

nervous system. Day records that young hybrid salmon raised at Howietoun, in which vision was more or less deficient, were observed to be generally lighter in color than their fellows.

The fishes of the sea are more often brilliant than those of the river or the lake. Warmth and light are favorable to brightness and variety of hue. The fishes of circumpolar regions, and those living at considerable depths, are therefore usually sombre, though occasionally they have iridescent scales or plates of great brilliancy.

In temperate regions, as along the coasts of the United States, sombre tones are most common, but in summer many sunny-hued strangers come up from the south.

In the tropical seas, however, the greatest beauty is to be found; and in some groups, such as the parrot-fishes and the wrasses, the most bizarre and astounding combinations of masses of brilliant color. Harsh and inharmonious as they seem, however, when imitated by the brush, they are never unpleasing in the living creatures. The West Indian fauna has many wonderful fishes,—such as the angel-fish, *Holocanthus ciliaris*; and the Spanish lady, *Bodianus rufus*,—but the utmost possibilities of beauty are to be found only in the Southern Pacific and the Indian Oceans.

As Count Lacépède has so eloquently shown in the passage already quoted, no class of animals has been so richly endowed with color as the fishes, except it may be the insects; and the effect of brilliancy in a fish is much greater on account of its larger size. Birds appear at a disadvantage in comparison, because, except in the metallic patches on the throats of the humming bird and a few similar instances, the surfaces of their feathers are not so well adapted to display as the broad burnished sides of fishes, kept constantly moist and lustrous by contact with water.

The beauty of fishes can only be known to those who have had the good fortune to see them swimming at ease, bathed in the limpidest of water and the brightest of sunshine. Aquaria are always dark and gloomy, and their glass walls seem more prison-like than the bars of a menagerie-cage. Museum preparations do not tell of the vanished beauty even so well as the lifeless bodies of the fishes themselves, and every angler knows how suddenly the dead fish loses its attractions of texture and color. This change has been well described by Dr. Badham in the following lines:—

“While blazing breast of humming-bird and Io’s stiffened wing
Are bright as when they first came forth new-painted in the spring,
While speckled snake and spotted pard their markings still display,
Though he who once embalmed them both himself be turned to clay,
On fish a different fate attends; nor reach they long the shore
Ere fade their hues like rainbow tints, and soon their beauty’s o’er.
The eye that late in ocean’s flood was large and round and full
Becomes on land a sunken orb, glaucomatous and dull;
The gills, like mushrooms, soon begin to turn from pink to black;
The blood congeals in stasis thick, the scales upturn and crack;
And those fair forms a Veronese, in art’s meridian power,
With every varied tint at hand, and in his happiest hour,
Could ne’er in equal beauty deck, and bid the canvas live,
Are now so colorless and cold, a Rembrandt’s touch might give.”

G. BROWN GOODE.

NATURAL HISTORY GARDEN AND AQUARIA FOR BOSTON.

At the meeting of the council of the Boston Society of Natural History previous to that held on Wednesday last, it was voted to recommend to the society, at its meeting of April 2, a resolution to the effect, that, in pursuance of the policy recorded in the vote of March 28, 1888, and adhering to the conditions therein re-

quired, the society authorizes the council, as soon as one-third of the final sum required for the establishment of its natural history garden and aquaria has been raised, to proceed with the establishment of the aquarium at City Point, in accordance with the plans laid down in the letter to the park commissioners of Dec. 31, 1889, which has received their approval. These plans will be best understood from this letter, which is in substance as follows:—

The Society of Natural History have been earnestly and constantly engaged in work upon matters connected with the foundation of natural-history gardens, since the receipt of the last letter of the commissioners, dated Dec. 30, 1887, and have finally concluded to offer the following as plans of what they deem to be best, hoping, if these are accepted, to follow up this first step very rapidly, so as to bring the matter speedily before the public. They propose to designate all the collections of living animals under their charge as the “Natural History Gardens,” and to establish under this title three different divisions,—one to be called the “Marine Aquarium;” a second, the “Fresh Water Aquarium;” and the third, the “New England Zoölogical Garden;” these to be situated on grounds and to have buildings such as may be mutually agreed upon by the commissioners and by the society, in accordance with the provisions of the letter of the commissioners above referred to.

In compliance with the request of the park commissioners to present a statement of the proposed policy of the society in regard to the exhibits at the places designated by them,—namely, at City Point, near Jamaica Pond, and at Franklin Park,—the council offer for consideration the following general statement, and the outline of their plans with reference to each of the three divisions.

