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BULLETIN

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BULLETIN

OF THE

ESSEX INSTITUTE.

VOL. 9. SALEM, JAN., FEB., MAR., 1877. Nos. 1, 2, 3.

REGULAR MEETING, MONDAY, JANUARY 1, 1877.

MEETING this evening at 7.30 o'clock. The PRESIDENT in the chair. Records read.

THE PRESIDENT stated that the occurrence of this meeting on the evening of the first day of the year, suggested the propriety of omitting the customary duties, and of devoting the time to the consideration of the results, and the influence on the cause of education and social culture, of the leading commemorations of the centennial year now closed. The principal and all absorbing event was the Centennial International Exhibition at Philadelphia, which was opened on Wednesday, the tenth of May, and closed on Friday, the tenth of November, the President of the United States, members of his Cabinet, and other distinguished individuals being present on both of these occasions.

The interest that has been given to this exhibition by the Institute claims a passing notice.

The early part of the last year, and the closing of the one preceding, were marked by an earnest effort of the

ladies of Salem to raise a fund to this end. Recourse was had to several available means. The most prominent was the Exhibition of Antique Relics in these rooms, in December, 1875, which was opened for several days and excited great attention. The display of articles was large, and the arrangement in good taste, illustrating the furniture, household utensils, and costumes of the several epochs in our history; also portraits and miniatures of several of those who in their day and generation acted well their part in the great drama of life. This was a financial success. Later in the season, after a lapse of a few months, a series of photographs, specially taken for this purpose, with letter-press accompaniment, "An Exhibit of Salem," its houses, industries, public buildings, and other noteworthy views and objects, were arranged in a portfolio, and contributed to the Massachusetts Educational Department in the Main Building, where it elicited many commendations. The expense was defrayed by the Ladies' Centennial Committee of Salem.

About the same time the Institute, aided by several friends, contributed a series of articles, including portraits, dresses, old papers, documents, and photographs illustrating the period of settlement of Salem, to be placed in the Historical Department of the Exhibition, which was arranged in rooms in the Philadelphia Academy of Fine Arts.

At the close of the exhibition, through the kindness of our associate, Hon. J. Leonard Hammond, one of the Chinese Commissioners, the Institute received a large and valuable collection of Chinese drugs, specimens of paper, cloth, tools, and other material illustrative of Chinese life. Also many photographs, catalogues, and other papers from the officials connected with the other commissions.

Four excursions were arranged to Philadelphia; thereby

some 250 persons, members and friends of the Institute, were enabled to visit the exhibition under very favorable conditions.

The President alluded to the coincidence that this centennial year was also the 250th anniversary of the settlement of Salem by Roger Conant and his companions, an event well worthy of our notice, and concluded by announcing that he should call upon Hon. G. B. Loring, the Massachusetts Commissioner, and Rev. Messrs. E. S. Atwood and E. C. Bolles, to address the meeting upon topics suggested by the occasion.

REMARKS OF THE HON. GEORGE B. LORING.

MR. PRESIDENT:—The scope of the work assigned me since I reached this hall is somewhat startling. I did not anticipate being called upon to open the discourse of the evening, and I certainly had no expectation of being asked to give an extended and elaborate account of the proceedings of the Commission in whose hands the work of conducting the Centennial International Exhibition at Philadelphia in 1876 was placed, and in whose deliberations I took part from 1872 to the close of the great event, as the representative of the Commonwealth of Massachusetts. The details of that work would be by no means interesting to an audience like this, and on an occasion when we have met for congratulation and rejoicing rather than for investigation or instruction. It was as a striking representation of the progress of the American people during the last century that the Exhibition was full of interest and importance, and not merely as an example of careful and successful detail in managing such an enterprise; and it is for such significance and meaning as this that it is entitled to the admiration of the world, and to the special attention of an institution like that

which you represent. The highly creditable part performed there by the Essex Institute, exhibiting as it did the most interesting collection of historical matter prepared for that occasion, has connected it intimately with this first centennial celebration of the birth of the American nationality, and renders it peculiarly appropriate that the meaning of the celebration should be carefully considered in this place and at this time.

The universal desire of the American people to celebrate in a suitable manner the declaration of their national existence was a natural and proper impulse. However interesting may be the ordinary current of life to the careful observer, it is to the striking and startling events that we owe the great attraction of human history, and it is upon them that we depend for the inspiring force which makes man's career in the past attractive, and in the present and future strong and vital and effective. The history which we love, and from which we draw our lessons, is the record of the startling and surprising events which lie along man's pathway in the world. It is indeed the surprises which we love, and it is by the surprises that we make our great strides towards accomplishment and perfection. Man prides himself on his deliberate wisdom, and on his power of accomplishing a great end by calm purpose and by high design. But his great deeds are too often unpremeditated, his great thoughts too often unexpected, his great achievements too often unprepared, for him to boast of his power, or to forget that to an unexpected accident he often owes more than to carefully organized intention. To the surprising and brilliant results of great conflicts, unforeseen and unthought of, to the sharp turns in diplomacy, to the sudden establishment and growth of national existence, we owe the charms of national and popular record. To the unexpected burst of

sunlight upon a difficult problem in science we owe some of the most remarkable inventions. The great discoveries have astonished even the discoverers themselves. Newton, upon whose mind the law of gravitation was suddenly impressed by the most trivial accident ; Morton, whose discovery of anæsthesia, for which he and he alone is entitled to the gratitude of man in all coming time, could have told a delighted and startled world how even to themselves the rising of the great curtain when the mysteries were revealed, was an event full of surprising joy. The marked incidents in science, in history, in art, in every day life, are the surprises which attract and charm us, and the startling steps which man takes in his advancement. The world is full of people,—the history of the world is full of striking events ; but while the steady current of commonplace flows calmly on, the great surprises attract, and develop, and form, and create, and instruct. The ordinary course of national life has its lesson and its accomplishment ; but it is out of an unusual and unexpected uprising that the world receives its greatest impulse. The nation whose career is anticipated and steady from step to step may be useful and powerful ; it is the nation whose birth is a significant surprise, and whose course is full of new vigor and new experiment, which fills the heart of man with hope and promise, and his mind with progressive thought and design.

We have been told by one of our acutest thinkers that the American nationality is a phenomenon, an unexplained curiosity ; to my view sir, it is a surprise, entitled to the same high rank in the history of civil endeavor, that is accorded to great discoveries in the records of science. In its colonial settlement and organization, in the process by which it secured its foothold on this continent, in its preliminary endeavor, in its birth and in its growth and

experience, the American nationality is an unparalleled and unrivalled surprise, and as such holds its place in history, not as an eccentric phenomenon, not as a doubtful curiosity. Its settlement was by no means imposing. A few bands of unsuccessful adventurers, a chartered land-company, a feeble and flying body of dissenters, compose the fundamental elements of our national birth to the casual observer. The planting of the great universal principle of our republic was unobserved, its existence was almost unknown and unheeded for a century. The passage of the May Flower to these shores was an event of so little importance at the period of its occurrence that it hardly received the notice equivalent in our day to a paragraph in a weekly newspaper. Jamestown furnished but small attractions as an event to the thoughtful men of its times. He would have been looked upon as wild and visionary, who had congratulated John Carver and John Smith, and John Winthrop, and John Endicott that they were laying the foundations of a great overshadowing empire whose majesty should be upheld by the might and dignity of a free and educated people. The century however which followed this simple and obscure work, witnessed the most remarkable growth of all the fundamental and preliminary work of national establishment and development which the world has ever witnessed. In these rapidly rolling hundred years the scattered and struggling people of the American colonies, accomplished what had before been done only in almost as many centuries. The long period of preliminary life during which England was toiling on to a position worthy of national recognition—a period whose beginning is lost to us in darkness and gloom—was as familiar to our fathers as their own contemporaneous history. They knew that during a hundred generations of men, the nations of

