him to branch out for himself in some line of natural history. His students became scattered throughout the world.

Up to the last, and as much as his failing health would allow, Linnæus kept up a lively and progressive interest in his science.

Finally, tired of life, and forgetful of all honors which had been so keen a delight to him, he passed beyond peacefully on the 10th of January, 1778.

His works and his name live forever.

At the conclusion of Dr. Morris's address a musical selection was rendered by the Glee Club of the United Swedish Societies, after which the following address was delivered.

LINNÆUS AND AMERICAN NATURAL HISTORY.

By FREDERIC A. LUCAS.

I presume that the question first in the minds of many present is, Why have we met this evening? why should we celebrate the two hundredth birthday of Linnæus?

In a general way, Linnæus may be said to have systematized the study of natural history, and arranged its known facts in an orderly manner; but his special claim to our gratitude is the invention or perfection of what is called the "binomial system" of nomenclature, that is, the use of the double name for each species of plant or animal. This may seem a small matter. In fact, those who ask Why doesn't every animal have a common name? might think they had reason to feel anything but grateful; but it was really one of the greatest advances made in natural history. For in science it is not enough to accumulate facts, they must be set in order, or classified, so as to be available. In fact, Huxley termed science "classified knowledge." Before the day of Linnæus, animals were mainly known by their descriptions or their vernacular name. The lion, for instance, would be called the "great tan-colored cat with a mane;" and, in order to indicate what species were related, it would be necessary to specify them each and all.

As the rising tide of commerce of the eighteenth century brought to Europe scores of animals previously unknown, the number of recognized species increased so rapidly that it promised to be a difficult matter to keep track of them. It was at this time that Linnæus devised the plan of applying to each animal a general or generic name which should indicate the immediate group to which the animal belonged, and a special or specific

name to apply to that particular kind of animal alone. And so binomial nomenclature was born. It has been claimed that Linnæus was not the first to use the binomial system, but, if not, he was certainly the first to employ it consistently and to frame rules relating to such use. Linnæus wrote in Latin not as a matter of affectation, but because Latin was the common language of culture and science, and to this day many naturalists still write descriptions of new species in *Latin*, or preface their accounts with a brief diagnosis in that language. Had he written in Swedish, his native tongue, his audience would have been a small one, probably limited to his native land; as it was, his works were understood by all the naturalists of the day. Hence his scientific names which were Latin names are, like a gold coin, current the world over, while the so-called "popular name" is restricted in its use, and circulates only in the country where it is coined.

But Linnæus did much more than devise a scheme of nomenclature: he systematically defined each and every group of plants and animals with which he dealt, giving their chief characters in a few brief words; and the small groups, or genera, he combined in large divisions termed "orders." It matters not that the genera of Linnæus have since been divided and subdivided many times, the underlying principle of assigning certain definite characters to each animal remains the same.

Linnæus was a born classifier. He was not happy until he had duly set in order the facts and objects that came under his notice; and while he did not, it is true, carry this to the extent of the eccentric Raffles, who made several genera and species of thunder and lightning, he did propose a system of classification for diseases wherein they were duly assigned to their respective families and genera.

To many the term "classification" is repellant. It seems to signify something with which the ordinary man has nothing to do, when really it is something with which every one is, or should be, concerned; for classification is simply arranging things in their proper places, and putting things of a kind together. And the man who puts his cuffs in one place, his collars in another, and arranges his shoes in a row on the top shelf of a closet, is a classifier.

The naturalist is confronted by the same problem as a general, - that of grouping or arranging the various plants or animals so that he may know where each one is to be found, or where to assign any new form that may come to light. For an army is not merely a large number of armed men, it is an orderly assemblage of men so classed and grouped that they can be handled by one man. And the classification of the animal kingdom, for example, is very similar to that of an army, and to the same end, - that any one may put into its proper place each of the thousands of units with which he has to do.