The attention of the commissioners is invited at the outset to the scientific and educational character of the plan of the Natural History Gardens. The three divisions of this department of the society’s work, when regarded as a whole, form a connected series of exhibitions, which will, it is hoped, illustrate more completely than has ever been done before, the relations of organisms to the four great regions of their distribution,—the sea, the fresh water, the land, and the air. The principle underlying the whole, and to which each part, however small, has been made to contribute, is the illustration of the relations of plants and animals to their surroundings. The council believe that a full exposition of the laws governing these correlations is the fittest use they can make of the opportunities offered by the commissioners, and the most valuable contribution which they and the commissioners acting together can bring to the cause of public education.

I. Marine Aquarium.

In the maps of the proposed Marine Park the lands and ponds assigned for the use of the society are admirably suited for the purposes of a large aquarial garden; and the council desire to express their satisfaction with these indications of the intentions of the commissioners, for they confirm the council in the opinion that it will be practicable to found a marine aquarium at this place which will be of unique excellence as an instrument of popular interest and education.

1. A collection of living organisms arranged and exhibited for the illustration of natural laws has a fuller effect if the minds of the students and visitors have been prepared by previous study, or, in place of this, if they have at hand a brief explanation of the general structure and relation of animals and plants to each other and to their surroundings.

The society propose to supply this explanation by means of an epitome collection, which, with a printed guide, shall explain the structure and relations of the more important subdivisions of animals and plants, the general adaptations of the structure of organisms to an aquatic existence, and the fact that under ordinary conditions, however diverse, the organisms retain their typical structures. This collection would consist of two classes of objects,—(a) a series of representative forms, including the principal types of animals and plants; (b) such general dissections and other anatomical preparations of selected types, accompanied by diagrams, as may enable the observer to grasp the fundamental points of the structure, physiology, and correlations of the animal

kingdom, but with special reference to those living forms which constitute the whole aquarial exhibit. These collections, being an introduction to the larger display, should occupy one room, serving also as the vestibule or entrance-hall in the main building.

2. The correlations between certain structures and parts in animals, and their habits and natural surroundings, can be illustrated by placing plants and animals that live on muddy, sandy, gravelly, or rocky parts of our own shores in separate aquaria, properly arranged and furnished. The suitability of organisms to the work they have to do could be illustrated in this and other ways, and clear ideas of one of the fundamental laws of organic modifications presented to intelligent visitors and students.

3. The extraordinary modifications which have taken place in the structure of the descendants of air-breathing land animals, in order to fit them for life in the sea, would be illustrated in the aquaria and also in the salt water ponds. These would be used for such seals, cetacea, and other marine animals as are either too large to be accommodated in tanks in the buildings, or which can be most appropriately exhibited in such enclosures. Adaptations equally fitting and instructive are found in birds which live upon the sea or its borders; and examples of these forms would be shown in the same ponds, or in appropriate places upon their margins.

4. It is well known that the distribution of plants and animals is limited more, perhaps, by temperature than by any other single cause. It is practicable to illustrate this great law of distribution with suitably constructed and properly arranged aquaria, stocked and kept supplied with animals and plants taken at moderate depths upon our own coasts. The problems connected with obtaining and handling animals gathered at great depths present difficulties with which no garden should attempt to cope until it is completely organized.

5. Faunal collections would compose the greater bulk of the marine aquaria. It is intended to group these together in such a way as to represent the association of the forms in their respective habitats. No attempt, of course, would here be made toward systematic grouping, but very dissimilar forms would be associated together, bringing prominently into view the geographical distribution of types. In one room of suitable size aquaria would be devoted solely to the marine plants and animals of the North Atlantic, from Cape Cod northward. As a part of this collection a series of aquaria would be maintained for the exhibition of the commoner plants and animals occurring on the coast of Massachusetts. These forms could be permanently supplied, and, being named and described in a proper guide book, would be of great interest to all persons living on the seashore. The fauna south of Cape Cod is in large part easy of acquisition, and could also be well represented in separate series of aquaria. The fauna south of Cape Hatteras and that of the western coasts of the United States, and other faunas, could also be exhibited, as opportunities presented themselves, either to a limited degree or more or less extensively, if the future progress and success of this division warranted the extension.