antiquity struggled to emerge from darkness into light—and often struggled in vain. The weary and gloomy way travelled by France and Spain and Italy, before they had risen high enough in arts or arms or culture or power to entitle them to national recognition, they did not forget. And directed as they were by the best principles of government laid down in the past, strong in that remote isolation which protected them against all foreign interference, feeling the weight of responsibility which rested upon them as the founders of a new empire on whose success depended their own welfare and almost their own existence, they advanced with a vigor unknown before in the business of laying the foundations of the great social and civil temple which they and their children were destined to erect. In a century and a half the great preparatory work was accomplished. Our foothold as a nation was established on this continent. Our position was confirmed. We had a record of war of which the most martial people might be proud. We had thought out great problems of state; had solved to our satisfaction some of the most difficult questions of theology; had surrounded ourselves with the comforts and luxuries of life; had developed a civilization as high as any known on earth; and had perfected a social and civil organization whose health and strength arrested the attention of the thoughtful as a surprise, and are as superior to the eccentric and unusual operation of a phenomenon or a curiosity, as the grand march of the stars in their courses, is more majestic than the erratic career of a meteor flashing across a midnight sky.

Brought then as we were through this amazing period of vigorous infancy, we proclaimed to the astonished world that the life of a nation had begun, and so proclaimed it, that the declaration marks a period of time as

distinctly and unequivocally as does the rising of the sun or the going down of the same. To the United States, the American Republic, is it given of all nations to so date the hour of its birth as to celebrate its Centennial Anniversary. To us alone belongs that one initial event in history, so important, so accepted, so recognized, as to fix the time when a nation was born, and mark the hour when all the career of greatness began. Can this be said of any other? The significance and promise of the Declaration of our Independence, crowned with the accomplishment of the first century of national life, constitute a chapter in history which entitles us to the admiration of the world, and gives entire propriety to an international jubilee on our own soil. Summon before you the other nations of the earth, and where in all their annals will you find an event like this? Shall England be called on to celebrate the invasion of William the Conqueror, or the beheading of Charles I, or the restoration, as events out of which her very existence sprang? Shall France be expected to fix her International Exhibition upon the centennial year of the great revolution, or upon the promulgation of the Code Napoleon, or upon the return of the Bourbon, as the date of her national power and glory? The event is ours and ours alone; and we may never grow weary of contemplating that "brilliant and happy moment," when full armed the American people sprang into existence, and gave promise of what a hundred years might bring forth. I call this a surprise in history. It was a surprise to those who witnessed the event, it is a surprise to us who contemplate it. Not readily has its full significance been understood even by ourselves. By long-continued and persistent endeavor alone, have our minds been brought to a thorough understanding of the true intent and meaning of an international interchange

of thought and experience, and accomplishment, illustrating what has been done and said on our soil during the last hundred years. To our people, to Congress, to those who rule over us, the event appeared only as a holiday sport. To us who look back upon it, it stands out as the world's rejoicing over the progress of a free people in all those mental and material accomplishments, which constitute so much of national greatness. And I doubt not we shall date from it another century of progress and development, in which all our hopes, as sons of our colonial and revolutionary sires, will be more than fulfilled.

I cannot discharge my duty at this time with any degree of satisfaction to myself, or with any measure of justice to the event which has called us together, without allusion to the vital and inspiring force which gave unwonted strength to our infancy and vigor to our growth into manhood. Our very existence as a nation was the outgrowth of most earnest purpose, and most lofty thought and conviction. We turn back to this with gratitude and pride. Our fathers brought with them all the fundamental principles upon which they could build the structure of society,—a church upon freedom of conscience, a state upon the sacredness of individual rights,—and they proceeded to build wisely and well. Their theories were the matured thought of centuries. "Nothing came from Europe but a free people," says Bancroft. They came with the doctrine of suffrage and self-government thoroughly infused into their minds. They took their rulers from the ranks; and they who elected John Carver as the first governor of their colony, stand out conspicuous as those who taught the people how to govern themselves. They had been taught to believe the truths laid down in Magna Charta, and they read in its immortal lines, that a free people were entitled to a representative government, and that

"the regal authority could not suspend the execution of laws, except by the consent of Parliament." They had learned that great law of the State, which, in 1640, Pym laid down when he spoke for the privileges belonging to the high court of Parliament, and which Lord Kenyon still later announseed, when he claimed that the Houses of Parliament protected the liberties of England. It was doctrines like these, which were brought to these shores not by the ignorant and adventurous, but by the wisest and most thoughtful scholars of that age, by the graduates of Oxford and Cambridge, by those who brought from the banks of the Cam and the Iris that free and independent culture which for more than two centuries has made the banks of the Charles as sacred in the New World as those classic rivers are in the Old. The principles of free government, which the Englishman had proclaimed for generations, against the overshadowing power of the throne, and which had served in his native land as the vital force of a revolution, found here a genial soil, and became at once, in the entire absence of all civil organization, the strongest and most useful system in the land. Not then as theorists, not as investigators, not as mere inquirers, but as the custodians of a mature and well organized system, did the colonists commence and carry on their work. They were the heirs of careful culture, powerful intellects, and firm and defiant will. They had been taught in the best schools of industry and enterprise. They were good merchants, good mechanics, good farmers, good manufacturers, in a homely fashion. They were thoughtful theologians, and laid down the plan of salvation with as much definiteness and method as they fixed the boundary lines of their possessions and planted their sacred land-marks. They were neither crude nor inex-

perienced. Let no man suppose that they entered blindly upon their work. They advanced to their duties with perfect understanding, and with a well-defined purpose and strong determination. For a century and a half they gathered all knowledge together, which might guide them in their labors. And when the business of organizing a new government came upon them they found their minds fully enlightened for the great occasion. It is not surprising that at the end of the first century of their national existence, a people thus prepared in the beginning should have exhibited a degree of maturity in all the affairs of life which filled the minds of older nations with astonishment. It is not surprising that in all material endeavor such a people should excel. It is not surprising that the product of American ingenuity and skill should have arrested the attraction of the world, at the International Exhibition, and that in arts, in literature, in machinery, in manufactures, in the general management of the Exhibition itself, the American people should have proved a powerful rival in the great world-wide competition. The appeal here is constantly to the wisdom of the people—to that wise instinct which education and responsibility for many generations, have made a ruling characteristic in the American mind, and which has thus far been equal to all necessities, and has guided us through every trial which has hitherto shut down with threatening danger upon the republic.

In this Great Exhibition, Massachusetts, I am happy to say, performed her part well. She stood foremost in the products of her industry and skill. Her educational system was admired by the careful observer and scholar. Her historical exhibit, thanks to this institute, was entirely worthy of her radiant record. Her building, erected by the liberality of her citizens, and designed by me as the

Massachusetts Commissioner for the accommodation and entertainment of the people of our state, was the admired resort of multitudes from all quarters of the Union. To myself, as I am sure it is to you, the record of our Commonwealth on this centennial occasion, is a source of pride, and satisfaction. I trust the new era upon which she has now entered, will be still more radiant than the past, and that she may advance in moral excellence, in intellectual culture, in material prosperity, until the desires of the fathers are all fulfilled, and the law of national life laid down by them shall be supreme among the nations of the earth.

