

HINTS  
ON THE FORMATION OF  
LOCAL MUSEUMS.

BY  
THE TREASURER  
OF THE  
WIMBLEDON MUSEUM COMMITTEE.

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THE

**POPULAR SCIENCE REVIEW,**  
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**JAMES SAMUELSON.**

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Prof. Buckman, F.L.S.,  
F.S.A., F.G.S.  
James Breen, F.R.S.A.  
Dr. Collingwood, M.A.,  
F.L.S.  
W. Crookes, F.C.S., F.L.S.  
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E. Jesse, F.L.S.  
Dr. Lankester, F.R.S.  
Mrs. Lankester.  
G. H. Lewes.  
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A. de Quatrefages.  
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with the most valuable specimens.

LOCAL MUSEUMS.

## WIMBLEDON MUSEUM NOTES.

UNDER the above title it is proposed, from time to time, to publish a few pages containing suggestions about the formation of the Wimbledon Museum, with reports of the progress of its various departments. It is hoped that these "Notes" may also serve as a guide to the promoters of Local Museums elsewhere.

*Number One*

OF

### WIMBLEDON MUSEUM NOTES

Will shortly be published. It will contain:—

1. Suggestions regarding the commencement of the Wimbledon Local Museum, pointing out what may be done preparatory to the erection of a Museum Building.
2. The exact boundaries of the Museum Area comprised in a radius of five miles from the Parish Church. With a Map.
3. The name and address of each inhabitant who has undertaken the collection and preservation of objects for the Museum, particularizing the class of objects selected for collection by each person.

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*Joseph Toynbee*

*London :*  
Robert Hardwicke, 192, Piccadilly.  
1863.

*“Tongues in trees—books in the running brooks—  
Sermons in stones—and good in everything.”*

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## *PREFACE.*

Inasmuch as a Village or Parish Club possesses great facilities for originating a Local Museum, a few words regarding the Wimbledon Village Club, may not form an unsuitable preface to an address on Local Museums.

The Wimbledon Village Club, which has been in successful operation for some years, is intended for the recreation of all classes ; it consists of Honorary Members, who pay ten shillings yearly, and of Ordinary Members (artisans, labourers, &c.), who pay 8d. monthly, 1s. 6d. quarterly, or 5s. yearly. Ladies may become Honorary

Members. Persons temporarily resident in the Parish may be admitted as visitors, upon introduction by a Member, and upon payment as follows:—By visitors of the Ordinary Member class, 1d. per day; by those of the Honorary Member class, 2s. 6d. a month.

The Club is managed by a Committee, composed for the most part of both classes of Members, elected annually by each class out of its own numbers. It consists of

1. *A Reading Room*, supplied with Daily and Weekly Newspapers, Periodicals, and Books.\*

2. *A Smoking Room*, in which Chess, Draughts, Dominoes, and Newspapers, are provided.\*

3. *A Library*, from which Members, if subscribing for not less than a quarter, have the privilege of taking books home.

\* These rooms are open to Members:

*On Week days* from 8 to 10 a.m., 1 to 2 p.m., and 5 to 10 p.m. *On Sundays*, the Reading Room only, from 8 to 10 o'clock p.m.



*A Lecture Room* is attached to the Institution, in which Lectures, Penny Lectures, Penny Readings with Music, Chat Meetings, or Tea Meetings, are given weekly during the season.

*Penny Lectures* are short lectures on various subjects, of thirty minutes each, given by different gentlemen, on the same evening. *Penny Readings* are three or more short readings by different readers on the same evening. Music adds to their attraction. *Chat Meetings* are described at page 27. The payment at a Lecture, Lecture, and Reading, is one penny; reserved seats, sixpence; at a Chat Meeting, twopence each. Financially and otherwise these entertainments are most successful.

*Classes* in various subjects to be held in the evening.

*Refreshments* are supplied by the House-keeper at moderate charges.

There appears to be no reason why a

local club, of the character of the Wimbledon Village Club, should not exist in every village or town, or in each parish of a large city. A village, town, or parish club, constituted like the Wimbledon Club, is admirably calculated to meet the wants of the working classes, as regards their recreation and instruction. And, while it furnishes amusement and instruction to all classes, it brings them together at its various meetings in friendly intercourse; the management of the institution, and the organization of its several proceedings, afford a valuable experience to the Committee, who portion among themselves their respective work, and the preparation of the Lectures, Lecturets, Readings, &c., proves a healthy mental stimulus to those intelligent inhabitants, who desire to take part in one of the most delightful of duties, viz., the conveyance to the minds of others an interest in those pleasing and elevating subjects from which,

happily, their own minds derive gratification.

J. T.

Wimbledon Common,  
December, 1862.



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## On Local Museums.

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It having been suggested to the Committee of the Wimbledon Village Club, that it would be highly desirable to form a local Museum in connection with their Institution, they appointed a Museum Committee to make arrangements for its establishment.

The Museum Committee, on commencing their duties, gladly accepted the offer of their Treasurer to prepare an address, defining briefly the principal objects in view in the formation of a Museum at

Wimbledon. This address, which will be found to contain general suggestions regarding the formation of Local Museums, they now publish.

### ADDRESS.

The Wimbledon Museum Committee wish it to be understood in the very outset of their undertaking, that their Museum is to be purely local; it is to consist solely of such objects of interest characteristic of Wimbledon and its neighbourhood as may be found within a radius of five miles from the parish church.

To the suggestion that a purely local Museum be formed at Wimbledon, it has been objected that "Wimbledon has neither rare nor curious objects to exhibit."

The reply to this objection is, that the end of a local Museum is not the exhibition of rare and so-called curious

objects; but to develop and foster, in the minds of all classes of people, an interest in the common objects of Nature which surround them—objects ever abounding in beauty, and full of interest and instruction. And, therefore, although the village of Wimbledon possibly has no rare or very remarkable objects in its vicinity, it is nevertheless most desirable that it should possess a Museum, which will be a good illustration of what an ordinary local Museum should aim to accomplish—of what any village may accomplish.

The Wimbledon Museum should contain specimens illustrating the nature of the soil, the tribes of living beings (plants and animals) and the antiquities, if any, of the neighbourhood; and in its formation it is hoped that all classes of the inhabitants will take a part.

Another objection to local village Museums has to be answered. It has been said—“Where is the use of placing in a

Museum, common objects of the country which can be seen and collected by its inhabitants at any time, if they desire to have them ; and further, supposing a Museum to be formed on the plan proposed, it can surely be of but little interest, inasmuch as objects, precisely similar to its own, will form the contents of other Museums !”

In reply, it must be confessed that, as a general rule, man appears to be wholly unaware of the existence of by far the larger number of interesting living objects around him—of the vast kingdom, thronged with multitudes of subjects, over which he has a rightful dominion, but which he does not stop even to notice, much less to collect for examination. At the same time, it must be admitted that there is always some feeling of interest in Nature’s works, dormant though it be, in the minds of all men—a feeling that only requires to be roused into

activity to ensure pleasure in its exercise.

In the second place, supposing several Museums to have like contents, still the first great aim of local Museums, as already indicated, will have been attained, namely, the derival of interest and instruction by the inhabitants of each place—the makers of the Museum—in the act of its formation, in its careful inspection, and in the renewal of its specimens. Further, supposing, as is possible, that several local Museums should contain similar specimens, this fact itself will be a new source of interest, for it will indicate that places, some of which are possibly far apart, must be subject to similar influences in order to produce similar specimens. And doubtless, when objects in different Museums, at first supposed to be identical in their characters, are submitted to careful scrutiny, many material differences, more or less marked, will be discovered, and fresh fields

of research be opened up in the endeavour to trace the causes of such differences.

If called upon to particularize objects, whose collection, preservation, and careful examination would be a source of never-failing interest to the inhabitants of Wimbledon—young and old—the Museum Committee, speaking in very general terms, may point to the following list:—

(a) *Mineral Kingdom.*

1. Different kinds of sand, and of pebbles forming the gravel, and of fossils surrounding the pebbles, or within them.

2. Varieties of peat and clay, to illustrate the nature of the surface earth.

(b) *Vegetable Kingdom.*

1. Confervæ.

2. Lichens.

3. Fungi.

4. Mosses.

5. Ferns.

6. A collection of flowering plants, to show the leaf, flower, seed, and stem, arranged according to the natural system.

7. Seeds of different plants, seed vessels, and their skeletons.

8. Specimens of woods, also in section, (transverse and longitudinal) and their bark.

9. Several series, showing the stages of growth of a bud, from the period of its formation to that of its leaves, flower, seed, and bud again; series of leaves and their skeletons.

(c) *Animal Kingdom.*

Polypes, infusoria, and other animalcules, found in ponds and streamlets; worms, &c.

*Insects.*—Butterflies, dragonflies, flies, moths, gnats, beetles, spiders, bees, wasps, &c., and the various stages of their development.

*Mollusca.*—Land and fresh water shells.

*Fish.*—From lakes and rivulets.

*Reptiles.*—Frogs, the stages of their development from egg to tadpole, and perfect animal; toads, newts, efts, snakes.

*Birds.*—Stuffed, and their skeletons; the plumage of male and female, at different periods of the year; their nests and eggs. It would also be of interest to compare the skeletons of a house-sparrow, hedgesparrow, robin, wren; also their food.

*Mammalia.*—Stuffed, and their skeletons. It would, for example, be interesting to compare the skeletons of a bat, mole, rat, stoat, weasel, squirrel, hedgehog.

(d) *Antiquities.*

The vicinity of Wimbledon having been the site of one or more ancient camps and abbeys, it would be interesting to have drawings or photographs of them or specimens of relics.

In addition to objects of interest (to speak generally), a local Museum should



possess drawings and photographs of others which cannot be preserved, or magnified drawings of objects or parts too small to be seen by the naked eye; and it should also contain records from several persons during series of years, of the dates of the yearly appearance and disappearance of flowers, plants and animals.

It is proposed,

(1) That the collection forming a local Museum at Wimbledon be placed in a room for the purpose, or in cabinets and glazed cases against the walls of some public room.

(2) That all specimens, which must be in good preservation and in a state calculated to keep well, shall be sent to the Honorary Secretary of the Museum Committee, accompanied by the name and address of the collector, the name of the object, the exact place and time of collection, and any other circumstances of interest, all to be legibly written.

(3) That a record of facts interesting in Natural Science shall be preserved in the Museum.

(4) That a list of plants and animals found in the Museum area, be drawn up, printed, and circulated.