II. Fresh Water Aquarium.

It is obvious that an epitome collection is as desirable for the explanation of the relations of fresh-water plants and animals as of the marine.

1. The society would therefore form an epitome collection similar to that planned above for the Marine Aquarium; but this would necessarily differ in the details of its composition, fresh-water plants and animals being used instead of marine types. The adaptations of the structures of organisms to an aquatic existence would be exhibited by means of preparations of the gills, etc., as in the corresponding marine collection; but special adaptations to a fresh-water existence—such as the mode of reproduction of sponges, bryozoa, and some crustaceans by means of winter buds; the effects of desiccation upon some of these, and their mode of transportation from pond to pond; the contrasted structures of corresponding fresh-water and marine shrimps; the peculiarities of the batrachians, showing the transitions from a purely aquatic to a terrestrial type; and similar classes of facts—

would be prominently illustrated. The fresh-water faunas of the globe are all secondary, or derived mainly from the marine faunas. This can also be approximately demonstrated in the epitome collection by placing side by side a certain number of marine and fresh-water animals in series or in pairs, including occasionally some fossils, in order to compare the existing *Amia*, gar pikes, etc., with their marine but now extinct ancestors.

2. Some of the most important results of research bearing upon the evolution of organisms have been attained by means of experimentation, and it is of the greatest importance for educational purposes that illustrations of such facts should be made accessible to teachers and students. The council would therefore aim at the repetition of some of these experimental observations, and make permanent exhibitions of the results. For example: a series of aquaria could be maintained, showing the gradual modification of the brine shrimp in passing from a saturated solution of salt, through ordinary salt and brackish waters, to a final lodgement in purely fresh water, where it becomes transformed into a well-known fresh-water type of crustacean; another series repeating Semper's experiments upon the snail, *Lymnaea stagnalis*; and still others showing the results of experimentation upon the development of the axolotl, salamanders, etc. This department would also include aquaria for the exhibition of the animals and plants now living in mineral or hot springs, the Caspian and Dead Seas, and other anomalous and more or less isolated positions, such as caves and subterranean rivers.

3. Fresh-water plants and animals are not wholly derived from the sea: many of them are modified descendants of terrestrial organisms that have changed their habitat and become suited to an aquatic existence. Some of the ponds would be used to exhibit this important fact, since in them the larger air-breathing animals that live on or in the fresh waters—such as the swimming and wading birds; the batrachians (frogs, salamanders, etc.); the reptiles (snakes, turtles, and alligators); beavers, muskrats, and possibly larger representatives of the mammalia from the tropics, such as the hippopotamus—could be confined. Some of these ponds would also be devoted to the exhibition of the *Liliaceæ* and other plants, which, although originally truly terrestrial and flowering plants, have become more or less modified and fitted for aquatic life. The huge leaves and flowers of the *Victoria regia*, and the lovely color of many of these annuals floating upon the glassy surface of the water, and framed in a shore growth of rushes and grasses, would form pictures of rare beauty and attractiveness.

4. Insects, although as a whole purely terrestrial and aerial, contain a number of groups that pass either a portion or the whole of their lives in water. An insectary would therefore be established, furnished with aquaria, placed in the midst of suitable plants, and surrounded by ample cages of netting for the confinement and display of the adults after they have passed through their transformations and have begun to fly. This part of the exhibit could be made exceedingly instructive by means of a printed guide, explaining the transformations of the insects shown in the aquaria and cages.

5. The fauna of our own fresh waters is apt to strike one at first as uninteresting; but it contains sponges, especially interesting to the public on account of their effect on the water-supply; many microscopical plants that can be cultivated in masses, so as to be seen by the unassisted eye; large bryozoa, such as *Pectinarella*, growing in heads like a brain-coral; bivalves and snails of respectable size; several interesting species of batrachians; and many fishes of remarkable structure and habits. The council would therefore bring together a series of aquaria exhibiting the animals of the fauna of New England and eastern Canada, and also keep in view the idea of explaining their more obvious relations to the water-supply of our cities. The fauna of the inland waters of the western and southern parts of North America is accessible, and should be shown, in so far as the more prominent forms are concerned, in a separate series of aquaria. Opportunities will perhaps be offered in the future for the acquisition of the larger and more interesting organisms of other faunas. These can be exhibited, provided the future success of this division justifies an extension of the plan.