Rev. Mr. Atwood then addressed the meeting :

I am reminded that there are elsewhere than in history surprises, changes from high to low, from low to high. We were notified that we were to have a double subject, the outcome of the Centennial year, and the Centennial Exhibition. We have had plenty of fireworks, and I do not know how much will come out of it. The foreigners must have got the impression that we have not abated in our self esteem. If we are so great as a people no one knows it so well as ourselves. One of the ablest of the modern English thinkers said to me there was nothing that startled him so much as the journalism of our country, and among other things the newspaper accounts of the great Exhibition at Philadelphia. It would have been a vast exhibition anywhere. I saw that at Sydenham, that at New York, and that at Paris ; but all together were not so great in space as this. It was indeed a surprise in consideration of the newness of our country.

I have heard some people, since its close, argue that it was a very foolish undertaking, that it was too expensive, etc. I believe one newspaper (in Rutland?) com-

plained that it had been a great damage to their town, so many people had gone from there to see it; that fifty thousand dollars were spent by their people *outside of the town*. I need not take the trouble to argue the folly of such a proposition. The simple contact with the people of foreign countries was a great benefit to us. The Exhibition was an industrial school for the whole people. A party of men or women who could go through those buildings without having their minds instructed would be an anomaly and a wonder.

What interested me most was the effect which this exhibition was to have upon the standing of our country in the estimation of the world. Our calicoes, for instance, are preferred over those of England. We already have begun to reap practical results in the effect upon our exports. Some of you have doubtless seen that speech of the most noted of the Swiss watchmakers. He found a case of Waltham watches at Philadelphia and borrowed one of an inferior grade. Upon examination of it he declares to the Swiss people that there is not in Switzerland a manufactory that could produce such a watch. I have been informed by one firm that their exhibit at Philadelphia has been of untold value to them in their business.

We had there also the evidence of the progress of art-culture in America. Of the visitors, nine out of ten have preferred devoting their time to the Art Gallery. When the French artists made up their exhibit to send here, they collected nothing but second and third-rate art pictures. It so happened that in coming over some of these pictures became somewhat mouldy. It was reported in Paris that our people, when the pictures arrived, were so in despair with envy that they bespattered them with mud.

As an instance of the natural taste and judgment of

our people it may be mentioned that the best pictures attracted the most attention. The "Railway Station" was found out at once, and admired, although the spectators did not know that the painter was a master artist.

Another thing to be considered is the increased value that will be put upon brain labor. The great industrial interests have hitherto been favored, and have been the source of wealth. Science has not had so much opportunity, as witness the difficulties that even Agassiz had to contend with. The highest processes, the refinements of the ceramic art, are more valued. There is more appreciation of the worth of the intellect as a power in society.

The contrast there exhibited between the results of free labor and of slave labor was remarkable. Where were the Gulf States in the Exhibition? The only things to be seen there from the Southern States were the work of the freedmen. Mexico, Brazil, entirely overshadowed the South.

The results of missionary labors were evidenced in many things. In the Chinese Department were books published directly or indirectly through that influence. Religious thought has borne its fruit.

The outcome of all this must be a wonderful impulse to immigration of the best characters. English and French skilled workmen, seeing what America is doing, what are the prices for labor and the opportunities for employment, must be more than ever induced to come here. This of itself will pay for all.

Finally, the good behavior of the visitors at the Exhibition, and the order and propriety of conduct of all in attendance, were worthy of the highest commendation.

REV. MR. BOLLES, being called upon, spoke as follows :

I feel both pleasure and regret on rising to say the last word to-night. The gentlemen who have already spoken have had, as they deserved, our close attention ; but in one way and another they have so covered the field of discourse assigned to me that my own remarks seem superfluous. I may also express the thought that the list of topics should not have ended here. It would have been pleasant and profitable to us to hear Prof. Hagar on the educational, or Prof. Morse on the scientific, results of the Centennial Exhibition.

The addresses to which we have listened have done no injustice to the part of the United States itself in the honors of the Exhibition. But perhaps even the great American people will be modest enough to confess that it had something to learn there from less inventive and rapid foreigners. It should especially have had such a feeling toward the Art-displays of other nations. You have heard that France and Germany were discourteous enough to send us, as to an ignorant and uncritical land, only their second-rate works of art. But England did not scamp her work in the Art-Building ; nor did China and Japan neglect to do their best. To England in particular we owe a debt of gratitude. Beside our century of accomplishment in practical science and invention, she placed her last hundred years of art. She asked, "What have my painters done from 1776 to 1876? Who have they been, and where can I find characteristic canvases of each?" And she generously placed on view at Philadelphia, what was the illustrated history of this century of her growth in Art. It must have been in a spirit of genuine enthusiasm and friendship that the Queen and the noble owners of these paintings were willing to expose them to the

dangers of the voyage, that we might see, in even a more complete collection than can be found in any one gallery in Great Britain, the record of what England has been doing in Art since we left the old leading strings of her rule. There were paintings there which travellers remember to be cherished beyond price as examples of their peculiar style in the country to which they belong. And one could learn at Philadelphia those things concerning British Art, which would require much studying and journeying over sea to understand as well.

Nor can we easily discharge our obligation to China and Japan. What marvellous things they showed us in porcelain and bronze! Macaulay, in the third volume of his History, sneers at the fancy for Chinese ware which Queen Mary introduced at Hampton Court, as a "frivolous and inelegant fashion." But Miss Martineau, in her later History, shows that this love of Oriental art did not then have more than a limited range or existence, since she alludes to the Chinese productions to be seen in the early part of this century, in the homes of our Salem merchants, as one of the things talked about by those who were earnest for the free opening of the Eastern seas for trade. They wanted Oriental objects, Art-objects among the rest, more common; and Philadelphia showed us how vast were the resources of those nations so recently joined to the western world by the bands of commerce. I understood that the most ancient and precious things in the Chinese Court were to return to China, as they were the property of wealthy *connoisseurs*, and worth more at home than here; but the readiness with which the rest, even the most expensive, were sold, illustrated the increasing Art-culture of our own people. It is neither frivolous nor inelegant to admire those works; and after the passion of the day has thrown off a few of its bubbles, we may look

for a steady and intelligent demand for the rich colors and exquisite materials which the far East sends us.

It is well known that the most popular exhibits at Philadelphia were those in Art, and that the most constantly crowded building was Memorial Hall. The throng of sight seers was of course largely made up of those to whom the meaning of a picture or statue was as a Greek letter, and many were the odd speeches and queer mistakes which were noted among them. One spectator interpreted the enormous and unpleasant picture of "Rizpah" to be the "Goddess of Liberty searing away the American Eagle from the vanquished South." Another stopped in the Russian Court before a fine work in *repoussé* silver, which represented figures in violent action. "R-e-p-o-s-e," she slowly read it; "there don't seem to be much *repose* about that!" A man and his wife were examining the malachites in the same section. "They are beautiful, Charles, these *amalekites*, are they not?" "No, my dear," he answered, proud of his superior knowledge, "not *amalekites*, but *amalgamites*!" Still the people saw and enjoyed all these things; and unless they are more obtuse than the last century seems to have made them, they must have gained a vast amount of instruction from their visit.