(5) That an accurate register of the daily reading of the Barometer, Thermometer, and Hygrometer be kept in the Museum.

(6) That a Descriptive Catalogue be kept of the contents of the Museum.

(7) That a collection of works on Natural Science be kept at the Museum, for reference by subscribers.

Having perused this address thus far, the reader may perhaps be disposed to say, "surely it is impracticable in a village like Wimbledon, for example, to form and preserve a Museum, to keep satisfactory records, and to make an efficient catalogue; too much work will be required."

If the chief aim of a local Museum be steadily kept in view, namely, the diffusion of interest and the division of work among many (and ladies and children are by all means to be included), this objection becomes transformed into an advantage, for the interest and work must be divided among many heads and hands; thus, why should not one villager take charge of the formation and preservation of one particular department of the Museum in which he may happen to take, or in which he feels disposed to take, especial interest? For example, why should not one person devote himself to the department of moths, or flies, or butterflies, or dragonflies, or bees, or wasps, or gnats, or beetles, or spiders, or ants, or snails, or worms, or to one class of fish, or reptiles, or birds, or mammalia, or to lichens, or fungi, or mosses, or ferns, or particular classes of flowers, or seeds, or woods, or barks, or fossils? The observation, collection and

preservation of any one of these classes of objects would give ample work to any individual, or indeed to two or three associated together, or even to a family ; at the same time, that the interest taken by each worker in other departments than his own, would be increased rather than lessened.

Again, some one person may be appointed to draw up a list of plants, another to receive information from villagers regarding the migration of birds, a third the dates of the first and the latest appearance of annual flowers, a fourth the total disappearance of plants or animals, a fifth the habits of certain insects, fish, birds or quadrupeds ; while all would be aided in every way possible by the Committee ; and the specimens, if duly preserved, and the facts, if accurately recorded, would be of interest to the inhabitants, not only of our own village, but to those of all villages, towns and cities in Great Britain ; indeed to the inhabitants of all lands, wheresoever the

contemplation of God's works cheers and elevates the mind of man.

A further objection, of a similar character to the last, will probably be urged. It may be said—"Supposing it be granted that in the village of Wimbledon, and in other parishes equally favoured, inhabitants will be found who are able and willing to take part in the formation of a Museum and in keeping records, still, is there any probability, any hope of a similar success in villages remote from London and other large cities—in villages without resident gentry, but with small populations composed almost wholly of agricultural labourers?"

Now, it may safely be asserted, that there is not a single village in the land which does not contain some inhabitants who would willingly and gratefully learn more about, and take an active interest in, the observation and collection of Nature's works; further, it may be said that there

is not a single grown-up inhabitant of any village in the land, who has not, at one time or another, felt a strong desire to obtain some knowledge of the wonderful living world around him, who has not tried to learn a little concerning it, but who has too often given up all hopes of success, because he saw no means of satisfying his desires for information. No; it has already been said that a love for Nature's works, and a feeling of interest in them, are implanted in the mind of every human being, however few may be the opportunities for the cultivation of his mind, whilst each naturally looks up to those of higher mental cultivation than himself for a friendly, uplifting hand. And in the most obscure of country villages situated in the so-called dreariest of lands, are not friendly, uplifting hands to be found? Surely there is the clergyman, the medical man, the schoolmaster, the intelligent Mr. So-and-so, some one or two, at least, who would gladly aid

to fan into a flame the sparks of interest in God's works, shut up and smouldering, and, alas ! too often dying, in the breast of many a villager ; a flame that might possess the happy influence of burning out and destroying other flames less pure, less worthy than itself. But how is this good work to be accomplished ? How can a development of the love of Nature's works, and an union of all classes of a village in that pleasant elevating intercourse attendant upon the formation of a local Museum, be brought about ? Doubtless there are, in every English village, some inhabitants, at least, who, from a sense of duty, a love of Nature's works, or a sympathy for their toiling fellow-men, would gladly take an active part in forming a Museum, if they were not afraid that their efforts would end in failure.

It may, therefore, be well to impress upon the minds of all those desirous to promote the formation of local Museums, that if they start with right views, that

is to say, if they take a real interest in Nature's works and are possessed by a desire to bring them to light for the enjoyment and instruction of themselves and their fellow-villagers ; if they are not too ambitious to make their Museum a show, *then there can scarcely be a failure*. Supposing that merely a few books on Natural History and Botany are brought together—supposing that a few specimens of pebbles, fossils, plants, insects, animals, be collected, arranged, and preserved by a few inhabitants of a village—here is still a worthy beginning of a Museum, a beginning too which, if it advances no further, is not a failure ; for the collection, small though it be, stands there for the instruction, and incitement to go forward in the same field, to all around, and especially to the young, whose tastes are daily growing and requiring to be directed aright. And such a simple collection as the one now alluded to, must not be looked upon as insignificant, for in reality it sig-



nifies much; upon its face is legibly written the great lesson that God's creatures, common and small as many of them may be, are still found worthy of being watched, studied, carefully preserved, and kept for the contemplation and education of that creature, whom God endowed with the high gift of reason, and made in His own likeness.

Indeed, there is perhaps more hope of the success of a Museum in a small agricultural village than in a large city; for in a city the great difficulty consists in exciting an interest among its numerous inhabitants. Nevertheless, the comparatively slight interest taken by the larger portion of the populations of towns and cities in their present Museums, crowded as they are apt to be with curiosities from all parts of the globe, in the collection of which the inhabitants have taken no part, and to the exclusion of local objects, must by no means be cited as a proof that *local Mu-*

seums, made and preserved by the inhabitants of the place, will not be eminently successful, if some means can be devised for securing the interest and co-operation of the inhabitants. That an interest in the common objects of Nature pervades even the poorest classes resident in large cities, is evident from the fact that thousands upon thousands of little flowering plants are every spring bought by the inhabitants of city courts and alleys, cherished and tended like children, placed on the window-sill — often in the only corner where the rays of the sun can be caught — washed and cleansed from the city's smoke and dust, and thus kept alive for many weeks, and thrown away at last reluctantly, when the last leaf is green no more.\*

\* The writer of these lines, when busy among, and intimate with, many of the poor of London, distributed to several families small Wardian cases, and though of a very humble character, doubtless, to the benevolent mind of their inventor, not unacceptably still retaining his name. These

Akin to this love of plants by the poor, is their love of animals. How often is a cat kept and petted, and supplied with its daily feast of milk, where the mice have no hopes of living!—how often does a poor lonely man or woman tend the little bird in a cage, as if it were the only loved thing in this life. And surely this love of natural objects might be turned to a good account in the formation of Museums, especially in these days of cheap omnibuses, under-

Wardian cases consisted of an old soup plate, containing some mould, a few sprigs of lycopodium, or small ferns, and a bell-glass, about six inches broad and eight high. In these glasses the poor were supplied with a constant view, all the year round, of the purest green leaves and the graceful forms of the slender stems bearing them. The writer will not soon forget the delight with which these presents were received, especially by the sick and bedridden—how affectionately they were watched, how they formed the subject of pleasant conversation time after time, and how some were to be seen carefully guarded after ten years' gratification had been derived from them. The price of these cases was about one shilling each.

ground railways, and central stations, so that the poor sickly lodgers in crowded streets and narrow courts may have an additional inducement to leave for a time the dust and smoke and din of the city, to wander in the fresh green fields, or over the hills, or through the woods that encircle them, and are in effect within but a few minutes from them. A celebrated professor of natural history once projected the formation of a Museum of natural objects collected from the gardens of Lincoln's-Inn-Fields, and only abandoned the idea because the great abundance and variety of objects demanded too much time and attention. In the month of July, 1862, two gentlemen on one day collected, in the open ground of Battersea Park, 230 species of plants.

But cannot the difficulty above referred to, of creating an interest in behalf of a Museum in a large city, be met and over-

come? The most practical suggestion appears to be, that in a large town or city *each parish might have its own Museum*, the contents to consist of objects collected from a radius of five (or even more) miles from the parish church. If this plan were followed, a worthy emulation would be excited by the comparison of one Museum with another; when the objects are of the same kind, it would be interesting to see which are the finer specimens, which best prepared and preserved, which best illustrate their particular structure: and as the area providing objects for parish Museums would slightly vary in the case of each parish, additional interest would arise in observing what objects are found in one Museum that are not found in another. And it must be remembered, that whether a Museum is to be formed in a village, town, or city, the first step should be to define by the Ordnance Map the boundaries of the

space from which the contents of the Museum are to be collected.

The Committee (in the present address) having thus far answered all the objections that have been urged against the probability of the success of local Museums, have now to meet an objection of a wholly opposite character. It is this—"Supposing Museums of natural objects be general in villages and parishes, the face of the country will be stripped of its most rare and beautiful things for the purpose of their being transported into the local Museum." Now it is sincerely to be hoped that a result will accrue directly opposite to the one just indicated. In the first place, people having been led to regard carefully the wonderful properties and the beauties of living things, will have thus learnt to respect them, and so the wanton destruction of animal and vegetable life, now too frequently to be deplored, will be lessened, if not wholly averted; in the second place,

an object will not be taken from its habitat without due consideration on the part of the observer as to whether it be really required, whether a specimen of a similar kind be or be not already in the Museum ; and, in the third place, the objects that are but sparingly distributed over the Museum area, and consequently partaking somewhat of the character of rarities, will be watched, cherished, and their lives preserved.

It may be well to add a few words on the subject of *finance*. Doubtless, in very many villages and parishes the inhabitants, with a strong desire to form local Museums, might be deterred from commencing their work from the fear of a want of money. Now, in all cases where money can be obtained in abundance, it should be devoted to securing a good-sized, light, well-aired room, in buying cases and cabinets, glass shades, bottles, spirit, and in paying for the stuffing and preservation of objects

requiring skill and much time in their preparation; and it will frequently happen that villagers will be found able, and, if their expenses are paid, willing to undertake the work of stuffing, articulating skeletons, &c. It must nevertheless be borne in mind that the more simple and economical the arrangements of a Museum in the outset, the more steady the rise of interest, the more gradual its progress, and the offers of co-operation in its formation, the greater will be the hope of ultimate success. And if at first sight the difficulties in the way of accomplishing so desirable an object as the formation of a Museum by villagers, should even appear to be great, the greater will be the satisfaction in beginning most humbly, and in progressing gradually, even if the steps are very small, for it must be felt that the ascent of each step is fraught with pleasure.