III. New England Zoölogical Gardens.

The grounds at Franklin Park assigned by the commissioners for the use of the society are suited only to the third division of the Natural History Gardens,—the higher vertebrates or the larger terrestrial and aerial animals; and here, better perhaps than anywhere else, would it be possible to carry out one of the favorite projects of the supporters of the society, namely, such exhibitions as would familiarize the observer with the animals of New England. For in Long Crouch Woods is to be had not only a characteristic fragment of New England scenery and rock structure, but, by the limitations of the surface and of the territory, it would be impossible to make there any extensive display of foreign forms.

1. The council would exhibit fully the animals of the north temperate zone of the New World, limiting this zone to about eight or ten degrees of latitude on the parallels of New England, and thus display those which one might see at any point within the northern United States. All these animals could be cared for in such a place at the minimum expense, for their habits in a wild state have accustomed them to brave all the severities and vicissitudes of our climate. It being easier to obtain and to maintain the animals of this zone which are nearest home, it would follow that the great bulk of the collection at all times would be made up of animals characteristic of New England. But as thus one of the prime features of life upon the globe is necessarily touched upon,—its geographical distribution,—so may the lesson be made far more telling if to this assemblage be added just those animals (and no others) which in other faunas specially represent animals indigenous to New England. Thus, to instance one or two points, the council would exhibit side by side with the Rocky Mountain goat the *chamois*, structurally allied, adapted for and dwelling in similar mountain regions, characteristic of the Old as our own is of the New World; beside the cougar, or American panther, they would display the jaguar of South America; beside the black, the brown bear; while to correspond with the opossum, they would seek a relative, not in the more nearly allied marsupials of South America, but in the distinctive home of marsupials, among the strange forms which occur in Australia. As it would not be necessary to seek this counterpart for each animal, but in many cases only one for an entire series, as with the mice, hares, foxes, and so on, it will be seen that the collection would not be very largely increased, while its increase would be strictly limited, and its educational value greatly enhanced. It might be desirable to extend the collection in one or two instances; but in these only in the case of great groups, not represented in our own fauna, such as the *ornithorhynchus* of New Holland, and one, possibly two (or even three), of the *quadrumana*. Under such restrictions, which seem to be absolutely required by the extent to which the grounds at this point are limited, there would be a coherency and meaning to the collection which it would be difficult to find duplicated elsewhere, and it would be a means of exhibiting the characteristic features of the New England fauna and its relationships not easily accomplished in any other way.

The principal difficulty in carrying out even this limited plan is the insufficient surface suitable for such an exhibition. This is nowhere more manifestly true than as regards the ruminants; for within the limits of Long Crouch Woods itself it would be entirely impossible to display in any pleasing or profitable manner those largest forms among our quadrupeds which excite, perhaps, greater interest than any other,—the bison, moose, elk, caribou, deer. For this purpose it is absolutely essential that more ground be had, at least so far as a range is concerned. And this it is hoped the commissioners will grant whenever needed, perhaps in the ground which has been set apart as a deer park, in which it would be quite possible, by lines of wire fence practically invisible, to separate such bands as could not be brought into a common enclosure.

2. What has been said thus far relates principally to the terrestrial animals. Another mode of exhibition for the freer-moving, aerial creatures may be advantageously pursued. Thus it might be possible in a series of outdoor aviaries, sufficiently large to

enclose good-sized trees, to bring together at their proper periods the characteristic summer or winter birds, so that one might see for himself what was the avifauna of New England at any given time. In others might be placed, as a permanent exhibition, such of the native breeding birds as would bear association, where they might find room enough, and suitable places, for all purposes of nesting and bringing up their young. The headlong flight of some birds might prevent their exhibition here. Similar aviaries for the exhibition of birds found in our north temperate zone west of New England should be placed side by side with those of New England itself; while the exhibition of foreign birds for comparative purposes, limited in the same way as those of the less freely moving vertebrates, would be more naturally disposed in the mode common in foreign gardens.