Our household art, in particular, must be very much advanced as one result of the Exhibition. It is not so very long ago that England, which had so much to teach us in this department at Philadelphia, was herself a scholar to the older art of the continent. In the brief lull of the war with the first Napoleon there was a great rush of English visitors to France; and when hostilities suddenly recommenced, it is said that twelve thousand of them were caught and kept in Paris. They brought back new tastes and refinements; and English Art from that

day made a striking advance. But Art in Great Britain owes most perhaps to Prince Albert. It has been the fashion to deery him as only the imported husband of a queen. But he brought to England a delicate and graceful culture and a generous patronage of Art, which did much to give a beautiful drapery to the rugged English life, just as the ivy makes her old gray walls more picturesque. We should not forget that he was the originator of the Great Exhibition of 1851 in Hyde Park, where his Memorial now stands; and in consequence he may be considered in close relation to all the International Expositions which have followed; in some sense, indeed, the cause and suggestion of ours in 1876. The original Crystal Palace still remains, the attraction of holiday visitors to Sydenham; and in the London International of 1874, more than four thousand pictures were on the walls. And one result of this culture of Art has been to make the English home more beautiful. The exhibits of Minton's tiles, Daniell's porcelains, Elkington's electrotypes, Doulton & Watts' ceramics, showed us this; while the buildings of the English Commissioners, with their simple but effective decorations, were a pleasure and surprise to all who were fortunate enough to gain admittance. Long before the close of the Exhibition, Doulton & Watts' entire display of fire-place and wall ornaments was sold; and each one will become a missionary of Art in some corner of our land. No one could have failed to see how the strong home instinct of the English race entwined itself with new art in the production of those charming fireplaces which were such attractive centers for admiration at our Exhibition. They were copied many times in prints and photographs; and many were the remarks made about the beauty which a genuine New England wood fire would have in them, a grace which in

Old England they could seldom know. Now the English did not imitate all this slavishly from other nations; they made an art for themselves and their own homes. Once on the road to apply art principles they found their inspiration and their models in the scenery and life of their own land.

I believe that this Exhibition will give exactly the needed impulse and direction to American Art. We ought to realize our privilege—to incorporate with the vigorous and successful life of our republic the refining and helpful influences which Art culture can give. But we must have education for this. We must see and know what others have done, and then transmute foreign Art into that which shall be characteristic of America. Then over the centuries to come will bend this serene sky of Art, in which more than one shining star shall bear our national name.



TUESDAY, JANUARY 9, 1877.

MAJOR J. W. POWELL, the U. S. Geologist in charge of the Exploration and Survey of the Colorado Region, gave an interesting lecture on the North American Indians, with whom he has an extensive acquaintance and of whose philosophy and myths he has made an especial study. He alluded to their ideas of creation, their Gods, their religion, their mythology and their tales, interspersing his remarks with many impressive incidents and Indian stories.



MONDAY, JANUARY 15, 1877.

MAJOR J. W. POWELL gave this evening the second

lecture in the Institute course. The subject was "The Cañons of the Colorado." The lecturer spoke of his exploring expedition in that wild, uninhabitable region of the Rocky Mountains, undertaken at the request of the Government, and briefly described the natural features and scenery of the country, which are grand rather than beautiful. The valley of the Rio Colorado is a vast natural bed of rock, mostly bare of vegetation, a mile in thickness, and covering as large a surface as the whole of New England and the Middle States combined. He concluded the lecture in narrating the adventures of his party in their perilous but romantic voyage down the river. This was accomplished through great hardships and without any fatal accident, though they had many narrow escapes with their lives, and three of his men who deserted in the face of great danger were captured and killed by the Indians. The lecture was profusely illustrated with views of the scenery on the Colorado, including its principal cañons and cataracts, by the calcium light.



MONDAY, JANUARY 29, 1877.

PROF. HENRY CARMICHAEL, of Bowdoin College, favored the Institute with an instructive lecture on "Flame," which was fully illustrated by experiments that were singularly successful, though he was removed from the special facilities of the laboratory. The more prominent of these were the placing of phosphorus and gunpowder in the interior of the flame, the musical and sensitive flame, the effect of various chemicals upon the color of a flame, and the monochromatic flame, which gave to everything a ghastly and cadaverous appearance.

REGULAR MEETING, MONDAY, FEBRUARY 5, 1877.

MEETING this evening. The PRESIDENT in the chair.
Records read.

P. P. Bielby and George A. Purbeck, both of Salem, were elected resident members.

J. W. Powell of Washington, D. C., G. W. Levette of Indianapolis, Ind., and Benjamin J. Lang of Boston, were elected corresponding members.



MONDAY EVENING, FEBRUARY 12, 1877.

LECTURE ON THE TELEPHONE.

THE evening was devoted to a lecture on the telephone by Prof. ALEXANDER GRAHAM BELL, being one of the Institute course of lectures. The meeting was held at the Lyceum Hall for the purpose of more easy connection with telegraphic lines. It was the first public exhibition of the telephone invented by Prof. Bell, and the experiments were eminently successful, and were greeted with enthusiastic applause by an audience which completely filled the hall. A wire of the Atlantic and Pacific Telegraph Co. was placed at the disposal of Prof. Bell, and was connected with the Lyceum Hall in Salem, and with the office in Exeter Place, Boston, where were present Mr. Thomas A. Watson of Salem, the Professor's assistant, and Messrs. B. Bridden, the electrician, Prof. E. B. Warman, and A. B. Fletcher of the "Boston Globe."

The President, Dr. WHEATLAND, introduced Prof. Bell, who opened his lecture with an allusion to the pleasure it gave him to exhibit the Telephone for the first time before a public audience, here at Salem; not only on

account of its being the place of his residence and where he had conducted his experiments for some years, but because it was here that the science of Telephony had its rise. The first attempt to produce musical sounds by electric currents was by Prof. C. G. Page,¹ a Salem man, who discovered, in 1837, that whenever a magnet was affected by an intermittent current a sound was transmitted. This led observers in all parts of the world to take up the subject. The discovery was also made by Prof. Page that whenever a current is passed through a coil a sound is emitted by the iron surrounded by the coil. It had been imagined that a molecule of iron had changed its place. Prof. Page reasoned in this way:—if we can make this sound rapidly we shall have a musical note; and this can be done by making and breaking the circuit. These suggestions excited a great deal of attention abroad.

Reis constructed a telephone by which a musical note was produced, by making and breaking circuit, in an iron core surrounded by a coil. By singing into a transmitting instrument a membrane is made to vibrate, thereby producing the musical sound by intermittent contact with the vibrating medium. Reis' telephone has never been brought into practical use. It is a very beautiful instrument theoretically, but it gives merely the pitch and nothing more.

¹Charles Grafton Page, son of Capt. Jere. L. & Lucy D. (Lang) Page, born in Salem, Mass., Jan. 25, 1812, prepared for college in the Grammar School, Salem, under the charge of Theodore Eames, entered Harvard College in 1828, graduating in 1832, studied medicine with Dr. A. L. Peirson of Salem, and the Harvard Medical School, receiving the degree of M. D. in 1836. In 1838 he went to Virginia and practised his profession two years. In 1840 he was called to a position in the U. S. Patent Office and was one of the Examiners from that time until his death, which occurred at Washington on Tuesday, May 5, 1868.

In early youth he developed a taste for the study of electricity and the kindred sciences, and continued through life a diligent and successful student in these fields of observation and enquiry. He was a frequent contributor to "Silliman's Journal of Science," and was the author of several treatises on the subject of electrical science and discovery. In 1839-40 he was Professor of Chemistry in Columbia College, D. C.

I have followed out the experiments of Page and of Reis. All investigators have followed the idea of Page. I found that his theory of the cause of the sound was a mistake. An empty coil will produce the same effect. When you pass a current of electricity intermittently through an empty coil musical notes are emitted. When passed through a lead pencil a very pleasing note was emitted through the plumbago; also through an iron wire, and curious results are caused by induced electricity through the fore arm.

In the course of experiments by a number of persons joining hands with Ruhmkorff's coil a sound from the clasped hands was produced. Whenever the current through the persons joining hands was made or broken, a sound was produced. A piece of paper placed between the hands produced a still more curious effect.

These are effects produced *directly* by the currents of electricity. Still more interesting effects are produced by placing an iron coil *near* the magnet; by placing it nearer and nearer, the sound is louder and louder. This happens from every piece of iron placed near the magnet, and the effect is still greater when it is expanded into a thin membrane.