And Linnæus marshaled plants and animals as a general marshals his troops. And just as an army is composed of thousands of individuals, distinguished as officers and privates, formed into companies, regiments, brigades and divisions, so the thousands of species composing the animal kingdom are grouped into genera, families, orders, classes and phyla. In doing this, Linnæus instituted many minor reforms; for example, his characters were given in a definite order, and following the diagnosis was the synonymy, or list of names under which the animal had been described, and works in which it had been published. He was the first to strip natural history of its verbiage, and express himself in clear and concise language, and, had he lived to-day, I doubt not he would have been an advocate of spelling reform.

And yet, after all, this scheme of nomenclature is but a part of the service Linnæus rendered to natural history. It is not merely that his genius grasped the fact that nature was order, and that he devised methods for expressing this order; his zeal in the pursuit of knowledge gave a stimulus and purpose to the study of natural history that it had never felt before. In a way, his influence may be said to have been much like that of Agassiz in the United States, "He imbued [his pupils] with his own intense acquisitiveness, reared them in an atmosphere of enthusiasm, trained them to close and accurate observation, and then despatched them to various parts of the globe." It was not so much what he knew himself as the enthusiasm he inspired in others, that made him a power felt throughout the world.

It must ever be borne in mind that nomenclature, or the naming of plants and animals, is not the end of natural history, but only a means to an end,—a fact that many of our younger naturalists are prone to overlook. Too many of them seem to think that the great aim of the naturalist is to write "new species" after as many names as possible, when, to my mind at least, the making of new species is the most trivial work of the naturalist. It is important work, but only a step on the pathway of knowledge. The real problems are, Why do these species exist? what forces have brought them into existence? and what are their relations with one another?

The man who heard an overture for the first time, after listening a while turned to his friend with the query, When are they going to stop tuning up, and commence to play? So you may wonder why I chose for the title of this address "Linnæus and American Natural History." The truth is that Linnæus is so intimately connected with *all* natural history, that American natural history forms but a small part of the whole. And yet Linnæus was intimately concerned with the development of American natural history by his acquaintance with those men of science who were gathering and making known the fauna and flora of this continent; and as plants and animals were

brought to Europe, most of them found their way to Linnæus, and many were definitely named by him for the first time. The twelfth edition of the famous "Systema Naturæ" describes 210 mammals, 78 of which are American (including under that term North and South America); 790 birds are noted, of which 260 are American; and 88 of the 124 reptiles are also American.

We think of Audubon, Baird, Coues and Ridgway as the great American ornithologists, and they are great; but a glance at the check-list of the American Ornithologists' Union shows how prominent a part was played by Linnæus. The list of 1889 gives 729 species and subspecies. No less than 202 of these were named by Linnæus; while Audubon, the father of American ornithology, named but 33. Twenty-five bear the sign-manual of Coues, and 104 of Ridgway. We must, it is true, remember that a considerable number of the birds named by Linnæus are species common to Europe and North America, but, on the other hand, it must also be borne in mind that many named by Ridgway are what are called subspecies, which were not recognized in the day of Linnæus.

In the time of Linnæus there were few naturalists in the United States, but those were active; and that they approved of his methods is shown by a letter of Collin to Linnæus, in which he says, "Your system I can tell you obtains much in America. Mr. Clayton and Dr. Colden at Albany are complete professors, as is Dr. Mitchell at Urbana, Va." If this seems a pitifully small number to us, it must be remembered that in those days naturalists were few in number, and natural objects studied but little; and twelve years later there were in all England but seven botanists who were followers of the Linnæan methods. Those were the good times when one man knew the plants and animals of the whole globe. Now a naturalist may devote his entire time to the study of one small group, and the names of other plants and animals are often as unfamiliar to him as they are to the average man.

It is interesting, almost amusing, to see how little an idea Linnæus and his contemporaries had of the number of the animals in the world, for their most liberal estimates were very far from the facts. And this lack of knowledge Linnæus realized when he wrote at the end of his "Systema Naturæ," "*Ea qua scimus sunt pars minima eorum quæ ignoramus.*" Thus Ray in 1693, a short time before Linnæus began his career, estimated that there were about twenty thousand animals, including insects, in the whole world; and this was a very liberal estimate, for he actually described less than four thousand.