Therefore, on the plea of inability to



meet the requisite expenses, let no village, however insignificant, despair of forming a local Museum. Each village has a room, or rooms, for the purposes of a school, and a school-room might perhaps be used, at least in the commencement of the undertaking: a case against its walls would form a good beginning, and its presence there might be very valuable in stimulating the children to the observation and collection of natural objects; while, in the early morning or in the evening, the workers at the Museum might kindly be permitted to pursue their labours. Or, if the school-room be objected to, then surely a room may be found in most villages suitable to a certain extent, for the purposes of a Museum, and kept for use at the cost of a few shillings a week; and doubtless if no others were to be found to put their hand in their pockets to forward the work, the neighbouring farmers would gladly provide the rent of a Museum room, if they saw

so humanizing an influence among their labourers as that attendant upon the observation and collection of natural objects. But the clergyman of the parish, who has so enviable a power, and such numerous opportunities, for doing good, has but to open his lips, and the small sums of money required for rent, for cases, for bottles, for spirits, would flow in amply: the penny of the labourers, the shillings of the tradespeople, and the pounds of the more wealthy, would be willingly given; indeed, with how much gratification would the landed proprietor bountifully give his aid, when he saw the people stirring and helping themselves in so good a cause.

Lastly. It has been asked by some, desirous to see a local Museum established in their parishes, "Can you give us some definite directions how to set about its formation, supposing we are able to obtain money: and if we have people capable of

being interested in a Museum, how are we to set about interesting them?" To hold a "Chat Meeting" on the subject is, perhaps, as practicable as any. And what is a "Chat Meeting?" A Chat Meeting is a simplification of a Soirée or a *Conversazione*. It originated in the idea that many parishioners having in their homes interesting objects, the examination of which would afford pleasure and instruction to their fellow-parishioners, would, on certain occasions, gladly take these objects to a room appointed for the purpose, and display and explain them. Suppose half-a-dozen parishioners to bring objects on a certain evening, each parishioner taking a table, and in a quiet, chatty way, showing and describing to his brother parishioners the objects; one exhibitor would not interfere with another, and several pleasant chats might go on at the same time at different tables; this constitutes a Chat Meeting, and, with ordinary care, and

scarcely any trouble, a Chat Meeting may be made very agreeable, entertaining, and useful. For instance, a parishioner who has a microscope may display in it on one evening a series of sections of woods; on another, the circulation in the web of a frog's foot; on a third, the structure of a leaf, &c. Another parishioner might show, in his stereoscope, some of his series of views, say, of parish churches, English cathedrals, or Swiss views; a third might have on his table a portfolio of portraits of celebrated persons; a fourth might explain some kind of game; a fifth might have a table of specimens of cottage prints; a sixth, some drawings from nature, some outline engravings, some books of prints, or designs, or illustrations; some one thing or another of interest to the owner, who would be able to communicate his interest to his brother parishioners; while the meeting might commence with a general statement from the Chair of the

objects exhibited during the evening, pointing to the tables where they were to be seen. A meeting, of a character similar to that just adverted to, but with the especial aim of displaying fitting objects for a Museum—a Museum Chat Meeting—would be a good introduction to the establishment of a Museum. Thus, after a little preparation, one parishioner might bring a series of dried leaves; another a series of mosses or fungi; a third specimens of different woods or their bark; a fourth birds' eggs and nests; a fifth books on Natural History or Botany with plates; a sixth some insect, or part of an insect, as the foot, or eye, of a fly, under the microscope or lens; a seventh a stuffed bird or two; and an interest being excited in the minds of the visitors, they would probably be induced to offer to take part in the collection and preservation of objects.

A few remarks may be offered respect-

ing the *classification* and *arrangement* of specimens in a Museum.

Of course, in addition to the antiquities, the three chief divisions or departments of a Museum will correspond with the three great kingdoms :—

The Mineral.

The Vegetable.

The Animal.

*The Mineral Kingdom Department,*

may be arranged according to the successive layers or strata of which the ground consists.

Thus, at Wimbledon, the several kinds of peat, sand, gravel (and clay, where it exists), may be preserved in glass jars, so that the characters of each may be recognized at a glance; the various kinds of pebbles should be preserved, and the fossils found in the substance of the flints, or dispersed among the gravel, may be arranged according to their position in the scale of animated beings.

*The Vegetable Kingdom Department,*

may have two leading divisions :—

*The First division* comprising the Non-flowering Plants, as Lichens, Fungi, Mosses, Ferns ; sometimes called *acotyledons* (without cotyledons or seed-leaves), or *cryptogams* (concealed fructification or seedless) ; because “they do not bear manifest flowers, nor produce seeds containing an embryo, as do the great classes of dicotyledons and monocotyledons.”

*The Second division* comprising the Flowering Plants ; this may have two leading subdivisions, illustrative of “the two great classes into which flowering plants are to be found grouped in Nature.” These subdivisions are named according to the manner in which the wood is formed, Exogens and Endogens.

*a. The First subdivision.* Exogens, (producing outwards) so called from the new wood being formed in rings placed

outside the old. This subdivision is also called dicotyledons (two cotyledons) from the seed having two rudimentary leaves ; because the plants “in their early condition, while yet enclosed in the seed, nearly always have two (or sometimes more) little opposed lobes or leaflets.” In this subdivision “the parts of the flowers are most frequently in *fives* or *fours*, and the small veins of the leaves are commonly irregularly netted.” Examples of dicotyledons or Exogens—the oak, beech, pea, mustard.

*b. The Second subdivision.* Endogens, (producing inwards) so called because the plants “having woody stems, form bundles of wood which do not usually increase in thickness year after year ; once formed, they remain unaltered in diameter, scattered through the pith-like substance of the stem.” In this class, also called monocotyledons (one cotyledon), from the seed having only one rudimentary leaf, “the



parts of the flowers are usually in *threes*, and the veins of the leaves excepting in a few orders are parallel, or if diverging, are not irregularly netted.”\* Examples of Monocotyledons or Endogens — wheat, grass, reeds, rushes.

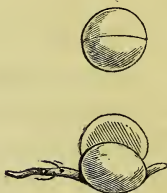
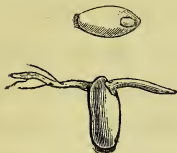
The subdivisions of the Vegetable Kingdom may be seen at a glance in “The Tabular View of the Vegetable Kingdom,” by Mr. Henfrey, published by the Christian Knowledge Society, in Bentley or Lindley.

\* The observations on the classification of the Vegetable Kingdom, in inverted commas, are from the “Official Guide to Kew Museum,” by Daniel Oliver, F.S.S. 1861, price 6d. On the following page, the leading characters of Exogenous and Endogenous Plants are shown by illustrations.

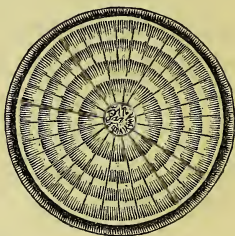
Endogens, or  
Monocotyledons.

Exogens, or  
Dicotyledons.

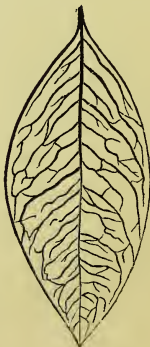
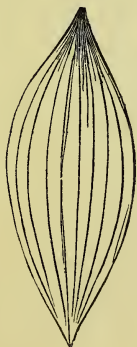
Seed.



Wood.



Leaf.



*The Animal Kingdom Department.*

In the arrangement of the *Animal Kingdom*, the two leading divisions will be the *Invertebrate*, and the *Vertebrate*—animals without, and animals with, vertebræ—*i.e.*, spinal columns. At the head of each of these two divisions, it may be well to place an illustrative specimen, the largest fresh water shell, for instance, as an *Invertebrate*; and a skeleton of a rabbit, for instance, as a *Vertebrate*.

The *Invertebrate Animals* may be arranged in three classes, thus:—

1. Radiata.
2. Articulata.
3. Mollusca.

It is always advisable to place a good sized specimen of each class outside the cabinet as a type of that class. The subdivisions of the invertebrate animals may be arranged according to Patterson's Introduction to Zoology.

The *Vertebrate Animals* are represented by four classes :—

1. Fish.
2. Reptiles.
3. Birds.
4. Mammalia.

As an introduction or heading to each department, or sub-department, specimens, illustrative of the leading characters of the department, or sub-department, may be placed together in a little series. Thus, at the head of the Endogenous and Exogenous plants, should be placed a few dissected specimens, showing distinctly the characters of Endogens and Exogens; at the head of each class of insects should be placed a dissected insect illustrative of the class; at the head of each tribe of birds a skeleton of a good specimen of the tribe, &c., &c.

The chief object of this address is to advocate the formation of purely *local*

Museums, but it is to be hoped that the establishment of such Museums will lead to secondary results of considerable interest and value.

For instance, it is hoped that the presence of a Museum will lead to the introduction of Museum Chat Meetings, Lectures, Lecturets, and Readings, upon subjects illustrated by the Museum, and upon which it is desirable to diffuse information.

Thus, why, on certain occasions, should not objects be taken from the Museum to some spacious room, and be displayed and explained by means of microscopes, magnifying glasses, diagrams, drawings, plates, books, and their nature illustrated by comparison with objects of a similar character taken from other localities in England, or even from foreign lands? Again, why, from time to time, should not the collectors of some particular series — say lichens, or grasses, or ants, or spiders and

their nests, or stones—give, on the same evening, short accounts of their proceedings and their collections (Lecturets), illustrated by specimens, drawings, or photographs? And, further, why should not there be Penny Museum Readings, at which subjects of interest may be investigated by reading the opinions of various writers regarding them? Such Meetings, Lecturets, and Readings, must not be considered to fail in their aims because they are, especially at first, but scantily attended; rather let their promoters be satisfied, if only a very few are found to join them and take an interest in them, for many causes may in the beginning operate to prevent their being generally attractive. Among these causes may be named the fact that a taste for, and a delight in, the study of natural objects, though innate, requires time for its cultivated development.