I hope I shall be able to exhibit some of these effects to-night. This, however, is the first attempt to do this before an audience, and it is possible the experiments may not succeed so well as I desire. The first thing is the production of a musical note in the way I have first described by intermittent currents. My friend, Mr. Thomas A. Watson, is at this moment creating an intermittent current in Boston. [Loud and distinct sounds, followed by an audible message, are heard.]

I believe I am the first person who has adopted the practice of using a metal diaphragm in the telephone.

Also I have discovered that a telegraphic message may be sent by means of using musical notes. Some of these discoveries which I have described were made simultaneously by three persons: Ward of Chicago, Lecourt, and myself.

All the entanglements of sound come through the air. We perceive all the varying tones, etc., without difficulty. Prof. Wheatstone and afterwards Prof. Henry demonstrated the fact that a solid substance, for instance a wooden rod or bar, would conduct an infinite number of vibrations simultaneously. Pianos on the opposite sides of a street may thus be made to answer to each other. The same effect may be produced in a wire also by the use of the battery. You can send as many musical notes as you please along a wire by using the means I have described.

I shall ask Mr. Watson to send two sounds at once. [*One sound heard.*] The notes are not simultaneous. The trouble is Mr. Watson is repeating the first experiment, through my mistake in sending the wrong signal.

[An intermittent current was then sent from Boston by Mr. Thomas A. Watson, Professor Bell's associate. This caused a noise from the telephone very similar to that of a horn. The Morse telegraph alphabet was then sent by musical sounds, and could be heard throughout the hall. The audience burst into loud applause at this experiment. A telephonic organ was then put into operation in Boston. "Should Auld Acquaintance be Forgot," "America," and "Yankee Doodle" were readily heard through the hall and heartily recognized. At this point Prof. Bell then explained how he learned to transmit the tones of the human voice, and paid a grateful tribute to Mr. Watson. Prof. Bell asked Mr. Watson for a song, and "Auld Lang Syne" came from the mouthpiece of the instrument almost before his words were ended. Mr.

Watson was then asked to make a speech to the audience. He expressed himself as having more confidence eighteen miles away than if he were present. His speech was as follows: "Ladies and gentlemen: it gives me great pleasure to be able to address you this evening, although I am in Boston and you in Salem." This could be heard thirty-five feet distant; that is, all over the hall, and brought down the house with applause. A system of questioning was then carried on and Mr. Watson was asked if he heard the applause. The answer was, "I was not listening. Try again." The applause was given and its receipt at once acknowledged in Boston.]

A number of musical notes can be sent simultaneously on the same circuit, which gives a great advantage. We did not get exactly the same effects as when the musical notes are heard in the air. The cause is not far to see; for in the intermittent current the vibrations are not in the exact ratio of the vibrations of the air.

Other experimenters have been trying, with myself, to bring to practical effect the principle of multiple electricity. I discovered that when a great number of intermittent currents were being transmitted one breaks while the other makes, so that there was really no break at all. There are six kinds of electrical current. [This subject was then further illustrated by the lecturer upon the blackboard; the different forms of the electrical wave; and the differences between positive and negative electricity; "direct" and "reversed" "intermittent, pulsatory and undulatory currents" were shown; and how the sound of musical notes may be produced by such currents together.]

The idea occurred to me of a new kind altogether, and that the current might be made to vary exactly as the air varies. [This idea was then further explained and illus-

trated by drawings on the board.] I used a common battery and instead of breaking the current I used a constant current, and a vibrating membrane. I found that by placing a membrane before the magnet and speaking before it, the sound was transmitted.

It was my good fortune to meet with another person interested in similar studies, Mr. Watson of Salem. It is chiefly due to his assistance that the invention is proceeding to a successful issue.

[The lecturer then explained the construction of the magneto-electric telephone on the blackboard.]

Though the sounds are at present feeble and heard with difficulty at a distance, I hope in the future to be able to have them more audible. Soft articulation is more intelligible than loud. A whisper is perfectly audible.

Messages have been transmitted through this instrument between Boston and Conway, a distance of 143 miles. I have passed the messages through the human body and through water, which has a million times more resisting power than a wire. The result of these experiments seemed to demonstrate that the resistance retarding the magneto-electric current was vastly less than the resistance to the galvanic current, and encouraged me to believe that it will, in time, be possible to converse across the Atlantic by means of international telephony. These experiments we are now conducting are made over a distance of twenty miles; and there is no battery, only a wire.

[Coughing and singing were then heard, and a variety of questions was then asked from the Salem end and among them: "What news from the Electoral Commission?" followed by the distinct answer of "I don't know of any." But the news came fleeting along that the engineers of the Boston and Maine Railroad had struck. General

Cogswell then asked if trains were running; the answer was clear and distinct that they were not at 5.30 o'clock. Prof. Bell introduced the Rev. E. C. Bolles, who said: "I shake hands with you cordially in imagination twenty miles away." The Rev. E. S. Atwood asked, "Does it rain?" "It does not in Boston," was Mr. Watson's answer. Prof. Gage, the electrician, then spoke through the telephone, endeavoring to have his voice recognized. This could not be done, as Mr. Watson was not familiar with the voice. Mr. Shuje Isawa was recognized, Mr. Watson being perfectly familiar with his tones. One of the assistants in Boston then said that "Hold the Fort" would be sung in Boston, and the tune which followed was readily recognized.] Prof. Bell closed his lecture by briefly stating the practical uses to which he was confident the telephone could be applied. Private dwellings may be connected with a central office, and messages transmitted by the voice. Merchants can conveniently transact their business by its aid. Hearty applause was afforded the lecturer as he finished, and people flocked about the stage in large numbers to more closely examine the wonderful instrument that had placed them in audible communication with people nearly twenty miles away.

The lecture and experiments were an unqualified success. Vice President Goodell of the Institute offered an order, which was adopted, to draft a series of resolutions to express the satisfaction of the Institute and audience for the instructive and interesting entertainment offered by Prof. Bell. A vote of thanks was also extended to Mr. Watson and sent to him by telephone. A vote of thanks was passed to the Atlantic and Pacific Telegraph Company for their kindness in allowing the use of their wires for these experiments. A vote of thanks was also tendered to Miss Molloy, operator of the Atlantic and

Pacific Telegraph Company at Salem, for her assistance during the evening. The telephone was then taken apart and explained to a few ladies and gentlemen, to their great wonder and satisfaction. A report of the meeting was transmitted to the "Boston Globe" by the telephone in the presence of about twenty, who have thus been witnesses to a feat never before attempted—that is, the sending of a newspaper dispatch over the space of eighteen miles by the human voice, and all this wonder being accomplished in a time not much longer than would be consumed in an ordinary conversation between two people in the same room.

The President appointed Rev. E. S. Atwood, Rev. E. C. Bolles, A. C. Goodell, Jr., D. B. Hagar, and Wm. D. Northend, as the committee to draft and report a series of resolutions as above.



MONDAY, FEBRUARY 19, 1877.

REGULAR meeting this evening. The PRESIDENT in the chair. Records read. Donations and correspondence announced.

Caroline Baldwin, of Salem, was elected a resident member.

Mr. JOHN McNEIL, of Winchester, formerly of Hillsborough, N. H., who has great interest in the restocking of the rivers and ponds of New England with fish, gave a familiar and instructive talk on artificial fish breeding and collateral topics. The people of Salem, who have an abundance of various excellent sea fishes at their very doors, do not, perhaps, appreciate the importance of the inland fisheries and the present efforts to restock with the

finny tribes the depleted rivers and ponds of the country, as do the residents of the interior, but they cannot help feeling an interest in the subject when presented as it was on this evening.

