

ON
NATURAL HISTORY
MUSEUMS;

WITH SUGGESTIONS FOR THE FORMATION OF A
CENTRAL MUSEUM IN WALES.

BY

F. W. RUDLER, F.G.S.,

PROFESSOR OF NATURAL SCIENCE IN THE UNIVERSITY COLLEGE OF WALES.

BEING A PAPER READ BEFORE
THE CYMMRODORION SOCIETY

ON

JUNE 9TH, 1876.

PROFESSOR A. C. RAMSAY, LL.D., F.R.S.,

DIRECTOR-GENERAL OF THE GEOLOGICAL SURVEY,

IN THE CHAIR.

LONDON.

1876.



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[*Read before the Cymmrodorion.*]

WHEN I had the honour of being invited to read a paper before the Cymmrodorion Society, I cast about me for some subject which should not only fall in with my own line of pursuits by being scientific, but should also bear in some way upon the welfare of Wales, and thus be brought fairly within the sympathies of this Society. The subject which I have been led to select fulfils both these conditions. Having for many years been officially connected with a large museum in London, I have naturally taken much interest in the formation and arrangement of collections, and have seized every opportunity of studying natural history museums—metropolitan, provincial, and continental. In this way I have been led to carefully note the characteristics of a large number of public collections, and to compare what appear to me to be their respective merits and demerits. On coming to Wales, I was of course anxious to learn something of the local museums. “When a naturalist goes from one country to another”, said the late Professor Edward Forbes, “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.” Such collections, however, not only exhibit the natural productions of the province in which they are situated, but they may be taken as standards by which to gauge the scientific

spirit of the neighbourhood. Wales possesses, I am pleased to find, many scientific collections; but, at the same time, I am bound to add that those which I have yet had an opportunity of visiting fall far short of what local museums should really be, when measured by the present advanced state of natural science. It has, therefore, occurred to me that a few suggestions on the formation and arrangement of a central museum, to illustrate Cambrian natural history, might not be without interest to those who are anxious to see the educational institutions of Wales not a whit behind those of the most advanced type.

In forming such a museum, the one great object to be steadily kept in view must be that of collecting, arranging, and exhibiting all the natural productions of the Principality. Every animal and vegetable, whether recent or fossil, every mineral and rock, to be found within the limits of Wales, must be adequately represented, so that the museum shall ultimately form a complete exponent of Welsh natural history. But I would go beyond this. Not only should the indigenous productions be exhibited, as presented in their original condition, but the application of these products to the arts of life should equally be illustrated. In other words, the purely scientific department should be supplemented by a technological collection, exhibiting the uses which we make of the natural resources at our command. Such a collection might even be extended with advantage to the local application of foreign raw materials; and would thus completely illustrate the industries which are carried on within the limits of the Principality. Nor should the art and archæology of Wales be neglected; but these are wide subjects, which lie far beyond my present scope.

Whilst we should patriotically aspire to render the local collections as perfect as possible, I would not, by any means, have the usefulness of the museum stop here. Comparing

any local collection with a general collection, it will of course be found that many important groups of animals, vegetables, and minerals are but imperfectly represented, whilst others are altogether blank. There is, consequently, great danger of very limited and inadequate notions of the great system of nature being formed by the student who confines his attention to local natural history. It was the fundamental fault of Werner's system of geology, that he supposed all the world to be modelled after the pattern of the kingdom of Saxony. A student confining his studies to Welsh natural history would be in danger of contracting equally narrow and vitiated views. To counteract such a tendency, it is eminently desirable to form, under proper conditions, a *general* collection which will give the visitor some notion of, at any rate, the larger groups in which natural bodies are classified. Just as every scientific man should strive to acquire a mastery over some special branch of science, however small, and, at the same time, have a general knowledge of science as wide as possible; so, it seems to me, every provincial museum should aim at illustrating thoroughly the natural history of its locality, whilst it offers, as far as its resources allow, a superficial though sound view of nature in its entirety. There should consequently be two departments to our central museum—one *local*, and the other *general*—each with distinct aims, and each appealing to a distinct class of visitors. Differing thus in their objects, it would be well to keep the two departments entirely apart, as is done, for example, in the Worcester Museum, where a special room is devoted to the illustrations of the natural history of the county. Whilst our local collection would certainly give value to the museum in the eyes of genuine students of science, who would be attracted thither by the opportunity of taking a complete survey of Welsh natural history, it is probable, on the other hand, that the general collection would form the chief source of interest