It is hoped that another good result of

the formation of purely local Museums, will be the rise, by their side, of general (typical) Museums. For example, when the inhabitants of a village or town have made in their local Museum a collection of specimens—say of grass and reeds, for instance—and when they have become familiar with the several species in their own neighbourhood, their sizes, characters, &c., with what increased interest will they compare with them, objects belonging to the same genus from other parts of their own country, or from foreign countries; comparing intelligently the sugar-cane and its sugar, or the tall bamboo, with the stems of our grasses and reeds; with how much interest will the Museum-workers of one locality in England seek to compare the productions of their own locality with those of other localities: and this desire to compare the products of other localities with those of their own, may lead to the interchange of specimens and the form-

ation of the typical Museum. Regarding the interchange of specimens, Professor Forbes says, "In every Museum of natural history, and probably in those devoted to other objects, there gradually, often rapidly, accumulates a store of duplicates, that if displayed in the collection render it more difficult to be studied than if they were away altogether, occupying as they do valuable space, and impeding the understanding of the relations and sequence of the objects classified..... Yet, out of these duplicates, more or less perfect sets of specimens might be made up, of very high value for purposes of instruction. A well organized system of mutual interchange and assistance would be one of the most efficient means of making Museums generally, valuable aids to education."\* Yes, there can be but little doubt that the formation of a purely local Museum, from a radius of five miles, will often lead to a

\* "On the Educational Uses of Museums," p. 16.



general typical Museum, or a division in which may be collected examples of the contents of other Museum areas, as well as of objects from foreign lands ; but it is important to bear in mind the necessity of keeping these divisions distinct from each other, and to allow the formation of the general Museum of types to follow only in illustration of the contents of the local Museum. It is quite possible for the two Museums to be successfully established, if made in the order above indicated, by which information and interest increase step by step, and where the typical specimens only illustrate the local ones.

And in many localities, doubtless a still further step would be taken in the development of Economic and Industrial Museums. In the year 1852, Mr. T. Twining set forth, in a memorandum to the Society of Arts, "the advantages which the working classes might derive from a collection of specimens, models,

diagrams, &c., illustrative of the successful applications of modern science and ingenuity to the improvement of their condition in their dwellings, furniture, and household utensils, their food and clothing, their industrial pursuits, and their intellectual development; in short, of everything which might enable them to promote the health and comfort of themselves and their families.”

Mr. Twining, in furtherance of his object, commenced an Economic Museum at the Society of Arts, in 1856; it is now located for more complete development in a building erected on the grounds of Perryn House, at Twickenham, S.W. (This Museum is open free on Wednesdays, between two and five, by orders obtained from the Secretary of the Society of Arts.)

Among the many *Industrial* Museums, those at Jermyn Street and South Kensington, in London, at Edinburgh, Dublin, and Liverpool, are prominent.

The following is the late Professor Geo. Wilson's fourfold idea of an Industrial Museum. It includes the conception of—

“ 1. An ample Exhibitional Gallery, where the raw or workable and other materials of industrial art, the tools and machines employed to modify these, and the finished products resulting from their modification, shall be displayed.

“ 2. A Laboratory and Workshop, where the qualities of industrial materials and products, and the effectiveness of industrial apparatus and machines may be investigated.

“ 3. A Library, where the special literature of industrial art may be consulted.

“ 4. Systematic Lectures on the contents of the galleries, the investigations of the laboratory and workshop, as illustrating industrial science.”

An address on the subject of local Museums would be incomplete were it not to contain a reference to the suggestions of

previous writers on kindred institutions. The subjoined remarks by Professors Kingsley, the late Edward Forbes, Phillips, and Bell, will be read with much interest, as embodying the opinion of men who have devoted much thought to the subject of natural science, regarding the value of local Museums. Professor Kingsley concluded a lecture on the study of natural history, delivered at Reading, in the year 1846, with the following words:—

“If the young men were really ready and willing to collect objects of interest, I doubt not that public-spirited men would be found who would undertake the expense of mounting them in a Museum. And you cannot imagine, I assure you, how large and how interesting a Museum might be formed of the natural curiosities of a neighbourhood like this, I may say, indeed, of any neighbourhood, or of any parish; but your Museum need not be confined to the neighbourhood. Societies now

exist in every part of England who will be happy to exchange their duplicates for yours. As your collection increased in importance, old members abroad would gladly contribute foreign curiosities to your stock. Neighbouring gentlemen would send you valuable objects which had been lumbering their houses, uncared for, because they stood alone, and formed no part of a collection; and I for one, would be happy to add something from the fauna and flora of those moorlands, where I have so long enjoyed the wonders of nature; never, I can honestly say, alone; because when man was not with me, I had companions in every bee and flower and pebble; and never idle, because I could not pass a swamp or a tuft of heather, without finding in it a fairy tale of which I could but decipher here and there a line or two, and yet found them more interesting than all the books, save one, which were ever written upon earth.”\*

\* “Miscellanies,” by C. Kingsley, vol. 2, p. 365.

Professor Edward Forbes, F.R.S., in the lecture referred to, "On the Educational Uses of Museums," delivered at the Museum of Practical Geology, and published in 1853, says, "It is to the development of the provincial museums that I believe we must look in future for the extension of intellectual pursuits throughout the land." .....

"When a naturalist goes from one country into another, his first inquiry is for local collections. He is anxious to see authentic and full cabinets of the productions of the region he is visiting. He wishes, moreover, if possible, to study them apart—not mingled up with general or miscellaneous collections—and distinctly arranged with special reference to the region they illustrate..... In almost every town of any size or consequence, he finds a public museum ; but how often does he find any part of that museum devoted to the illustration of the productions of the district? The very feature which, of all

others, would give interest and value to the collections, which would render it most useful for teaching purposes, has in most instances been omitted or so treated as to be altogether useless. Unfortunately, not a few country museums are little better than raree-shows. They contain an incongruous accumulation of things curious or supposed to be curious, heaped together in disorderly piles, or neatly spread out with ingenious disregard of their relations. The only label attached to nine specimens out of ten is, 'Presented by Mr. or Mrs. So-and-so;' the object of the presentation having been either to cherish a glow of generous self-satisfaction in the bosom of the donor, or to get rid—under the semblance of doing a good action—of rubbish that had once been prized, but latterly had stood in the way. Curiosities from the South Seas, relics worthless in themselves, deriving their interest from association with persons

or localities, a few badly stuffed quadrupeds, rather more birds, a stuffed snake, a skinned alligator, part of an Egyptian mummy, Indian gods, a case or two of shells, the bivalves single, the univalves decorticated, a sea urchin without its spines, a few common corals, the fruit of a double cocoa nut, some mixed antiquities, partly local, partly Etruscan, partly Roman and Egyptian, and a case of minerals and fossils—such is the inventory and about the scientific order of their contents.”

Professor Forbes proceeds to say, that “there are, however, admirable exceptions to this censure.....Ipswich and Belfast ought especially to be noticed.....the museums of Manchester, York, Scarborough, and Newcastle, might be cited as highly commendable likewise.”

The following lines are extracted from the conclusion of Professor Forbes' lecture:—



“I cannot help hoping that the time will come when every British town, even of moderate size, will be able to boast of possessing public institutions for the education and instruction of its adults as well as its youthful and childish population—when it shall have a well-organized museum, wherein collections of natural bodies shall be displayed, not with regard to show or curiosity, but according to their illustration of the analogies and affinities, of organized and unorganized objects, so that the visitor may, at a glance, learn something of the laws of nature—wherein the products of the surrounding district, animate and inanimate, shall be scientifically marshalled and their industrial applications carefully and suggestively illustrated—wherein the memorials of the history of the neighbouring province and the races that have peopled it, shall be reverently assembled and learnedly yet popularly explained.”

Now the first step towards the possession of such a Museum as is here indicated by Professor Forbes, would be the formation of the simple local Museums advocated in this address.

Subjoined is the parting advice of Professor Phillips, addressed to the Malvern, and other field clubs, at Worcester :—\*

“ I would if it were necessary, urge all persons belonging to field clubs, not selfishly to retain the specimens they gather, but to deposit them where they may be of use to their fellow-explorers. My experience of the friendly disposition of the officers and members of those clubs, assures me that here it is not necessary. But I feel justified in proposing a mode by which their liberality may become more effectually and permanently beneficial ; I earnestly advocate and petition for the

\* “ On the Geology of the Malvern Hills,” by John Phillips, Esq., M. A., F. R. S., F. G. S. Worcester : Allgood, 1856.

formation of an entirely local Museum, at Malvern. Such an institution there, would prove of the utmost value; it is not so easy to establish as may be imagined. Whoever has the charge of it will have difficulty, except it be made a fundamental law, an invariable statute, to keep the Museum to its narrow, but useful purposes. You will be offered curiosities from every land, trifles from every sea. I entreat you to refuse all but what is the growth of your own beautiful Malvernia, or the gift of your Palæozoic and Mesozoic seas. Resolutely refuse to contend with larger communities, to adopt less definite objects. Have the courage to decline to accept any specimens whatever that do not actually belong to your own district. There is surely no reason why the British Museum should swallow up all the provincial institutions, and a district so exceedingly rich as Malvern, ought to have a Museum of its own."

The following remarks by Professor Bell, were addressed by him as the President of the Linnæan Society, in the year 1856, to the annual meeting of the fellows:—

“It was the observation of the most accomplished and fascinating writer on local natural history that England has ever seen, that if the natural productions of each district had their local historian, our knowledge of the natural history of the country would become more perfect than by any other means; and every one knows how beautifully, and how perfectly the author of that sentiment carried it into practice. It is indeed the only means by which this end can be obtained; and it is therefore with much pleasure that I advert to the numerous local institutions, now springing up in various directions, in some instances in connection with mechanics’ institutes, with schools, or other establish-

ments for the education or instruction of the middle classes, the principal design of which it is to allocate in a provincial Museum the natural products of the county, or of a more circumscribed district, and frequently associated with a collection of local antiquities. I have thought it might be useful to point out some circumstances which would conduce to the proper design of such institutions, and at the same time render them the means of greatly extending our acquaintance with indigenous zoology and botany.

“The primary object then of these institutions should be the collection and preservation of the animals, plants, and palæontological specimens which are found in the district; and to this should be added a full and accurate record of their habitats, and of any other interesting circumstances connected with them, whether of soil, of geological position, of meteorological phenomena, the period of the year when ob-

tained, peculiarities in their habits, and in short any facts which may bear upon their history. If in addition to this first consideration it happens that instruction is to be given by lectures, or other means, in the study of natural history, generally a typical collection may be added, which should be considered as entirely distinct from the local one, and as having a totally different object.”

In furtherance of the end advocated by the three gentlemen whose writings have been quoted, viz. :—the diffusion of a taste for the study of natural history, Dr. Acland, the Regius Professor of Medicine in the University of Oxford, in January, 1856, offered prizes “for Essays on the fauna of Christ Church meadow and the adjoining waters ; viz:—a prize of 25*l.* for the best monograph of the *vertebrata*, with notes on their habitats and history, and a collection of specimens ; a detailed anatomical and physiological description of one

species, together with the history of its development, and illustrative dissections and drawings or photographs. And a prize of 25*l.* for the best catalogue of species, a collection of specimens of the *invertebrata*, to be accompanied with a monograph of one genus, and illustrated with dissections and drawings or photographs."