3. Long Crouch Woods, then, would be *par excellence* a New England exhibit; and such a display would naturally lose much of its interest in the winter time. If, however, there could be combined with this a winter garden situated in Sargent's Field, adjoining, cost alone would prevent it from becoming so attractive as to make it a constant place of resort at all times, and particularly during the colder months of the year. Here, in a large but simple structure of glass and iron, handsome rather in its proportions than through decorative attachments, warmed so as to have a very constant but not too high temperature throughout the winter, one would walk upon the unfrozen ground in a garden where varied and luxuriant vegetable forms would enable him to imagine himself in the midst of the tropics. The loftier vegetation, like the bamboos and certain palms, could be grouped in a higher central portion; while miniature ponds and fountains, reached by winding walks, would everywhere afford special nooks for aquatic or spray-loving plants. This could be enlivened still further with a very few of the more brilliant-plumaged birds and songsters in aviaries, aquatic birds on the ponds, and with here and there an enclosure containing some small creature, specially pleasing by its form or attractive by its habits,—a gazelle, a jerboa, perhaps a spider-monkey; a chameleon, a Surinam toad, or a garter-snake. The possibilities of such a scheme are fascinating; and the structure should be so arranged and situated that extensive additions could be made to it, and that it could be approached directly by conveyance to the door. An ordinary greenhouse would, of course, be necessary as an adjunct of the winter garden, for forcing plants for ornamental purposes.

4. An insectary should be built; and, both for economic reasons in construction and heating and for the convenient proximity of the necessary food-plants, it should be an annex to the greenhouse. Colonies of striking and curious insects, especially the social insects, undergoing their transformations, might be exhibited in a small, single-storied structure of glass and iron, like an ordinary conservatory, with no more flooring than would be required for passageways between the plants and shrubs. Such a collection would be inexpensive and attractive, and, without in any way curtailing its public use, would afford ample opportunity for scientific experimentation of an important kind. Pedigree breeding, for instance, or breeding in constant temperatures, whether high, low, or average, might here be carried on upon a large scale. Indeed, the opportunities are so great that the choice of subjects would be difficult, so many would claim attention; and it would be quite possible to display a changing round of attractive and instructive sights from week to week throughout the year.

The educational use that can be made of these three different divisions of the Natural History Gardens, forming one connected whole,—one in principle, but varying in details to suit the special needs of each division, and the adaptability of the separate locations,—will undoubtedly meet the requirements of the present, and also give the necessary freedom for enlargement or modification needed by future generations. It will be seen, also, that the New England element enters into each division in varying proportions, as circumstances permit, and to the greatest degree where the objects concerned are more commonly known, being most developed among the higher animals, with which, from their size and their relations to man, the public is more familiar.

The difficulties which surround the whole project,—in many

respects so novel as to offer no precedents, wholly new to those on whom the burden of the execution of the plan must fall,—as well as the great expense of the undertaking, have been subjects of long and thorough consideration by the council. These difficulties account for the delay in replying to the last communication of the commissioners. Their deliberations have finally brought the council to the assured conviction that it would be neither feasible nor wise to attempt to begin the three proposed divisions at the same time; and yet it is obvious that the work of the society in building up the department of Natural History Gardens should not be delayed. Although the sites proposed for the Marine Aquarium and the Fresh Water Aquarium will not be ready for occupation for some time, nevertheless it is the unanimous opinion of the council that the undertaking should begin with the Marine Aquarium. The proposed site of this division, the less proportionate expenditure for installation and maintenance, and its general interest to the public, combine to make it likely that it can be made a financial success, and thus contribute to the foundation and maintenance of the other departments.

In order to meet these difficulties and make a beginning without unnecessary delay, the council suggest the propriety of starting a temporary marine aquarium on grounds already under the control of the commissioners, and therefore respectfully inquire of the park commissioners whether the establishment of a temporary aquarium at the Marine Park in South Boston would meet with their approval; and, if so, what part of the grounds and water-front now at their disposal could be allowed the society for that purpose.

The pumps, piping, and specimens would of course be serviceable for removal to the buildings and grounds of the permanent establishment; and, if thought advisable, it might be practicable to construct even the temporary building so that it could be taken down and rebuilt in another place, or easily removed to a new site.

A temporary garden of respectable proportions would require only a limited sum for buildings and machinery, and would probably prove remunerative; the society could also begin operations sooner, if a limited sum devoted to such uses could be asked for; and they could thus effectively start the work of exciting public interest in favor of their plans for the establishment of a fresh-water aquarium and a New England zoological garden, and probably advance with surer steps toward the establishment of these two divisions of the Natural History Gardens.