to the casual visitor and less-advanced student. But this general collection must be kept within moderate limits. The investigator, who has occasion to study with thoroughness any particular group of natural objects, will assuredly resort to the great metropolitan collections; and it would be absurd for a provincial museum to endeavour to illustrate with completeness any natural group, unless it happen to be indigenous. All that we should attempt in the general collection is to convey to the visitor, who uses it educationally, some broad, though clearly defined, notions of the larger groups of natural bodies. This may be done, and indeed best done, by the display of only a limited number of typical specimens, provided that they are selected with judgment, and displayed with intelligence. We have no need of a multitude of objects, tending to bewilder rather than to enlighten. Nor should we covet rare specimens, which always cost much, and often teach little. Neither should we seek pretty and attractive things, such as are to be found in some museums, heaped together in bower-birdish fashion, where they gratify the senses, without nourishing the intellect. Let us by all means have rare and pretty specimens, if they can claim educational value, but not simply for sake of their rarity or their beauty. What we really want is a moderate number of comparatively common objects, judiciously selected, accurately classified, well displayed, and fully illustrated, where necessary, by preparations and diagrams. Such a collection, though small, would have far higher educational worth, and would command greater respect from scientific authorities, than the large heterogeneous collections of unassorted donations which frequently form the bulk of museums of old-fashioned type. "Unfortunately", says Professor Edward Forbes,¹ "not a few country

¹ "On the Educational Value of Museums." Being the Introductory Lecture at the Metropolitan School of Science (now the Royal School of Mines) for the Session 1853-54.

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 usually single and 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 miscellaneous fossils—such is the inventory and about the scientific order of their contents." These words were spoken more than twenty years ago. During that time, science has grown rapidly in this country, fostered chiefly by the Department of Science and Art; whilst local museums have multiplied under the Public Libraries Act of 1855.¹ Yet there are too many provincial collections to which Professor Forbes's language may still be fitly applied. Hence, a word on the principles of classification and the method of exhibition to be carried out in a local scientific museum may not be out of place.

¹ An Act for further promoting the Establishment of Free Public Libraries and Museums in Municipal Towns, and for extending it to Towns governed under Local Improvement Acts and to Parishes. 18 and 19 Vict., c. 70. It is understood that Mr. Mundella intends to introduce a Bill for extending this Act.

The common division of all natural objects into animals, vegetables, and minerals, is one which admits of scientific application; and consequently our museum must contain at least a zoological, a botanical, and a mineralogical collection. Let us seek to define what each of these separately should contain, and how it should be arranged, commencing with the *zoological* department.

The popular notion of a zoological collection is that of an assemblage of stuffed animals, butterflies, and shells—pretty, curious or rare. Viewed, however, from a purely scientific standpoint, such a collection presents the smallest possible value, since it fails to impart sound notions, either of the essential structure of the organisms which are represented, or of those relations between different organisms on which modern classification is grounded. The more closely the attention is confined to external forms, the less scientific will be the arrangement of any zoological collection. What would be thought, for example, of a library in which the books were never opened, but were got together, and placed on the shelves, solely with reference to the characteristics of their binding? Yet, in collecting shells without reference to the structure of the creatures that inhabit them, or in exhibiting stuffed animals without seeking to illustrate their internal organisation, we are simply amusing ourselves with the binding without troubling to read the contents of the volumes. It is true, the lettering on the back of a book generally gives some clue to the character of the work; but it is one thing to know a book by its cover, and quite another to be familiar with its contents. As long as we look merely on the outside, our acquaintance with the animal kingdom must needs be superficial and unsound. External characters always give inadequate notions of structure, whilst in some cases they even mislead by suggesting false analogies: every one knows that this is the case, for example, with the group of whales.