Bearing on our subject, more perhaps in name than in any other respect, an interesting little pamphlet, published in the year 1858, and entitled "The Village Museum,"\* may be referred to. From this publication, and from private correspondence, it appears that the Vicar of Godstone, Surrey (for the writer is permitted to name the village), at Christmas time, in the year 1857, undertook the getting up a temporary exhibition, called a Museum. By the

\* "The Village Museum; or, How we Gathered Profit with Pleasure," by the Rev. G. T. Hoare, Tandridge, Surrey. Routledge and Co., price 6d.

aid of friends, a large collection of every possible kind of interesting object was brought together, and exhibited in the parish school rooms during several days, to the delight, amusement, and instruction of the parishioners and visitors. "The Village Museum" thus formed was somewhat similar to a Chat Meeting, only that the latter is supposed to be supplied with objects from the parishioners only, that it gives but little trouble, and is intended to be repeated not only yearly, but several times a year, so as to be a continuous means of affording instructive amusement to all classes.

The author of the pamphlet thus concludes his Preface. "The scheme may be made not only self-supporting, but, as in the case described, auxiliary to any funds for education, &c., in the neighbourhood. Of course, a considerable amount of local energy and skill is required to carry such an undertaking to a successful issue, and



the scale on which it is attempted must vary according to the resources of the neighbourhood. But the author is willing to believe that there are few neighbourhoods so barren in resources, or so destitute of energy and benevolence, that such an undertaking can anywhere be deemed impracticable."

The writer having communicated with Professor Owen and Professor Bell on the subject of local Museums, these gentlemen wrote him the following letters, with their kind permission to publish them. He may add, that Sir William Hooker, Professor Acland, and many other physiologists and naturalists, have also expressed a warm interest in the subject.

*Letter from Professor Owen, F.R.S., Superintendent of the Department of Natural History, British Museum.*

"Sheen Lodge, Richmond Park,  
"Jan. 19, 1862.

"Dear Mr. Toynbee—I believe that

the most useful Museum for a suburban locality, such as Wimbledon, contiguous to commons and wooded grounds and preserves, is that which is devoted to the natural objects of such locality. It gives a stimulus to observe and collect: it adds an interest to every object contributed, in the relation which each specimen always bears to its collector, and the circumstances attending its recognition. Well carried out, such a Museum is helpful to science in fixing a date to the Fauna and Flora of the district determined on, and in giving the material means of contrasting it with the condition of both at a later period in the ever-changing circumstances of a populous neighbourhood.

“ I am sure your neighbours will be surprised at the number and instructiveness of the objects of Natural History which will be brought together in a few years, if your excellent proposition is accepted and zealously carried out. The Works of the

Infinite so wonderfully surpass our finite means of knowing them, that a residue rewards the direct observer in the best explored localities.

“With every good wish,

“Yours most truly,

“RICHARD OWEN.”

“Joseph Toynbee, Esq., F.R.S.”

*Letter from Professor Bell, F.R.S., late  
President of the Linnæan Society.*

“The Wakes, Selborne,

“Jan. 24, 1862.

“My dear Sir—I do not at this moment recollect any work which gives a succinct and clear account of the best mode of collecting and preserving the objects to be kept in local Museums. If the following hints, however, are of any use to you, they are much at your service. The quadrupeds, which it would be necessary to preserve in any local Museum, are compara-

tively few and small. The Bats, which are especial objects of interest, should be cleaned and slightly stuffed, and may be pinned, or attached with thread, to small pieces of thin board, or of millboard, which may be made as neat as you please. The other quadrupeds, such as the smaller insectivora and carnivora, the shrews, &c., and the rodents, should all be well and naturally stuffed, as well as the birds, and should be kept in closely glazed cases. Most of the reptiles are better preserved in spirits. The cranium of every quadruped should be preserved, and the head and feet of the more remarkable birds. The bats, the moles, and the shrews are as yet objects of special inquiry, and the field naturalist in every district should take particular care to obtain specimens which would settle the question as to the identity or distinctiveness of several of the so-called species. Fish are nicely preserved by taking off half the skin, including the azygoi fins, &c.,

sticking them on board, and varnishing them. Shells of course are to be kept in drawers, and every variety of each species should be obtained. The land and fresh water shells are very beautiful, and every district has its specific molluscous inhabitants. The best way to free the shells from their inhabitants, is to plunge them into boiling water, and keeping them a few moments therein to ensure their absolute death, when the animal is easily removed. With regard to the collection and preservation of insects, every elementary work on entomology gives full directions.

“Plants should be dried between folds of bibulous paper, the best sort of which for the purpose is to be had of Newman, the editor of the *Zoologist*, Devonshire Street, Bishopsgate Street. They should be repeatedly changed during the process of drying and kept under considerable pressure, when fully dried they should be attached by thread or little slips of paper

to good white paper of an uniform size, and kept in bundles. Palæontological specimens should be kept in glass cases to be readily observed, and careful notes made of the locality in which they had been found. Every specimen, whether animal, vegetable, or palæontological, should have its generic and specific names, the locality and the name of the finder on a little ticket attached to the board, paper or other matter on which it is fixed.

“ Notes should be carefully made of the capture or discovery of every species. One of the most interesting results of these local collections will be the light thrown upon the geographical distribution of plants and animals, and the relation between the geology of the district and its organised productions. The notes should be occasionally examined, and selections from them published, either in a separate form as is done admirably by the Tyneside Naturalists' Field Club, and occasionally by that

of Greenwich, and some others, or by communications to such works as the Zoologist, &c., &c.

“ I fear that these homely hints are too commonplace to be worth your having, but they may at all events suggest fuller and more elaborate notes for your guidance.

“ Believe me, my dear Sir,

“ Faithfully yours,

“ THOMAS BELL.

“ Joseph Toynbee, Esq., F.R.S.”

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In bringing this short address to a conclusion, it may be remarked, that whether local Museums be regarded with the hope that they will induce people of all classes to take more interest in Nature's works, and to wander more frequently and a little further over her bright and peaceful fields; whether

they be esteemed as a bond of sympathy and union for all classes, pointing to one common object, worthy of the thoughts and labour of the best of mankind; or whether, if efficiently carried out, they may be looked up to, in the aggregate, as a means in the hands of master minds, of tracing some grand generalizations in Nature's laws, and thus giving man some conception, faint though it be, of the designs of the Great Frammer of all things; it must be confessed that they appear admirably calculated to give the masses of the people additional sources of improvement, healthy recreation, and worthy occupation.

The writer being desirous to afford assistance to those willing to take part in the collection and preservation of specimens for local Museums, begs to add in appendices some information regarding microscopes, an account of apparatus necessary for the collection and preservation

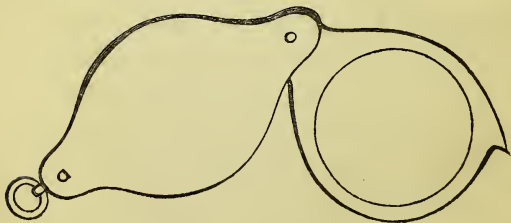


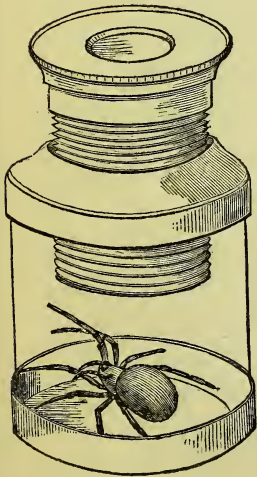
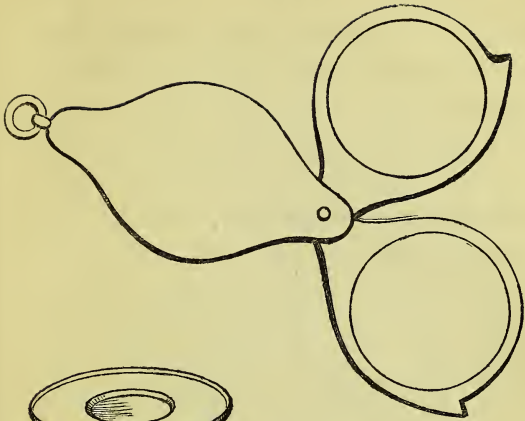
of objects of Natural History, and a list of the names of books which may be of service to observers, together with their published prices.

The writer has also added a copy of the Rules proposed for the management of the Museum, which is intended to be established as a branch of the Institution known as "The Wimbledon Village Club and Lecture Hall," and to be directed by a special Committee of that Institution, subject to the ultimate control of the General Committee.

*APPENDIX I.**Magnifying Lenses and Microscopes.*

1. The most simple and inexpensive glasses are the single and double lenses. Both are here figured. The price of the single lens is one shilling, of the double lens one shilling and sixpence. Of the two powers in the double lens, one is stronger than the other; when the two lenses are used together the magnifying power is increased.



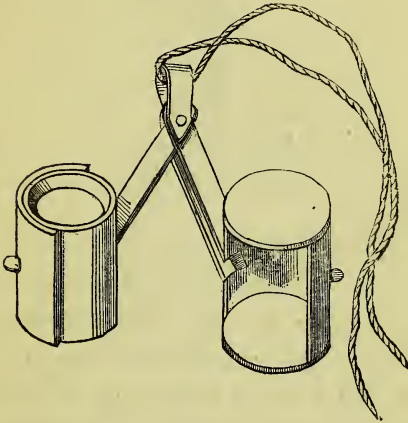


2. An *Insect Glass* is very useful. It consists of two lenses, one placed at each end of a brass tube which screws into the upper part of a glass tube. The glass tube being placed over a living insect, the latter is thus prevented from escaping,

and may be examined and watched. By means of the screw, the lenses may be brought nearer to or taken further from the insect. Price one shilling and sixpence.

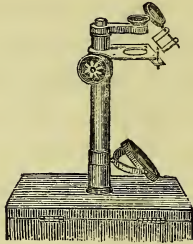
3. *The Coddington Lens.* As a high magnifying power for the hand, the lens so-called is invaluable. By means of it not only the form but the structure of many animal and vegetable substances can be made out. The directions for its use require to be carefully attended to, as the focus is short. In the first place, the lens, held in the right finger and thumb, should be brought close to the eye, care being taken not to be so near as to interfere with the eye-lashes. The object, by means of the left hand, is then to be brought nearly into contact with the side of the lens furthest from the eye. If the object is transparent, it should be held up before a window, so as to allow the rays of light to pass through it; if the object is opaque, it should be held somewhat

down, so that the rays of light from the window may fall upon it.