Mr. McNeil stated that a quarter of a century ago, two-thirds of the food,—beef, mutton, pork, etc.,—consumed in New England was produced in New England; now, the production has fallen to about one-third of the consumption. The fisheries have been nearly destroyed on the great rivers by the erection of factories and other causes, and the ponds have been in a large measure depopulated of their fishes; hence the necessity of restocking by artificial means, and the efforts of the Legislatures of the various States to encourage this purpose.

Mr. McNeil presented many interesting facts in relation to artificial fish-breeding, explained the process of spawning, hatching, transportation and restocking, and spoke most positively of the assurances of success resulting from the plans now in progress. He described the habits of fishes and spoke particularly of the lamprey eel, the alewives, the shad and the salmon, the four varieties of the most importance for the rivers; explained the fishways on the Merrimac and Connecticut, and gave an account of the success that had already been achieved on those rivers and of the hopeful promises for the future. In conclusion he stated that he should be glad to answer any inquiries that the audience might suggest, and several questions were asked and satisfactorily answered.

He had started from home with some eggs of the salmon, but they had hatched on the way and the young fishes were exhibited.

Mr. F. W. PUTNAM added some observations in regard to the lamprey eel, illustrating his remarks on the black-

board, and concluded by offering a vote of thanks to Mr. McNeil, in behalf of the Institute, for his interesting and instructive lecture, which was unanimously adopted.

A. C. GOODELL, Jr., Esq., in behalf of the Committee appointed on the previous Monday evening, reported the following resolutions in reference to Prof. Bell and the telephone, viz. :—

RESOLVED, That we tender our cordial thanks to Professor Alexander Graham Bell, and to his associate, Mr. Thomas Augustus Watson of Salem, for the wonderful and profoundly interesting experiments so successfully performed by them at Lyceum Hall on the evening of the 12th instant; and to the Atlantic and Pacific Telegraph Company, who generously permitted the use of their wires between Salem and Boston; and to Miss Anastasia L. Molloy, who operated the telegraph on that evening.

RESOLVED, That the experiments we have witnessed satisfactorily demonstrate the feasibility of conveying articulate sounds by means of magneto-electricity; and we find that this method possesses advantages over the ordinary electric telegraph in the following particulars:

First, in the simplicity and cheapness of the mechanism employed.

Second, in dispensing entirely with batteries.

Third, in avoiding the necessity of employing skilled operators.

Fourth, in the apparently great motive force of the magneto-electric current employed, and (according to the evidence exhibited by Prof. Bell) in the fact that resistance is, by this means, so far overcome or avoided as to encourage the belief that, practically, no difficulty may be expected, from that source, in the longest circuits.

Fifth, in the rapidity of communication by the telephone, and in the ease with which it insures accuracy by admitting of instantaneous vocal repetition from either end of a telephonic line.

RESOLVED, That the discovery that the vibrations of a conducting membrane or plate set in motion by the human voice can be so delicately and forcibly communicated to a corresponding membrane at the opposite end of an electric circuit, as to produce articulate sounds of exactly the same timbre, quality, pitch and relative strength, appears to us one of the most marvellous discoveries of the age; and the practical embodiment of this discovery, in the telephone, constitutes a most curious and remarkable invention; and we deem it especially noteworthy that these were not accidental, but the result of profound study of the science of acoustics, and a consequent inference that currents of electricity might be made to vary in intensity in the exact ratio that air varies in density when affected by sound.

RESOLVED, That we deem it a signal honor to have been privileged

to witness the first public operation of this wonderful instrument, at a meeting, a report of the proceedings of which was sent abroad as *the first public message by the telephone.*

RESOLVED, That we are gratified to learn that these experiments are to be repeated in Salem; and to them, as at once instructive and astonishing, we invite the attention of the public.

RESOLVED, That these resolutions be communicated to Prof. Bell and to Mr. Watson by the Secretary; and offered to the press.

The committee who reported these resolutions consisted of Rev. E. S. Atwood, Rev. E. C. Bolles, A. C. Goodell, Jr., D. B. Hagar, and Wm. D. Northend.

Before putting the question President Wheatland, after alluding to Prof. Bell's recognition of our late townsman, Dr. Page, as the discoverer of the transmission of sound by the electric current, related some very interesting reminiscences of his school and college classmate, Dr. Page, and of those other Salem gentlemen, the late Jonathan Webb, Thomas Cole and Francis Peabody, who had many years ago distinguished themselves by their investigations and experiments in relation to electricity and electro magnetism.

The resolutions were then unanimously adopted.

Mr. F. W. PUTNAM presented a communication entitled "Notes upon the Birds observed in Southern Illinois, between July 17 and September 4, 1875, by E. W. Nelson." Referred to the Publication Committee.

NOTES UPON BIRDS OBSERVED IN SOUTHERN ILLINOIS,
BETWEEN JULY 17 AND SEPTEMBER 4, 1875.

BY E. W. NELSON.

THE following observations were made during a collecting trip through the southern portion of the state at a season when but few species other than the summer residents were to be found. One of the main objects of the trip was to learn as far as possible what species were to be found in the southern extreme of the state during summer. For this purpose two main points were chosen. Mt. Carmel on the Wabash, and Cairo at the junction of the Ohio and Mississippi. From each of these places short trips were made into the elevated country away from the rivers, the results of which will be given in a supplementary list after each of the main lists.

Mt. Carmel and Vicinity.

The observations at this place extend over the entire time of our sojourn in Southern Illinois, as my companion, Mr. F. T. Jencks,—to whom I am indebted for many of the Mt. Carmel notes,—remained here during my trip to Cairo and vicinity.

At this place our collecting was mainly confined to the heavily wooded bottom-lands along the Wabash and White Rivers, with short excursions to the slightly hilly and well wooded country back of the town. This we found would scarcely repay us for our trouble, and our attention was turned to the rich fauna of the bottoms. Here in dense thickets about ponds and lagoons and especially in the undergrowth in portions of a cypress swamp on the White River, a few miles above the town, we found our most attractive field.

In such places *Protonotaria citrea*, *Helminthophaga pinus*, *Dendroeca carulea*, *Oporornis formosus* and *Mylodiobetes mitratus* with other interesting species were more or less numerous.

From Mt. Carmel an excursion was made to Fox Prairie about thirty-five miles to the north-west. The observations there will be given in an additional list.

As my friend Mr. Ridgway has discussed the faunal and floral relations of the Wabash Valley¹ I would refer the reader to this excellent paper, and proceed to the results of our field work.

¹ Proc. B. S. N. H., Vol. XVI, Feb. 18, 1874, pp. 304.

Family **TURDIDÆ.**Genus **Turdus** *Linn.*

1. **T. mustelinus** *Gmel.* WOOD THRUSH. Abundant in the bottoms and common in portions of the more elevated woodlands.

2. **T. migratorius** *Linn.* ROBIN. Apparently not common. A few were seen about the town.

Genus **Harporhynchus** *Cab.*

3. **H. rufus** *Caban.* BROWN THRUSH. Not common. A few observed along the roadsides.

Genus **Galeoscoptes** *Caban.*

4. **G. carolinensis** *Caban.* CAT BIRD. Common. Usually found about the farms west of the town.

Family **SAXICOLIDÆ.**Genus **Sialia** *Siv.*

5. **S. sialis** *Huld.* BLUE BIRD. Abundant, especially about the trees and fences on the wide flat between the town and the river.

Family **SYLVIIDÆ.**Genus **Polioptila** *Scl.*

6. **P. cærulea** *Sclat.* BLUE-GRAY GNATCATCHER. Very common. Found in the tops of the tall oaks in the bottoms with *Dendroica cærulea*. Half-fledged young were taken the last of July.

Family **PARIDÆ.**Genus **Lophophanes** *Kaup.*

7. **L. bicolor** *Bonap.* TUFTED TITMOUSE. Very numerous everywhere in the woods, although more abundant in the bottoms.