As comparative anatomy has advanced, the systematic zoologist has been led to look less at the exterior, and more at the interior; less at the surface, and more at the substance. Supposing we had occasion to classify a collection of watches, it would clearly be but a poor arrangement to put all those with gold cases into one group, all with silver cases in another, with pinchbeck in a third, and so on. We know, in fact, that the case is but the secondary part of a watch, and that the essence of its structure is to be found in that assemblage of wheels which we call the "movement". To understand its structure, therefore, we must open each watch; and we can then place together those which are really similar in essence. We might thus form several groups, according as the escapement is a verge, or horizontal, or duplex, or lever. Such an arrangement would certainly commend itself to the watchmaker, though the *dilettante* might rest satisfied with the primitive method of classification by cases. In like manner, to satisfactorily illustrate and classify a zoological collection, it is necessary to expose as fully as possible the internal organisation of the creatures which are represented. Thus, each stuffed specimen belonging to the great group of back-boned animals should be accompanied by its skeleton; or, failing that, by the skull and other typical parts. And, if possible, the characters and disposition of the viscera, or internal organs, should also be exhibited by means of preserved specimens, by models, and by diagrams. Even where dissections are introduced, they will afford but little information to the inexperienced visitor, unless accompanied by corresponding drawings with clear references to the several organs. Without this, a stranger standing in front of a preparation usually fails to see anything but a flabby mass of confused parts dangling in a bottle of spirit; in other words, the most careful dissection needs popular interpretation. Those animals which are destitute of an internal

skeleton will of course be represented by such other hard parts as they may possess; but these should stand side by side with preparations, casts, and diagrams, illustrating their internal economy.

Let it not be supposed that in advocating as perfect a mode of illustration as can possibly be attained, I am also advocating the accumulation of many individual specimens. It seems sufficient, indeed, to exhibit merely a few types of the larger groups and sub-groups. But the selection of an average representative of a group as a type may lead to too high a notion of the sharpness of division between the several groups; may lead, in fact, to the false impression that nature is as sharply cut into sections as is suggested by our classification, which by necessity is in large measure artificial. It must be remembered that in nature we often pass, by the most gradual transition, from one group of organic forms to another; and it becomes, therefore, highly instructive to exhibit in a collection such transitional forms as will help to give a philosophical view of nature, without attracting too much attention to our confessedly arbitrary landmarks. Hence, in addition to an average specimen from each group, there should be exhibited judiciously selected aberrant forms—forms which would serve to mark a passage from one group to another; that is to say, each group should be represented by the most typical and by the least typical example which can be found; by a specimen taken from the centre, and a specimen or two from near the circumference of the group, where it is conterminous with another, or even overlaps it. Thus, the great group of Carnivora might be represented, not only by a dog and a cat, and if possible by a bear, as central types, but also by a seal, which would be taken as it were from one of the margins of the group where it abuts upon the whales.

But whilst a collection such as that here sketched out

might satisfy the requirements of the scientific student, it would be well to appeal to our practical instincts by illustrating the uses of animals to man in the shape of a collection of Economic Zoology; that is to say, a collection showing the application of animal products to industrial purposes, similar to the well-known series of the Department of Science and Art at Bethnal Green. As an example of the importance of these animal products, one might refer to the information which would be given to the public by exhibiting a series illustrating the manufacture of textile fabrics from raw materials derived from animal sources, such as woollen and silken goods.

In that section of our natural history museum which deals with the *vegetable* kingdom, this technological division would be much more important than the corresponding part of the animal series. So large a proportion of the objects with which we daily come in contact are derived from vegetable sources, that a department of Economic Botany can hardly fail to attract even those who have no pretensions to scientific education. Who, with a healthy spirit of inquiry, does not care to learn something about the sources and mode of preparation of those vegetable substances which are used as articles of food or of medicine, as materials for textile industries, or for constructive art? The admirable Museum of Economic Botany at Kew has attained, under Dr. Hooker, to a state not far removed from perfection; and thus offers a model which other museums might seek to imitate in humble measure. But an immense amount of information can be imparted to an intelligent visitor by the exhibition of a very unambitious collection, got together with comparative ease and at moderate cost.