The price of the Coddington Lens, mounted in German Silver, is six shillings. This, the simple lenses, and the insect glass are to be obtained of Whitehouse, Optician, Cranbourn Street, Leicester Square.

4. *Field's Simple Society of Arts' Microscope.* Price 10s. 6d.



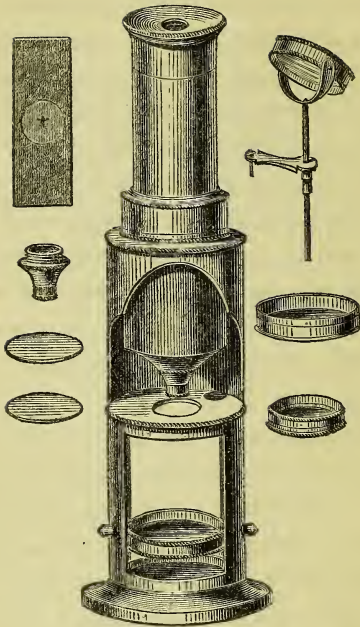
The microscope most easy to use, the least expensive, and the one to commence with, is the *simple* microscope made by Messrs. Field and Son, of Birmingham, for the Society of Arts, price ten shillings and sixpence. It consists of a body which screws into the top of the solid wood box in which it is kept; of three *lenses* which screw into the hole of the arm, singly or all together; of a *stage*, a flat plate of brass, with a large opening in its centre, over which the object to be examined is placed—the lenses being

brought near to the object by means of a button fixed to the side of the microscope body, which being screwed forward or backward, the lens moves up or down; of a *mirror*, fixed at the lower part of the body of the instrument, and by the movement of which light is thrown up to the object on the stage, when such object is transparent. In using the microscope, the brass body has to be taken out of the box, and screwed into the hole on the box-lid; one or more lenses are then to be screwed into the small round hole in the arm; the lens or lenses are to be brought directly over the large hole in the stage; on the hole the object to be examined is to be laid, and then light is to be thrown up from the mirror below so as to illuminate the object. The eye of the observer is then to be brought close to the lens, and while looking through the latter, the small button is to be turned to or fro until the object is in focus and seen distinctly. When an opaque

object is to be examined, the light, of course, must be thrown upon its surface. For this end a small lens is provided; it fixes into a little hole in a small arm, which can be drawn from beneath the stage; and the lens can be so arranged as to throw the light from a window or candle upon the object placed over the large hole in the stage. To examine the surface of a transparent object, the specimen may be laid upon a piece of dark paper and examined in the same way as one that is opaque. There is also a small glass cage, into which a drop of water containing animalcules, &c., can be introduced, and then placed on the stage under the lenses. A small pair of forceps fixed on a pin, fitting into a small hole in the stage, is used by squeezing the wire between the finger and thumb, the forceps then open, and any small object can be placed between its teeth, which close upon the removal of the pressure and grasp the object. There is also a small



pair of hand forceps for seizing small objects and placing them on glass under the lenses, also some small pieces of glass on which objects can be laid before they are placed under the lenses, some very thin glass for placing over the objects when on the thick glass, to keep them still and flat, and when wet objects are being examined for the purpose of preventing the moisture from the object, and from the water around it rising and bedewing the under surface of the lens. The box containing this microscope is five and a half inches long, three and a half broad, and two and a half deep; it is of polished wood and very strong. With the microscope, is a printed description of it and the apparatus, with drawings. For an additional half-crown, Wollaston's doublet, a higher power than the other lenses, with admirable definition, is added to this microscope. To be obtained at Wright's, Great Russell Street.



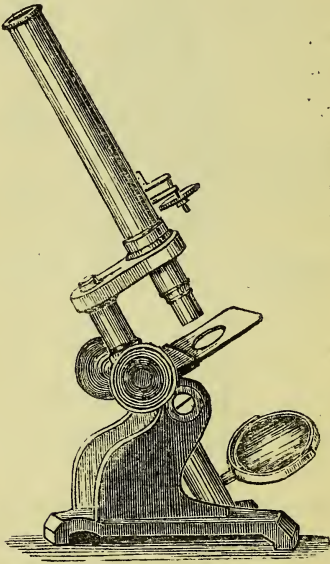
5. *The Guinea Compound Microscope*, sold by Baker, No. 244, High Holborn, is contained in a box about ten inches long, four broad, and three and a half deep. It

consists of a body standing on a circular foot about two inches in diameter. On the lower part of the body is fixed a mirror, above is a firm stage with a hole to receive the light, and over the latter the object is placed. Above the stage is a tube which embraces another tube containing the eye piece and the magnifying power. The magnifying powers, four in number, screw on to the lower part of the tube. The box also contains a lens to throw light upon opaque objects, two circular glasses on which to place objects, a disc of bone, black on one side and white on the other, on which opaque objects can be placed; six objects mounted, a cage for animalculæ and little insects, and a circular trough to contain water.

6. *The Two-Guinea Microscope*, made by Baker, is of the same make as the last-named instrument, but larger and better.

7. *The Three-Guinea Educational Microscope*, made by Baker, has joints to the

stand, quick and slow movement, a sliding stage, stage forceps, dissecting forceps, box for animalculæ, with one-inch, half-inch,



and quarter-inch achromatic object glasses; the whole fitting into a mahogany case.

8. *The Five-Guinea Universal Microscope*, made by Smith, Beck, and Beck, of No. 6, Coleman Street, E.C., has an inch and a quarter of an inch object glasses, a quick and slow motion, a sliding stage with a spring for holding glasses, a diaphragm, two eye-pieces, stage forceps, dissecting forceps, and a glass plate with a ledge. All are contained in a case.

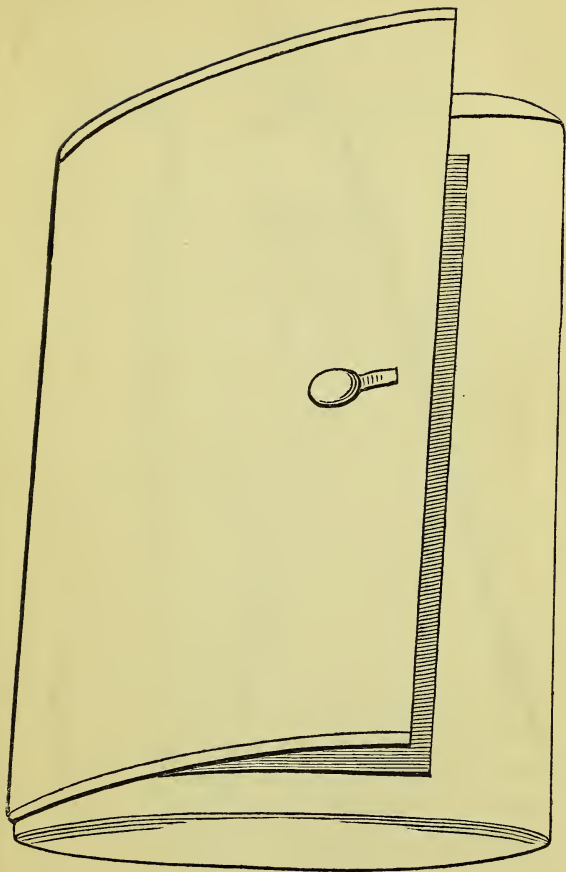
Every one who can afford five guineas for a microscope, will do well to buy this instrument.

## APPENDIX II.

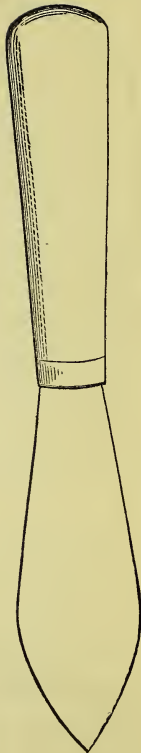
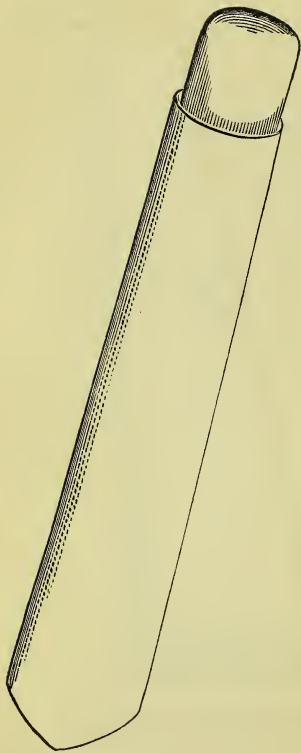
*Apparatus for the Collection of Objects.*

In the first place, *a box* to contain objects is necessary. The ordinary tin box, called a sandwich or botany box, may be used. The smallest size may be obtained for one shilling; it measures about five inches long, four inches broad, and an inch deep. Boxes, of any size, of the above kind, may be had at Cranbourn Street.

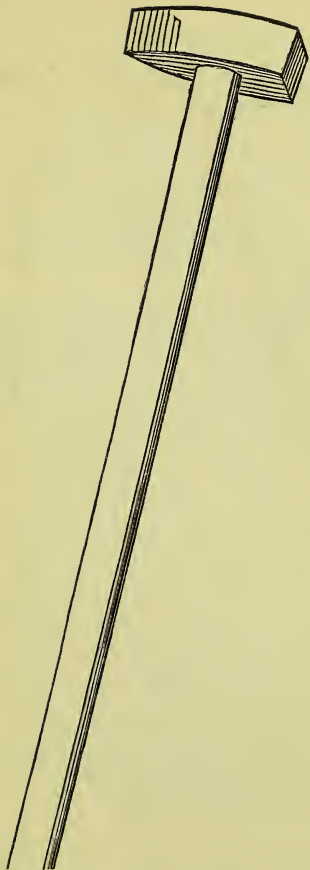
2. A *blunt knife* or *spatula* for the purpose of digging up small plants, for scraping lichens from walls, stones, and trees, getting up fungi, and numberless other operations; the most useful size is, perhaps, that measuring about seven inches long. It can be bought for ninepence, with a case.



Botany Box (partly open).