Now, Ray was what would be termed to-day a "lumper," and divided all living things into four great orders, — insects, fishes, birds and beasts.

the last including reptiles. The number of beasts he stated to be a hundred and fifty, adding his belief that "not many that are of any considerable big-ness in the known regions of the world have escaped the cognizance of the curious." The birds he considered might reach as many as five hundred. Contrast this with the more than twelve thousand species so far described. The number of insects he considered might possibly reach twenty thousand species, a long way from Sharp and Walsingham's estimate of two millions, or Riley's of ten millions. Nowadays this estimate of Ray provokes a smile, and yet we can find an example of much greater complacency shown by one of our noted scientific men of much more recent date; for Dr. Coues about 1880 thought that few mammals remained to be discovered in North America. How badly he was mistaken is shown by Dr. Allen's review in 1894, showing that the number of recognized species had more than doubled in ten years, rising from 181 in 1880 to 369 in 1890; and since then many more have been described, not merely small creatures that to the ordinary observers are alike, but large animals like bears and mountain-sheep.

It well illustrates the activity displayed by naturalists of that day to say that by 1758 the number of known mammals and reptiles had increased to 334 and of birds to 790; the figures in the one case being an advance of a hundred per cent over those of Ray, and in the other of fifty per cent.

How thoroughly the world is being ransacked for new animals, and how actively naturalists are engaged in their description, may be gathered from the following figures. Up to 1830, species to the number of 71,598 had been described, by 1881 the number had risen to 211,553, and by 1896 to 366,000; more than 150,000 species having been described in fifteen years. And the vast and ever-growing host of living things — the beasts of the field, the birds of the air, the fishes that are in the water about the earth, to say nothing of the myriad species of the plant world — are each and all named in accordance with the method devised by Linnæus two centuries ago. Linnæus builded better than he knew, and his work has stood the test of time; and the methods he devised for classifying and naming animals are those in use now. His details may have been faulty, and the groups he considered as genera may have been divided and subdivided, but his plan stands.

Scores of animals known to Linnæus have been swept out of existence, and thousands that he never knew have been discovered; but the stimulus given by him to the study of nature remains unchecked, and to-day in many countries the members of learned societies have assembled, as we have gathered here, to do honor to the great Swedish naturalist. Sweden, indeed, chanced to be the birthplace of this great man, but genius is not fettered by time and space, belonging rather to all time and to the whole world.

At the conclusion of Mr. Lucas's address the Glee Club sang a second selection, and then the evening exercises ended with an exhibition, by means of stereopticon views, of plants and animals known to Linnæus, in charge of Dr. A. J. Grout and Mr. Lucas.

In the Borough of Manhattan the day was rounded out at the New York Aquarium, Battery Park, where the New York Zoölogical Society gave a reception to the Academy and the guests of the occasion. This function likewise commemorated the centennial anniversary of the erection of the building and gave the first view of the collections by night. A feature of the reception was the exhibition of forms of marine life known to Linnæus.

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An important and highly interesting feature of the Linnæus celebration lay in the following documents contributed by sister societies in many parts of the world, and letters written by several of the Honorary Members of the New York Academy. Each is reproduced here in the language in which it was sent in.

Kungl. Svenska Vetenskapsakademien, Stockholm.

It is with great pleasure that the Royal Swedish Academy of Sciences has received in these days, from all parts of the world, the most gratifying testimonies of the great admiration and esteem in which our first president, Carl von Linné, is held by all those who love and study nature. Your invitation has also been accepted with great gratitude: it was, however, received so late that it was impossible to take any measures for participating in your celebration in such a way as would have been desirable to us. You have expressed your wishes that we should contribute an official document appreciative of the work of Linné. There is, however, no opportunity now to prepare such a document, and we must thus confine ourselves to a short statement elucidating our opinion.

There were many great naturalists before Linné, if we count from Aristotle to Ray and Willughby. There was certainly a great amount of knowledge, also, concerning animals and plants; but there was no system, no scientific names or terms. The facts that were known in natural history before Linné were thus heaped without order, or with very little order, like a pile of bricks and stones at a building-place. Linné was the great architect who made the plan for the erecting of the building, - the system; and he furnished at the same time the mortar - the nomenclature - for cementing