The strictly scientific portion of the botanical department would of course be represented by an Herbarium, which ought to contain a complete illustration of the Flora of Wales.

But a well-filled Herbarium, though valuable to the student who wishes to consult a typical collection, scarcely forms a feature in a public museum; and the dried specimens hidden in their cabinet appeal but little to the ordinary visitor. To give, however, a popular insight into plant-structure, a few large sectional models might be advantageously exhibited in the general collection. Thus, the flower of a buttercup and a rose, a dandelion and an oak, would illustrate respectively the large divisions of thalamifloral and calycifloral, monopetalous and apetalous exogens; whilst a lily and a grass might severally represent the petaloid and glumaceous groups of endogens. The larger divisions of the flowering plants being thus represented, it would remain for a few models and diagrams to convey some general notions of cryptogamic structure. The display of diagrams, or large drawings, should indeed be encouraged in all departments; and an intelligent curator will thus utilise every foot of wall-space. Where resources are not limited, an attempt should be made to illustrate the local flora by a collection of living specimens. A botanical garden becomes, in fact, as valuable an adjunct to the vegetable department as an aquarium to the animal department; but there are few museums in this country so fortunately situated as to secure such an association.

Turning to the *mineral* section of our typical museum, it is necessary to somewhat expand our view. For, in order to give anything like a fair notion of the mineral kingdom, it is absolutely necessary to exhibit a tolerably large series of the more commonly occurring species. Especial attention should of course be paid to those minerals which are either of interest to the geologist as rock-constituents, or of importance to the technologist. But the selection of a few representative species could hardly be satisfactorily effected, since mineral species are less easily grouped around typical centres than are either animals or plants. In fact, the classification

of minerals, on natural history principles, is a task that bristles with difficulties; and it can hardly be said that a thoroughly satisfactory natural system has yet been framed. Seeking, therefore, a classification which shall be useful in practice, rather than philosophical in principle, we are led to advocate such a method as shall enable the visitor to find with readiness any given mineral that he may happen to be seeking. The iron-master from South Wales, who visits the museum, will naturally desire to find in one group all the mineral substances with which he may feed his furnaces. Without doubt, it is perfectly justifiable, on scientific grounds, to place the specimens of red hæmatite by the side of the ruby and sapphire. But the practical convenience of keeping the hæmatite with the other ores of iron, whilst the ruby and sapphire take their place among kindred gems, is obviously of sufficient weight to overrule more refined considerations, such as those derived from the isomorphism of ferric oxide and alumina.

In the mineral department, the technological side would admit of very extensive development. The fine collections exhibited in the Museum of Practical Geology in London sufficiently show how the application of mineral bodies to industrial uses may be efficiently illustrated. As a large proportion of the mineral substances which are brought to light by mining operations have to pass through chemical processes for the extraction of the metal which they may contain, it is obvious that a *metallurgical* collection will form a necessary adjunct to the mineralogical series. In a country having command of such rich mineral resources as Wales, this department ought to be very thoroughly represented. How coal and metalliferous minerals occur in nature, and by what methods they are extracted, should be taught by means of models and diagrams; whilst the successive stages through which the ores pass in the processes of smelting should be

illustrated by specimens taken from the dressing-floor and the furnace. Assuredly, an appeal for such specimens would not be unanswered by those who are at the head of the vast mining and metallurgical industries of Wales.

Our technological museum might receive further extension in its mineral department by exhibiting the application of clays, sands, and other mineral substances to the manufacture of pottery, porcelain, and glass; whilst another section might be well devoted to specimens illustrating the preparation of pigments and other chemical substances from raw materials supplied by the mineral kingdom.

Such collections would admit of great extension, and the more extensive they could be made the more interesting would they become to the visitor. But even a small technological collection may convey a vast amount of information if the arrangement is under an intelligent and well-trained head. This is admirably illustrated in the Technological Gallery of the Crystal Palace, under the excellent curatorship of Dr. David Price. Here the resources are comparatively limited, yet by a judicious system of arrangement, and by means of full descriptive labels, they form an extremely neat and instructive collection—a collection, however, which is too often neglected by the visitor to the Palace, bent solely on pleasure.