Genus **Parus** *Linn.*

8. **P. carolinensis** *Aud.* CAROLINA TITMOUSE. Less abundant than the preceding and more confined to the damp bottom-lands.

Genus **Sitta** *Linn.*

9. **S. carolinensis** *Lath.* WHITE-BELLIED NUTHATCH. Found rather commonly throughout the woods.

Family **TROGLODYTIDÆ.**Genus **Thryothorus** *Viell.*

10. **T. ludovicianus** *Bonap.* CAROLINA WREN. Common everywhere in open woods and about brush-piles or logs in clearings. The males sang through July and until well into August. Mr. Ridgway has since informed me that this species sings throughout the year.

A double nest of this species was given me by Mr. John Ridgway of Mt. Carmel, which was obtained by him in the bottoms. The two nests were of about equal size and composed principally of moss and grass. The contiguous sides were slightly united. Both nests were constructed the same season and when found one side contained half fledged young.

11. **T. bewicki** *Bonap.* BEWICK'S WREN. Not very numerous. A few were observed about the yards in town, and a few specimens were obtained along a ruinous hedge fence by the roadside near Fox Prairie.

Family **SYLVICOLIDÆ.**Genus **Mniotilta** *Viell.*

12. **M. varia** *Viell.* BLACK AND WHITE CREEPER. Common throughout the bottoms, and in damp woods on the uplands.

Genus **Protonotaria** *Bd.*

13. **P. citrea** *Baird.* PROTONOTARY WARBLER. Common in the button-bushes bordering the lagoons in the bottom-lands. Usually found in small parties of from five to six individuals containing the parents with their young. The middle of July the latter were in many cases but just able to follow the old birds. The sudden inundation of the bottoms the last of July drove all the bush-frequenting birds away, and the water not falling until the middle of August they did not return. I did not hear a note from these birds, and were it not for their bright color they would be very difficult to collect.

Genus **Helmitherus** *Raf.*

14. **H. vermivorus** *Bonap.* WORM-EATING WARBLER. Not common. Found in localities similar to those frequented by the preceding.

Genus **Helminthophaga** *Cab.*

15. **H. pinus** *Baird.* BLUE-WINGED YELLOW WARBLER. Rather common in the most densely wooded portions of the bottoms. We found it more numerous about the borders of the cypress swamp than

elsewhere. It was usually found upon the lower branches of tall trees or the tops of saplings searching the twigs on the tips of the branches, its movements strongly suggesting a titmouse as it hung head down or searched the under side of a branch for insects. A faint "cheep" was the only note heard.

Genus *Parula* Bon.

16. *P. americana* Bonap. BLUE YELLOW-BACKED WARBLER. Not common. A few breed.

Genus *Dendroica* Gray.

17. *D. æstiva* Baird. YELLOW WARBLER. Common in the cultivated portions, principally away from the bottoms.

18. *D. maculosa* Bd. BLACK AND YELLOW WARBLER. The only one seen was a migrant taken in the bottoms August 30. (Jencks.)

19. *D. cærulea* Bd. CERULEAN WARBLER. The most abundant species of the *Sylvicolidae*. Found everywhere in small parties, but much more numerous in the bottoms.

20. *D. dominica* var. *albilora* Baird. WESTERN YELLOW-THROATED WARBLER. First noted August 30, when they were found to be abundant in a group of elm trees on the river bank near town. During the succeeding three days they were plentiful and thirty-six specimens were taken and many more seen. After September 2nd not a specimen was to be found, though diligent search was made. While here they showed great preference for the elm trees before mentioned, none being found elsewhere. They uttered the faint "cheep" common to most warblers, and one was heard delivering a low song from the top of a tall elm. The notes were so low that even when standing under the same tree the song could only be distinguished by carefully listening.

The movements of these birds while in the trees were rather slow and quite nuthatch-like. Among the specimens taken were some having the loreal line almost immaculate white and others with a bright yellow line in front of the eye. (Jencks.)

Genus *Siurus* Sw.

21. *S. auricapillus* Swains. GOLDEN-CROWNED THRUSH. Abundant in heavy woods.

22. *S. motacilla* Bonap. LARGE-BILLED WATER THRUSH. Not uncommon, but so shy that they were very difficult to obtain, always flitting from tree to tree well in advance, and uttering a sharp metallic note.

Genus *Oporornis* Bd.

23. *O. formosus* Wils. KENTUCKY WARBLER. Abundant in the

bottoms and occasionally straying into the more elevated wood-lands. Its habits closely resemble those of *Siurus auricapillus*. A young bird barely able to follow its parents was taken the last of July in the cypress swamp.

Genus **Geothlypis** *Cab.*

24. **G. trichas** *Caban.* MARYLAND YELLOW-THROAT. Common in suitable places about fields.

Genus **Icteria** *Vieill.*

25. **I. virens** *Baird.* YELLOW-BREASTED CHAT. Very common in dense brier patches in the bottoms, but owing to their skulking habits were very difficult to obtain. Several young unable to fly were obtained July 19th.

Genus **Myiodioctes** *Aud.*

26. **M. mitratus** *Aud.* HOODED WARBLER. Common throughout the heavily timbered bottoms but most abundant in the dense under-growth about the border of the cypress swamp. Frequently found in small bushes close to the ground, though generally keeping in the taller bushes or small trees.

27. **M. canadensis** *Aud.* CANADA FLYCATCHER. Two specimens were obtained in the bottoms the first of September. (Jencks.)

Genus **Setophaga** *Sw.*

28. **S. ruticilla** *Sw.* RED-START. Very common in the bottoms.

Family **HIRUNDINIDÆ.**

Genus **Progne** *Boie.*

29. **P. subis** *Baird.* PURPLE MARTIN. Abundant along the river near town until about August 25th, when they disappeared.

Genus **Petrochelidon** *Cab.*

30. **P. lunifrons** *Bd.* CLIFF SWALLOW. Very common.

Genus **Hirundo** *Linn.*

31. **H. horreorum** *Barton.* BARN SWALLOW. Abundant until about August 28th.

32. **H. bicolor** *Vieill.* WHITE-BELLIED SWALLOW. A few stragglers were seen the last of July.

Genus **Stelgidopteryx** *Bd.*

33. **S. serripennis** *Bd.* ROUGH-WINGED SWALLOW. Common along the river.

Genus *Cotyle* Boie.

34. *C. riparia* Boie. BANK SWALLOW. Abundant with the preceding, both species disappearing about the middle of August.

Family **VIREONIDÆ.**Genus *Vireo* Vieill.

35. *V. olivaceus* Bonap. RED-EYED VIREO. Abundant everywhere in the woods.

36. *V. gilvus* Cassin. WARBLING VIREO. First seen August 27th; after this date they became common in the bottoms. (Jencks.)

37. *V. flavifrons* Bd. YELLOW-THROATED VIREO. Rather common in the bottoms, frequenting the tops of the tallest trees.

38. *V. noveboracensis* Bonap. WHITE-EYED VIREO. Common in swampy thickets.

Family **LANIIDÆ.**Genus *Collurio* Vigors.

39. *C. ludovicianus* var. *ludovicianus*. LOGGER-HEAD SHRIKE. Not common during our stay, but said to be numerous during the breeding season.

Family **TANAGRIDÆ.**Genus *Pyranga* Vieill.

40. *P. rubra* Vieill. SCARLET TANAGER. Abundant everywhere in the bottoms and in every stage of plumage from olive-green to bright scarlet.

41. *P. æstiva* Vieill. SUMMER RED BIRD. Rare in the bottoms, but not uncommon about the borders of woods on the uplands. More retiring than the preceding, and in consequence likely to be overlooked, at this season at least.

