.	France.
For the surfaces . . .	= 1 :	7·14 :	73
For the species . . .	= 1 :	1·17 :	2·77
For the genera . . .	= 1 :	1·13 :	1·56
For the families . . .	= 1 :	1·02 :	1·16

Calculating then by the square league, we shall obtain for one league—

	Species.	Genera.	Families.
Maine-et-Loire . . .	3·6	1·3	0·24
Centre of France . . .	0·5	0·2	0·03
France	0·17	0·04	0·02

Lastly, the proportion of the species to the genus and family is—

	Species to the genus.	Species to the family.
Maine-et-Loire . . .	2·7	14
Centre of France . . .	2·8	17
France	4·9	35

For each of the fourteen districts of Silesia the number of species to the genus varies betweeen 2·1 and 2·3, and the number of species to the family between 8·2 and 10·1; but for the whole of Silesia the numbers are 2·8 species to each genus and 14·4 to each family (Schneider, die Verth. &c. p. 210), and for the whole of Germany they are 4·2 and 19 (Koch).

I might multiply these examples, but a more general fact will be sufficient for the most complete demonstration. Of course the terrestrial globe is the largest region that we can take into consideration; its surface, deducting the parts covered by water, is 6,825,000 leagues; and if we suppose that there are 200,000 phanerogamous plants, which is one of the highest estimates that has ever been proposed, there would be for each square league 0·029 species, or say 0·03. Now the most restricted and even the poorest localities have an infinitely greater number of species to the square league. Thus, at the summit of the Pic du Midi de Bagnères, there are 71 phanerogamous plants upon a surface of 200 metres (Ramond); in Scotland, on the most monotonous peaty plains, there are from 50 to 100 Phanerogamia in a square English mile; and in the environs of London, which do not possess a great abundance of spontaneous plants, 400 species have been counted in a square mile (Watson, Phytol. 1838, p. 267).

In the entire vegetable kingdom, that is to say, for the whole surface of the earth, there are about 12 species to each genus

and 500 to each family, whilst all the separate Floras, even those of large countries, are far from presenting such high numbers.

This will show how troublesome it is to compare the proportions of the species by genus or family, and also the number of species in relation to the surfaces, between countries of very different extent, as for instance between a small island and a continent, an isolated summit or a small alpine zone and a larger subalpine region, or a great northern country. Nevertheless these comparisons have been made even by esteemed authors, but it is always necessary to study methods before employing them, and in nothing is this more true than in statistics.

6. *Analogies with other Floras.*

There are other facts to be ascertained besides the resemblances and differences between the vegetation under consideration and that of adjacent countries, or those with an analogous climate. The relations and differences may exist in all the kinds of characters. We must of course endeavour to lay most stress upon the principal ones, and for this purpose it is necessary to acquire fixed ideas as to the relative value of the characters of vegetation.

II. Relative Value of the characters of Vegetation.

Some geographical botanists appear to attach the greatest importance to numerical abstractions, probably on account of the precise form of documents of this nature. I cannot adopt their opinion, and precisely because I prefer exact methods, and exactitude does not always consist in preferring numbers to words, but in giving its true importance to every thing and every point of view.

In endeavouring to comprehend and depict the general vegetation of a country, I should first direct my attention to the characters which strike everybody, and which constitute the principal features of the picture. These characters may sometimes be expressed by figures, and then it is advisable to take advantage of them; but this is not always the case. The ordinary forms of language, if they express matters of greater importance, appear to me to be preferable to numerical characters of the second or third order.

The general division of the soil, into marshes, pasture-land, forests, maritime districts, cultivated lands, &c., appears to me to be the thing which at the first glance furnishes the most just notion of the vegetation of a country. We have not only a physical character, such as the temperature and the humidity of the air, but for the forests and meadows also a botanical

character, and one of the most important. If the degree of civilization of the country allows us to ascertain exactly the proportion of these great kinds of *station*, it will be well to give it in a numerical form. In this case the numbers express what is essential to be known, in an exact and condensed form.

After this, I regard it as important to ascertain *the commonest species* in the *stations* which occupy the greatest amount of space, and in particular the social arborescent species, that is to say, those of which the forests are exclusively composed. In highly cultivated countries the indication of the principal agricultural species is almost of equal importance.

In the third degree of importance I should place the *enumeration of the principal genera*, the indication of the *predominant* and *characteristic families*, the frequency or rarity of certain great *physiognomical categories*, such as succulent plants, evergreens, annual plants, &c.

Lastly, I should give the lowest place to the characters which only a botanist can discover, or which result solely from a complete investigation, and from calculations made from books,—such as the indication of *rare species, the proportion of the Dicotyledones to the Monocotyledones, the total number of species, genera and families, that of the species peculiar to the country, and the average number of species to the genera and families.*

The analogies and discrepancies, in relation to other countries, have more or less value according as they repose upon one or other of the characters, of very different degrees of importance, to which I have just referred. These reflections appear to me to be adapted to the guidance of the authors of Floras, and travellers who describe vegetation. They show to the former that there are some numbers which it is useful to calculate, and others that are useless or even deceptive; and to the latter that certain essential facts are not evident on the spot or to the eyes.

PROCEEDINGS OF LEARNED SOCIETIES.

ZOOLOGICAL SOCIETY.

January 24, 1854.—Dr. Gray, Vice-President, in the Chair.

A Monograph of the Genus Ruticilla. By F. Moore.

Genus Ruticilla (Ray), Brehm.

Syn. *Ficedula*, Boie. *Phœnicura*, Swains. *Chaimarrornis*, Hodgs.*

1. Ruticilla phœnicura, Linn.

Syn. *Motacilla phœnicurus*, Linn. S. N. i. p. 335.
Sylvia phœnicurus, Lath. Ind. Orn. ii. p. 511; Gen. Hist. vii. p. 21.
Ruticilla sylvestris, Brehm, Vœg. Deutschl. p. 363. t. 21. f. 4.

* Altered to *Chaemarrhornis* by Agassiz, in his 'Nomenclator Zoologicus'.