From minerals and their applications, it is an easy step to those aggregations of minerals which constitute *rocks*, and thus form the solid crust of the earth. To recognise with precision the various kinds of rock met with in the course of geological exploration is by no means an easy task; and a special study, born of mineralogy and geology, has latterly grown up under the name of *petrology* or *lithology*. A petrological collection is absolutely necessary in any museum; and in the special museum under discussion it should comprise a well-selected series of specimens, uniform in size,

illustrating with fulness the various sedimentary, eruptive, and metamorphic rocks of the Principality. A knowledge of mineralogy is absolutely necessary, as a preliminary to the study of petrology; but it often happens that the constituent minerals of a rock are so minutely developed, and so confusedly aggregated together, that the ordinary mineralogist finds himself unequal to the task of their separation and discrimination. Hence, of late years, the microscope has been placed in the hands of the petrologist, who has used it with singularly good effect in unravelling the constitution of the more fine-grained and apparently compact forms of rock. This young branch of science, which I may perhaps call "Mineral Histology", should be encouraged in every possible way; and it would be well to accompany specimens of crystalline rocks by enlarged drawings, showing their minute structure as opened out under the microscope. The technological side of the rock-collection would find expression in the display of a series of rocks applied to industrial uses, either as building-stones, such as our sandstones and limestones, or as ornamental materials, such as our marbles and granites. The slate quarries of North Wales would furnish abundant materials for an interesting series in this section. Nor should the Welsh marbles and other ornamental stones be neglected.

Whilst many rocks clearly betray, by their mineral constitution and mode of occurrence, an igneous origin, more or less similar to that of our modern volcanic products, a large proportion of our rocks as clearly show, on the other hand, that they are made up of fragmentary materials which were originally deposited from water in the form of sand, mud, and other sedimentary matter. Such clastic or sedimentary rocks should of course be duly exhibited in the petrological collection, whilst many of them have further claims upon our attention by their high economic value. But their special

interest lies in the fact that they frequently contain the shells, bones, and other hard remains of animals, and occasionally the leaves and other parts of plants, representing in both cases the relics of organisms which lived in or near the waters from which the original sediments were thrown down. A collection of such *fossils*, constituting a *palæontological* department, must form an important feature in every natural history museum. Strictly speaking, it might be well to arrange the fossils in their proper zoological and botanical order, alongside the recent forms of life, thus showing the continuity that subsists between the several groups. But to the geologist it is manifestly so important to classify the extinct forms of life according to the succession of the beds in which they occur, that practically a stratigraphical arrangement will always rule over one founded on purely zoological grounds. The most convenient arrangement, therefore, appears to be that followed in the galleries of the Museum of Practical Geology, which contain the finest collection of British fossils in the world. The fossils are there arranged stratigraphically in ascending order, with a subordinate zoological classification; that is to say, all the fossils, from one set of strata constituting a "formation", are placed together; but this large group is broken up into a number of smaller groups, each containing fossils which are related among themselves by zoological characters. It should be our aim in the central museum to gather together as typical a collection as possible of Welsh fossils—a collection which would be peculiarly rich in many of the oldest known forms of life, since the rocks containing these ancient remains are typically developed in certain parts of the Principality. The remarkably successful labours of Mr. Hicks among the older Welsh rocks sufficiently show what may be done, even now-a-days, in the discovery of fossils in beds reputed to be well-nigh barren of such remains.

Not only should the geological department contain characteristic specimens of the rocks, minerals, and fossils of Wales, but it should also exhibit such illustrations of the geological structure of the country as are afforded by accurate maps and sections. Fortunately, the national survey of the entire Principality has long since been completed, thanks to the indefatigable labours of Professor Ramsay, the present Director-General of the survey. The results of this great work are comprised in about twenty sheets on the scale of one inch to the mile, and these sheets, when placed together, form a splendid geological map of Wales. Surely, the available wall-space in the geological room could not be better occupied than by this map, and the explanatory sections. For purposes of public exhibition, these sections might be advantageously enlarged, so as to form bold diagrams; especial prominence being given to such as illustrate the structure of our Cambrian coal-fields.