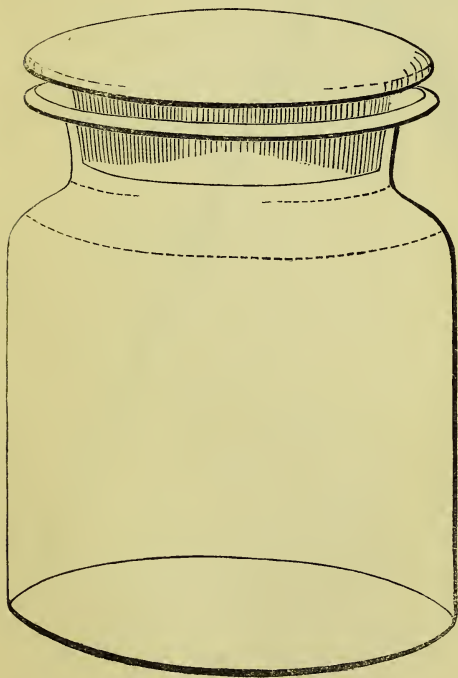
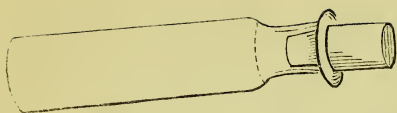


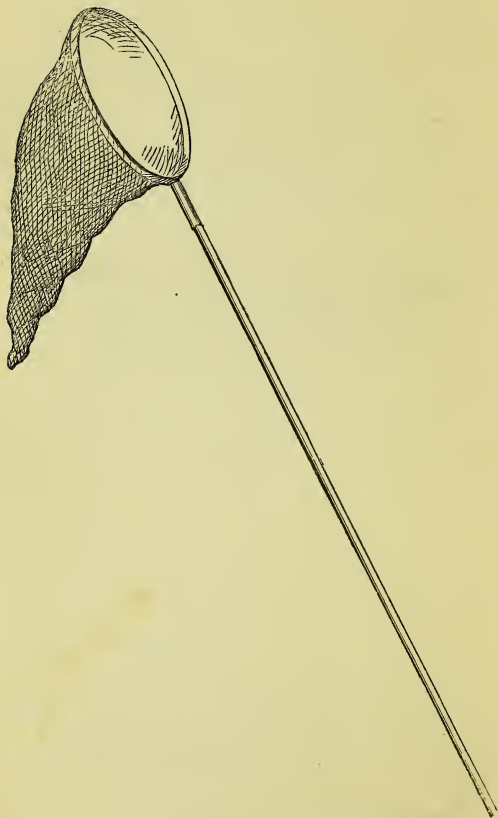




3. A *hammer*, with one side flat for breaking pebbles, rocks, or other objects, the other sharp, to aid in chipping portions of rock, cutting bark from trees, getting up roots, &c., price one shilling and sixpence. This, the spatula, and botany-box can be had at Skeels's, Cranbourn Street, London.

4. *Bottles*, to contain objects from ponds and streams. These should be of two kinds, one with a wide mouth, into which objects taken from the water by means of a small *muslin net* (made by stretching muslin over a stout wire ring), may be emptied, or into which leaves or small twigs of water plants may be dropped. Bottles of this kind are now made with corks, having wooden tops; they are to be had at most chemists. The smaller bottles are to receive the few drops of sediment which remain after pouring off the water from the larger bottles.





5. A very *fine muslin net* for catching butterflies, moths, and other insects.

6. The paper for drying plants, alluded to by Professor Bell, and sold by Mr. Newman, of Devonshire Street, Bishopsgate Street.

7. A hand press for use in drying plants, or a flat stone weighing about forty pounds.

*APPENDIX III.*

## CLASSIFIED LIST OF BOOKS.

In compiling the following catalogue, the object has been to provide persons who happily take an interest in the works of Nature around them, with the names, prices, &c., of books which may assist them in their inquiries; and it is hoped that even the poorest men, women, boys and girls in the British Isles, who from time to time long to know something of the beauties and mysteries of God's works, abounding as they do in every corner of the land, will find in this list some valuable books, of which the cost is not beyond their reach.

The writer feels confident that the existence of a more general interest in—and

a consequent more general demand for—good and inexpensive books on the works of Nature, has but to manifest itself, in order to secure a supply of even greater value and at a much lower price than is at present practicable; and it is hoped that the time is not far distant when every home will possess, at least its shelf, of Natural History books.

It must be noted that with the titles, &c., of each book in the list, the *publisher's* price is stated; *booksellers*, however, for ready money, usually charge ten pence for each shilling of the publisher's price. Members of the Christian Knowledge Society and the Religious Tract Society are charged nine pence for each shilling of the published price.

(A) BOOKS ON THE MINERAL KINGDOM.

Elements of Geology. By Sir C. Lyell,  
F.R.S. John Murray.

A new edition in preparation.

Manual of Geology. By John Phillips, M.A., F.R.S. pp. 600, numerous woodcuts, 12s. 6d. Griffin & Co.

Advanced Text Book of Geology. By David Page, F.G.S. pp. 326, numerous woodcuts, 1856, 5s. Blackwood.

History of British Fossil Mammals and Birds. By Professor Owen, F.R.S. 237 illustrations, 31s. 6d. Van Voorst.

The Ground beneath Us : its Geological Phases and Changes. By Joseph Prestwich, F.R.S. pp. 79, 57 woodcuts, 2 plates coloured, 3s. 6d. Van Voorst.

Invaluable as a guide to the Geology of London and its vicinity.

Manual of the Mineralogy of Great Britain and Ireland. By R. P. Greg and W. J. Lettsom. 8vo, woodcuts, 15s. Van Voorst.

Geology in the Garden ; or, the Fossils in the Flint Pebbles. By Henry Eley, M.A. pp. 122, 12 plates of illustrations, 6s. Bell & Daldy.

Rudimentary Treatise on Mineralogy. By Mrs. Varley. 2s. Virtue.



Introductory Text Book of Geology.  
By David Page, F.G.S. pp. 160, wood-  
cuts, 1s. 9d., 1862. Blackwood.

Old Bones ; or, Notes for Young Na-  
turalists. By the Rev. W. S. Symonds.  
numerous plates, 2s. 6d. Hardwicke.

(B) BOOKS ON THE VEGETABLE KINGDOM.

1. *The Structure, Classification, and Nomen-  
clature of the Vegetable Kingdom.*

A Manual of Botany: including the  
structure, functions, classification, proper-  
ties, and uses of plants. By G. R. Bent-  
ley, F.L.S. pp. 811, 1200 woodcuts,  
12s. 6d., 1861. Churchill.

Manual of Botany: an introduction to the  
study of the structure, physiology, and clas-  
sification of plants. By J. H. Balfour,  
F.R.S. Numerous illustrations, 10s. 6d.  
Griffin.

School Botany. By J. Lindley, F.R.S.  
pp. 208, 163 woodcuts, 5s., 1839.  
Longmans.

This book is an introduction to the Natural  
System of Studying Plants.

Vegetable Kingdom, A Tabular View

of. By Henfrey. Being a series of engravings : in cloth, 6s.

Christian Knowledge Society.

Manual of Botanic Terms. By M. C. Cooke. 27 plates, containing 293 woodcuts, and pp. 90 of text, 2s. 6d., 1862.

Hardwicke.

Manual of Structural Botany. By M. C. Cooke. 215 woodcuts, pp. 123, 1s., 1861.

Hardwicke.

A Dictionary of Botanical Terms. 200 woodcuts. By the Rev. J. G. Henslow, F.R.S. 8vo, cloth, 4s. Groombridge.

British Wild Flowers. Illustrated by J. E. Sowerby, and described by C. P. Johnson. pp. 168, 1600 coloured figures, 6os.

Van Voorst, 1860.

Wild Flowers worth notice. By Mrs. Lankester, pp. 138, 96 fig., 2s. 6d.

Hardwicke.

The Symmetry of Vegetation. By J. Lindley, F.R.S. pp. 50, woodcuts, 1s., 1854.

Chapman and Hall.

Illustrations to be employed in Practical Lessons on Botany, adapted to beginners in all classes. By Professor Henslow,

F.R.S. pp. 31, several woodcuts, 6d.,  
1858. Chapman and Hall.

On the Germination, Development, and  
Fructification of the Higher Cryptogamia,  
and on the Fructification of the Coniferæ.  
By Dr. W. Hoffmeister, translated by F.  
Currey, M.A., F.R.S. Plates 65, pp. 506,  
25s. 6d. Ray Society, Hardwicke, 1862.

2. *British Plants generally.*

English Botany: or, Coloured figures of  
British Plants, with their essential charac-  
ters, synonyms, places of growth. 3rd edi-  
tion, enlarged, re-arranged according to the  
natural order, and entirely revised. By J.  
T. B. Syme, F.L.S., the Figures by J. E.  
Sowerby. In monthly parts, at 5s. each.  
Hardwicke.

Commenced January 1, 1863.

The British Flora; comprising the Flow-  
ering Plants and Ferns. pp. 636, 12 co-  
loured plates containing numerous figures.  
By Sir W. J. Hooker, F.R.S., and G. R.  
Walker-Arnott, F.L.S. 14s.; plates co-  
loured, 21s. Longmans, 1860.

Hand-book of British Flora. By G.  
Bentham, F.R.S. pp. 680, 12s., 1861.  
Lovell Reeve.

Illustrated British Flora. An illustrated edition of the above work, to be published in 25 monthly parts at 2s. 6d. each, commencing January, 1863. Each part will contain 40 pages, and about 50 cuts, from drawings by W. Fitch. Lovell Reeve.

The Field Botanist's Companion: being a familiar account, in the four seasons, of the flowering plants most common to the British Islands. By T. Moore, F.L.S. With coloured pictures and dissections, by Fitch, of 110 species, and a Glossary. In 1 vol., pp. 424, 24 plates, 21s. L. Reeve.

The Useful Plants of Great Britain. By C. P. Johnson and J. E. Sowerby. pp. 324, 300 coloured figures, 27s. Hardwicke.

Flowers of the Field. By Rev. C. A. Johns, 7s. 6d.

Christian Knowledge Society.

Wild Flowers of Britain. By Anne Pratt. 2 vols. square 16mo, 192 coloured plates, 16s. Christian Knowledge Society.

The Flowering Plants of Great Britain. By Anne Pratt. 5 vols. 8vo, 241 coloured plates, 15s. a volume.

Christian Knowledge Society.

Florigraphia Britannica: Engravings and

Descriptions of the Flowering Plants and Ferns of Great Britain. 1625 illustrations by R. Deakin, M.D. 4 vols. 8vo, 7os., plates coloured, 10os. Groombridge.

3. *Particular Tribes of British Plants.*

(a) *Protophytes (the simplest forms of Vegetable life).*

A Synopsis of British Diatomaceæ. By J. Smith. 2 vols. royal 8vo, 51s.