In view of these considerations, the council of the Boston Society of Natural History ask the approval of the park commissioners to the following proposition: namely, that they shall be allowed to begin operations as soon as they have raised a third part, more or less, as may be needed, of the proposed sum of two hundred thousand dollars, for the purpose of erecting and equipping a building for a temporary aquarium at Marine Park, on land to be granted by the commissioners of parks; said sum to be ultimately incorporated with the two hundred thousand dollars to be raised by the society for the establishment of the Natural History Gardens, but for the present, and as long as the temporary aquarium exists, to be considered as belonging to an independent foundation.

Little has been said about buildings in this communication, because it has been considered essential first to settle what the council as scientific men and the commissioners in their official capacity, both being equally interested in the cause of public education, would deem it best to do; and, second, because in all such undertakings the true basis should be sought in the exposition and teaching of principles. As will be seen, however, by all those who have followed the history of this undertaking, the plans have been made with due consideration of the advantages offered by the localities proposed for the three divisions; and their unique character and extent are fully justified by the unequalled opportunities offered by the commissioners for the founding of these great institutions, devoted to the entertainment and instruction of the people in the system of parks under their jurisdiction.

We hope to publish next week some account of the action taken by the Boston Society of Natural History at its meeting on April 2.

STAMMERING.

IN the *Provincial Medical Journal* of Feb. 1, 1890, is an anonymous letter from a physician, himself a victim to this unpleasant habit, which contains so many points of practical interest that portions of it are here reproduced from the *Medical Analectic*.

"Having lately received several circulars from different professors who advertise their secret methods for the cure of stammering, I have thought that a personal experience might be of interest and value. I shall not attempt a learned physiological analysis of the nerve-centres and nerves involved in the different muscles, and sets of muscles, in stammering, but rather aim at a simple statement.

"Since twenty years of age, I have been, though not wholly, yet fairly free from the trouble. In my earliest remembrance of speech, and all through my boyhood, I was a terrible stammerer. I have only heard of two epileptics in my family,—one a woman, a first-cousin; the other a boy, a second-cousin,—both on the father's side.

"The occasions on which I have stammered for thirty years past, and yet stammer, are about as follows: from habit acquired in travel, and in India, and to save the legs of the maid, I prefer to go out of my room, and call to the maid for what I may want. For two years I had a favorite maid called Mary. It was in vain for me to attempt to call out 'Mary!' My lips would compress, the upper teeth seizing the flesh inside the under lip. The word would not come without extreme and painful effort. But there was one way towards perfect relief: I always called 'O Mary!' i.e., I placed a vowel-breathing before the consonant, and thus unlocked the complex and in-harmonious co-ordination of brain, nerve, and muscle involved in the production of *m*. In reading a lecture before a public audience, a terrible word is 'method.' Within the last ten years my upper teeth have made wounds inside the under lip in getting out this word. I naturally avoided the ridicule of inserting a vowel-sound before an audience. Another occasion on which I am still constantly bothered is in saying 'good-morning,' as I am shown out of a front-door by master or maid: something unduly glues my tongue over the *g* in 'good.' I get over this difficulty by bringing into operation another mental act, and the action of a different set of muscles, by the act of lifting my hat. I can say 'good-morning' without stammering while in the very act of lifting my hat. Here the same principle is involved as in putting a vowel before *m*: spasm of certain muscles is relieved by diverting nerve-energy to other channels and other muscles. Again: if I feel that I am about to stammer in any word, I try to substitute another word. Often in public reading, if I avoid the difficult word by some substitution, the same difficult word may recur many times, and I can speak it with little or no difficulty.

"If I am reading a lecture in public which is legibly written, and if I have previously read it aloud to myself, I shall stammer little or not at all: in other words, I do not stammer when the nervous system is calm. Similarly, if, speaking in a public discussion, I confine my mind to one simple point at a time, I do not stammer; but if the mind, in its active tumultuousness, sees too much or too widely the other possible relatives of the subject, and a fear of want of clearness comes over the mind, then my speech is full of stammering.

"The points which have seemed to me important toward avoiding stammering are to seek nervous calmness. If this be not attainable by the will, the sufferer can do something to divert the *præ* or present spasms; such as drawing in the breath, always keeping the lungs well filled with air in speaking, walking up and down the room, moving other parts of the body by an act of will, taking up a book or ornament, etc. I have made it a strict rule never to seek to force myself to say the difficult words, but stop and use another word or substitute some other words immediately preceding the difficult one. The sufferer should read aloud when alone both poetry and prose. Stammerers rarely stammer in reading poetry aloud when alone: the mind and nerves by poetry are induced into harmonic rhythm