In addition, however, to the large official map and sections, it would be instructive to exhibit a series of smaller maps, each coloured in part only, so as to show at a glance the exact area of a particular formation. This principle is carried out with excellent effect in the Leeds Museum, under its accomplished curator, Professor Miall. In our Welsh Museum, the collection of fossils from the Cambrian formation should be accompanied by a map showing the distribution of Cambrian rocks, and these only; in like manner, the case of Silurian fossils would be associated with a map exhibiting the range of the Silurian rocks; and so with the other formations. For this purpose, use might be made of small but accurate maps, such as that which forms the frontispiece to Professor Ramsay's well-known *Memoir on the Geology of North Wales*.

At the head of the palæontological collection, among the fossils of the uppermost, and therefore the most recent, deposits, will be found the remains of our own species. The

earliest of such relics take the form of rudely-chipped implements of stone, found chiefly in river-gravels and in bone-caves. The limestones of both South and North Wales are in many localities rich in ossiferous caverns, and many of these have been explored with fruitful results. The Museum of the Royal Institution of South Wales, at Swansea, for example, contains a valuable collection of specimens from the well-known caves in the peninsula of Gower; whilst in North Wales, the Caves of Perth-i-Chwareu, Cefn, and Plas Heaton have been explored with signal success by the Rev. D. R. Thomas, Professor T. McKenna Hughes, Professor Boyd Dawkins, and other scientific investigators.

Within the last few years, the study of the early remains of man,—remains which are safely assignable to periods far beyond the reach of historical records in Western Europe,—has attracted a large number of students, and has acquired considerable popularity under the name of *prehistoric archaeology*. Every natural history museum should certainly contain a collection of these archaic remains. How such a collection can be advantageously exhibited may be realised by any one who has visited the Blackmore Museum at Salisbury, where the munificence of Mr. William Blackmore has not only erected one of the most elegant museums in England, but has furnished it with a splendid garniture of specimens, all bearing directly or indirectly upon this one branch of study.

The stone implements which form the earliest relics of man's handiwork separate themselves into two groups—the one series rude and unpolished, the other more highly finished—representing the successive phases of culture which correspond respectively to Sir John Lubbock's *palæolithic* and *neolithic* ages. The use of stone was followed by that of metal; and, according to the Northern antiquaries, whose classification is generally followed by modern archæologists,

the use of bronze preceded that of iron. A local museum is surely a fit resting-place for such archaic objects as throw light upon the early history of the surrounding country, and it would be well if those who discover objects of this kind were sufficiently public-spirited to place them in a museum, where they would minister to the instruction of the people and the advancement of science, rather than retain them in private collections, where they are hidden from most students, and are oftentimes in danger of being forgotten and neglected. The prehistoric relics of Wales would form an interesting series, which ought to attain to considerable magnitude. But many types of implement would probably be unrepresented in such a series, and these missing forms should consequently be exhibited in the general collection. An appeal to curators of public museums and to private collectors would probably secure casts of typical specimens, and a student gains almost as much instruction from a cast as from the original. The section of prehistoric archæology should also include models of cromlechs, menhirs, and other megalithic monuments; or, if not models, at least plans and sketches of such structures.

As an aid in interpreting the use of archaic implements, and in throwing light upon the successive phases of early civilisation, it is of great importance to study the implements of existing savages. An *ethnological* collection, illustrating the manners and customs of savage races, so far as they are reflected in their industrial arts, is always an attractive feature in a museum; but too often it becomes merely a centre of vulgar curiosity. That there is, however, another and a higher way of viewing such a collection is sufficiently evident by examining the remarkable collection of Colonel Lane Fox, at present exhibited in the Bethnal Green Museum. This large assemblage of objects has been collected and classified with the definite purpose of illustrating the evolution of cul-

ture ; and it strikingly shews what lessons may be taught by the philosophical arrangement of a special collection. It would, however, be almost impossible, and perhaps unadvisable, to imitate such an arrangement in a general museum ; and for ordinary purposes it will be sufficient to follow a geographical arrangement, such as that adopted in most museums, and notably in the magnificent Christy Collection. When it is remembered that this collection is under the guardianship of Mr. A. W. Franks, it is needless to add that its arrangement presents all that can be desired, and might be well imitated in a provincial museum.