Van Voorst, 1853-6.

British Desmidiæ. By John Ralfs, M.R.C.S. pp. 226, 35 plates of many hundreds of coloured figures. 1848.

Reeve.

A History of Infusoria, including the Desmidiaceæ and Diatomaceæ, British and Foreign. By A. Pritchard, M.R.I. 4th edition, enlarged and revised, by Arlidge, Archer, Ralfs, Williamson, and the authors. pp. 960, 40 plates, 2000 figures, 1861, coloured 5os.; plain 36s. Whittaker.

(b) *Cryptogams (flowerless plants).*

British Lichens. By W. L. Lindsay, M.D. pp. 352, 22 coloured plates, 7s. 6d.

Routledge.

British Angiocarpous Lichens. By the Rev. W. A. Leighton, M.A. 2 vols. 8vo, 30 coloured plates, pp. 1084, 42s.

Ray Society, Hardwicke.

British Fungology. By the Rev. M. J. Berkeley, M.A., F.L.S. 8vo, pp. 442, 24 coloured plates, 30s. L. Reeve.

British Fungi. With descriptions of the esculent and poisonous species, and a tabular arrangement of orders and genera. By M. C. Cooke. 24 pages of coloured plates, 6s., 1862. Hardwicke.

The Esculent Fungi of England. An account of their classical history, uses, characters, development, nutritious properties, modes of cooking, &c. By the Rev. Dr. Badham. 12 coloured plates, 12s.

L. Reeve.

Synopsis of British Seaweeds. Descriptions, with critical remarks, of all the known species, abridged from Professor Harvey's "Phycologia Britannica." A pocket volume, 220 pp., 5s. Van Voorst.

Atlas of British Seaweeds. Figures of all the known species, drawn on a reduced scale from Professor Harvey's "Phycologia Britannica." In 80 coloured plates, demy 4to, 63s. coloured. Van Voorst.

*Phycologia Britannica*. A history of the British Seaweeds; containing coloured figures and descriptions of all the species of Algæ inhabiting the shores of the British Islands. By William Henry Harvey, M.D., F.R.S., Professor of Botany to the Dublin Society. With 360 coloured plates, drawn on stone by the author. In 4 vols. royal 8vo, arranged systematically, reduced to 126s.

Van Voorst.

British Seaweeds. By the Rev. D. Landsborough. pp. 400, 20 coloured plates, 7s. 6d.

Routledge.

The Seaweed Collector's Guide; containing plain instructions for collecting and preserving, and a list of all the known British localities. By J. Cocks, M.D. 2s. 6d.

Van Voorst.

Manual of British Marine Algæ; with descriptions of all the known British Seaweeds, with plates of all the genera by Professor Harvey. 8vo, 21s.; coloured plates, 31s. 6d.

Van Voorst.

British Mosses. By R. M. Stark, F.R.S.E. pp. 236, 20 coloured plates, 7s. 6d.

Routledge.

The British Ferns; or, coloured figures and descriptions, with the needful analyses

of the fructification and venation of the ferns of the British Isles, systematically arranged. By Sir J. W. Hooker, F.R.S. 66 coloured plates, 42s. L. Reeve.

British Ferns. By T. Moore, F.L.S. Numerous woodcuts and 12 plates. pp. 124, 1s. Routledge.

An edition of the above work printed on better paper, and having the plates coloured, 3s. 6d.

A Plain and Easy Account of the British Ferns; together with their classification, arrangement, structure, and functions, directions for out-door and in-door cultivation, &c. By Mrs. Lankester. Fully illustrated; 2s. 6d. plain, 4s. coloured by hand. Hardwicke.

(c) *Phanerogams (flowering plants)*.

The Grasses of Great Britain. Illustrated by Sowerby, described by C. Johnson. pp. 192, 144 coloured plates, 34s. Hardwicke.

A Natural History of British Grasses. 74 coloured plates, and other engravings. By J. E. Lowe, F.R.A.S. Royal 8vo, 21s. Groombridge.



The Green Fields and their Grasses. By Anne Pratt. pp. 96, numerous wood-cuts, 1s. Christian Knowledge Society.

British Grasses and Sedges; by Anne Pratt. With 37 coloured plates, containing every British (216) species, 8vo, 10s. 6d. Christian Knowledge Society.

An Encyclopædia of Trees and Shrubs in Great Britain. By J. C. Loudon. pp. 1162, 2109 wood-cuts, 50s. Longman, 1842.

History of British Forest Trees. By P. J. Selby, F.R.S.E. Each species is illustrated by a portrait of some well-known or fine specimen; the leaf, florification, seed vessels, &c., are embodied in the text, or inserted as tail-pieces. 8vo, nearly 200 illustrations, 28s. Van Voorst, 1842.

Forest Trees of Great Britain. By the Rev. C. A. Johns. With numerous illustrations, 2 vols. foolscap 8vo, 8s. Christian Knowledge Society.

(C) BOOKS ON THE ANIMAL KINGDOM.

I. *The Animal Kingdom generally.*

General Outline of the Organization of the Animal Kingdom, and Manual of Com-

parative Anatomy. By T. Rymer Jones, F.R.S. 8vo, 1861, 31s. 6d. Van Voorst.

A Natural History of the Animal Kingdom. By W. S. Dallas. 8vo, pp. 800, 8s. 6d. Griffin, Bohn, & Co.

A Manual of Zoology. By Milne Edwards, translated by Dr. Knox. pp. 503, 473 woodcuts, 5s. 6d. Renshaw.

Introduction to Zoology; with 330 illustrations, and a Glossary of Scientific terms. By Robert Patterson, M.R.I.A. pp. 466, 1857, 6s. 6d. Simms and Macintyre.

The Treasury of Natural History; or, Popular Dictionary of Animated Nature: In which the zoological characteristics that distinguish the different classes, genera, and species, are combined with a variety of interesting information illustrative of the habits, instincts, and general economy of the animal kingdom. To which are added, a syllabus of practicable taxidermy, and a glossarial appendix. By Samuel Maunder. New edition, with 900 wood engravings of animals, fcp. 8vo, 10s. Longman.

The Stepping-stone to Natural History: Vertebrate or Back-boned Animals, viz.,

Mammalia, Birds, Reptiles, and Fishes.  
By James Owen. With 66 engravings  
on wood, 18mo, price 2s. 6d. Longman.

\*\_\* To be had also in Two Parts, Part  
I. Mammalia, 1s.; Part II. Birds, Reptiles,  
and Fishes, 1s.

The Microscope and its Revelations. By  
W. Carpenter, M.D., F.R.S. 3rd. edition,  
pp. 792; about 400 woodcuts and 10 plates.  
12s. 6d. Churchill.

This book contains an immense amount of in-  
formation touching the nature and classification  
of the Animal and Vegetable Kingdoms.

A Treatise on the Habits and Instincts  
of Animals, in two divisions:—I. On the  
Instincts of the Animal World. II. On  
the Senses of Animals. By William  
Swainson, F.R.S., L.S. With vignette  
title and woodcuts. Fcp. 8vo. 3s. 6d.  
Longman.

Essays on Natural History, 1st, 2nd,  
and 3rd series. By Charles Waterton.  
1838, 1844, 1857. Longman.

The Natural History of Selborne. By  
the Rev. Gilbert White, M.A. With

notes by Sir W. Jardine and E. Jesse.  
pp. 416. 40 engravings, 5s., 1861.

Bohn.

Every naturalist ought to possess a copy of this charming and admirable work.

The Sea-side Book: an Introduction to the Natural History of the British Coasts. By W. Harvey, M.D., M.R.I.A. Fcp. 8vo, 83 illustrations, 5s. Van Voorst.

Manual of Marine Zoology of the British Isles. By P. G. Gosse, F.R.S. Two parts, 7s. 6d. each. Van Voorst.

Half Hours with the Microscope. By Dr. Lankester, illustrated by Tuffen West. pp. 92, 250 figures, 2s. 6d. Hardwicke.

## 2. *On the Several Classes of Animals.*

### (a) *Invertebrata.*

Lectures on the Comparative Anatomy and Physiology of the Invertebrate Animals. By R. Owen, F.R.S. 2nd edition, illustrated by numerous woodcuts, 1855, 17s. 6d. Longman.

Anatomy of the Invertebrata. By C. T. von Siebold. Translated from the

German, by W. T. Burnett, M.D. 8vo, pp. 470, 1854, 16s. Trübner and Co.

A Manual of the Sub-kingdom Cœlenterata. By J. R. Greene. Woodcuts, pp. 271, 5s., 1861. Longman.

A Manual of the Sub-kingdom Protozoa. By J. R. Greene, B.A. pp. 85, a few woodcuts, 2s. Longman.

See especially as an Introduction, Carpenter on the Microscope and its Revelations.

Particulars of this book at page 99.

A History of Infusoria, including the Desmidiæ and Diatomaceæ. By A. Prichard, M.R.I. See page 93.

British Fresh Water Polyzoa. By G. J. Allman, F.R.S. 11 plates (10 coloured), imp. 4to, pp. 119, 31s. 6d.  
Ray Society, Hardwicke.

History of British Sponges and Lithophytes. By Dr. Johnstone. 8vo, 1842, 30s. Van Voorst.

History of British Zoophytes. By Dr. Johnstone. 2nd edition, 2 vols., 8vo, 1847, 42s. Van Voorst.

British Zoophytes. By the Rev. Dr. Landsborough. pp. 404, 20 coloured plates, 7s. 6d. Routledge.

Recent Foramnifera of Great Britain. By Professor Williamson, F.R.S. Imp. 8vo, pp. 100, 7 plates, 31s. 6d.

Ray Society, Hardwicke.

Introduction to the Study of the Foraminifera. By W. Carpenter, M.D., F.R.S.; assisted by W. K. Parker, and T. Rupert Jones, F.G.S. pp. 317, 22 pages of plates, 31s. 6d. Ray Society, Hardwicke.

A Synopsis of the British Naked-Eyed Pulmograde Medusæ. By E. Forbes, F.R.S. Imp. 4to, 13 coloured plates.

Ray Society, Hardwicke.

Marvels of Pond Life ; or, a Year's Microscopic Recreations among the Polyps, Infusoria, Rotifers, Water-Bears, and Polyzoa. By H. J. Slack, F.G.S. pp. 197, with numerous illustrations, 5s.

Groombridge.

*Mollusca and their Shells.*

Mollusca: being a Series of Engravings. 6s. Christian Knowledge Society.

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