Ethnology and prehistoric archæology have brought us to a point where Science shades off into Art and historic Archæology. Interesting as it would be to trace the connexion between Science and Art, it would be trespassing far beyond the special province of this paper. Nor is there need to thus transgress ; for the taste for Art is so much more widely-diffused than that for Science, that the claims of Art will assuredly not fail to find other and far abler advocates.

Assuming, however, the desirableness of establishing a central museum for Welsh natural history, it remains to inquire where it should be placed. This is too important a question to be lightly answered. It is a matter of frequent observation that the success of a provincial museum too often depends upon the enthusiasm of a few individuals, sometimes even of one. Who can fail to mark, for example, the impress left by Professor Henslow on the Ipswich collections ? And I could name many provincial museums in England which, at the present time owe their success to local scientific men and collectors still living. It is, however, a dangerous thing for a public museum to depend thus upon the support or interest of a single individual, or even on a few amateurs, such as form our local natural history clubs ; and it has indeed often happened that when the leading scientific spirit of

a locality has been removed, the museum has degenerated, and lapsed into a state of neglect. It is obvious that a central museum should not be exposed to such a contingency. Hence it seems in the highest degree desirable to affiliate it to some large educational establishment. Such an institution will always possess on its staff individuals whose duty it is to have an intelligent acquaintance with natural history. When one scientific teacher quits his post, another supplies his place; and thus the locality is never left without the presence of a trained student of science, who could assist and advise the professional curator of the museum.

Such considerations alone would lead me to suggest Aberystwith as a suitable locality, and to advocate its affiliation with the University College of Wales. But many other reasons tend in the same direction. Dr. Hooker, whose great experience entitles his opinion on such matters to be received with the greatest respect, has pointed out the importance of selecting an eligible site for a museum: "a main object being to secure cleanliness, a cheerful aspect, and space for extension."¹ All these conditions are well fulfilled in the college buildings at Aberystwith. With the sea on one side, and an open space with grass and trees on the other, the museum would be placed in a clean and cheerful situation; whilst the unfinished portion of the building offers ample room for extension. In addition to the educational advantages which it would present to the students, it would become a means of instruction and recreation to the thousands of visitors who are attracted to Aberystwith during the season from all parts of the kingdom. The museum would thus enlist much wider sympathies than if placed in a town with a more fixed population; and the more widely the museum becomes known,

¹ Address to the British Association for the Advancement of Science. Delivered at Norwich, August 19th, 1868, by Joseph D. Hooker, D.C.L., LL.D., F.R.S., etc.

the greater will be the number of donations. Moreover, Aberystwith, by its central position, is well placed to receive contributions alike from North and South Wales, and thus to represent the entire Principality. But another consideration, not without considerable weight in determining the selection of a site, is to be found in the fact that the nucleus of a collection is already formed at Aberystwith. It must be confessed that, at present, the collections are but small. Yet the fact that donations are constantly being received shows that the museum, though young, is by no means friendless, and needs only to be better known in order to be better supported. Bearing in mind the efforts which have recently been made in the cause of liberal education in Wales, we may well believe that the museum, as an educational agent, will not be overlooked.

There can be no doubt that Wales does not at present possess a natural history museum which can be compared with those of many of the larger centres of population in England, say Liverpool or Manchester, Leeds or Bristol. But I believe that such a want needs only to be pointed out in order to be supplied. Emboldened by what has been done in the past, we are warranted to look hopefully to the future; confidently believing that, either at Aberystwith or elsewhere, we shall in the fulness of time possess a museum worthy of Wales, and of the fine possibilities that yet lie latent in the Principality.