Family **FRINGILLIDÆ.**Genus *Chrysomitris* Boie.

42. *C. tristis* Bon. GOLD FINCH. Common about the farms and roadsides.

Genus *Poœcetes* Bd.

43. *P. gramineus* Bd. GRASS FINCH. Rather uncommon, frequenting the fields near town.

Genus *Coturniculus* Bonap.

44. *C. passerinus* Bonap. YELLOW-WINGED SPARROW. Rare in the vicinity of Mt. Carmel. A single specimen was taken in a grain field.

Genus *Chondestes* Sw.

45. *C. grammaca* Bonap. LARK FINCH. Not uncommon along roadsides.

Genus *Spizella* Bonap.

46. *S. pusilla* Bonap. FIELD SPARROW. Abundant in fields and along roadsides.

47. *S. socialis* Bonap. CHIPPING SPARROW. Abundant in all suitable places.

Genus *Peucaea* Aud.

48. *P. æstivalis* Cab. BACHMAN'S FINCH. Rather common. Those obtained were found about the fences or brush piles in half cleared fields. They were shy and quite difficult to secure from their habit of diving into the nearest shelter when alarmed, or skulking, wren-like, along the fences, dodging from rail to rail. One was observed singing from a fence stake, but seeing the intruder it stopped abruptly and darted into a patch of weeds.

Genus *Euspiza* Bonap.

49. *E. americana* Bonap. BLACK-THROATED BUNTING. Quite common about the borders of cornfields and along hedges.

Genus *Cyanospiza* Bd.

50. *C. cyanea* Bd. INDIGO BIRD. Exceedingly common everywhere except in the densely wooded bottoms. Several could often be heard singing at once.

Genus *Cardinalis* Bonap.

51. *C. virginianus* Bonap. CARDINAL GROSBEEK. Very common everywhere; more numerous than I observed it anywhere else. Its clear whistle was heard from the top of tall trees in the gloomiest portions of the bottoms, as well as from the border of the woods near the farm houses.

Genus *Pipilo* Vieill.

52. *P. erythrophthalmus* Vieill. TOWHEE FINCH. Not uncommon about partly cleared fields.

Family **ICTERIDÆ.**Genus **Molothrus** *Sv.*

53. **M. ater** *Gray.* COW BUNTING. Several large flocks were observed the last of July, but none were seen singly, nor after the first of August were any to be found.

Genus **Agelæus** *Vieill.*

54. **A. phœniceus** *Vieill.* RED-WINGED BLACKBIRD. Not common.

Genus **Sturnella** *Vieill.*

55. **S. magna** *Sv.* MEADOW LARK. Abundant about fields. About the last of July they united into large flocks.

Genus **Icterus** *Auct.*

56. **I. spurius** *Bon.* ORCHARD ORIOLE. Common during July and the first of August.

57. **I. baltimore** *Daud.* BALTIMORE ORIOLE. Not common. A pair, with young, the only specimens observed, were seen the 2nd of August.

Genus **Quiscalus** *Vieill.*

58. **Q. pupureus** *Bartr.* var. **æneus** *Ridg.* PURPLE GRACKLE. Very abundant. Gathered into immense flocks, in the more open portions of the bottoms, the last of July.

Family **CORVIDÆ.**Genus **Corvus** *Linn.*

59. **C. americanus** *Aud.* CROW. Very plentiful in large flocks. Not so shy as is usually the case with this species.

Genus **Cyanura** *Sv.*

60. **C. cristata** *Sv.* BLUE JAY. Very common everywhere.

Family **TYRANNIDÆ.**Genus **Tyrannus** *Cuv.*

61. **T. carolinensis** *Bd.* KING BIRD. Common about farms.

Genus **Myiarchus** *Cab.*

62. **M. crinitus** *Cab.* GREAT-CRESTED FLYCATCHER. Very abun-

dant everywhere in the woods and common about the trees on the flat between the river and the town. About the first of September they left for the south.

Genus **Sayornis** *Bon.*

63. S. fuscus *Bd.* BRIDGE PEWEE. Common about the outskirts of the town and along the river, on the flat.

Genus **Contopus** *Cab.*

64. C. virens *Cab.* WOOD PEWEE. Abundant everywhere in woods.

Genus **Empidonax** *Cab.*

65. E. pusillus var. **trailli** *Bd.* TRAILL'S FLYCATCHER. Found in the bottoms, but in smaller numbers than the following.

66. E. acadicus *Bd.* ACADIAN FLYCATCHER. Usually found in the gloomiest portions of the bottoms, where it was common.

Family **ALCEDINIDÆ.**

Genus **Ceryle** *Boie.*

67. C. alcyon *Boie.* KINGFISHER. Very common about the ponds in the bottoms and along the rivers.

Family **CAPRIMULGIDÆ.**

Genus **Chordeiles** *Sw.*

68. C. popetue *Bd.* NIGHT HAWK. Not observed until about September first, when it became abundant. (Jencks.)

Family **CYPSELIDÆ.**

Genus **Chætura** *Steph.*

69. C. pelagica *Bd.* CHIMNEY SWIFT. Exceedingly abundant. About dusk they would pour forth from their hiding places by hundreds and come swooping and darting over the town in such countless numbers that the air seemed filled with them in every direction.

Family **TROCHILIDÆ.**

Genus **Trochilus** *Linn.*

70. T. colubris *Linn.* RUBY-THROATED HUMMING BIRD. Plentiful about the bottoms. Fully developed eggs were taken from the females the last of July.

Family CUCULIDÆ.

Genus *Coccyzus* Vieill.

71. *C. americanus* Bonap. YELLOW-BILLED CUCKOO. Common.

Family PICIDÆ.

Genus *Picus* Linn.

72. *P. villosus* Linn. Hairy WOODPECKER. Common.

73. *P. pubescens* Linn. Downy WOODPECKER. Abundant. Found in the woods everywhere with the preceding.

Genus *Hylotomus* Bd.

74. *H. pileatus* Bd. PILEATED WOODPECKER. Rare. Said to have been formerly common.

Genus *Centurus* Sw.

75. *C. carolinus* Bonap. RED-BELLIED WOODPECKER. Very abundant everywhere in the bottoms. Much less frequent in the more elevated timber.

Genus *Melanerpes* Sw.

76. *M. erythrocephalus* Sw. RED-HEADED WOODPECKER. Very abundant about the borders of clearings and in open woods.

Genus *Colaptes* Sw.

77. *C. auratus* Sw. GOLDEN-WINGED WOODPECKER. Rather common.

Family STRIGIDÆ.

Genus *Syrnium* Sav.

78. *S. nebulosum* Gray. BARRED OWL. Common. Although their notes were heard nightly, the species was rarely seen.

Genus *Scops* Sav.

79. *S. asio* Bon. SCREECH OWL. A single specimen observed the first of September. (Jencks.) Their notes were occasionally heard in early evening. Fully 90 per cent. of these birds in this locality are of the rufous phase. (Ridgway.)

Genus *Bubo* Dum.

80. *B. virginianus* Bonap. HORNNED OWL. Not common.

Family **FALCONIDÆ.**Genus **Falco** *Auct.*

81. **F. sparverius** *Linn.* SPARROW HAWK. Common. More numerous about clearings in the bottoms than elsewhere.

Genus **Nauclerus** *Vig.*

82. **N. forficatus** *Ridg.* SWALLOW-TAILED HAWK. Rare. Said to be common some years. A single specimen was observed over the river July 20th.

Genus **Ictinia** *Vieill.*

83. **I. mississippiensis** *Gray.* MISSISSIPPI KITE. Rare. Two specimens were observed about a clearing in the bottoms. I am informed by Mr. Ridgway that two of these birds were observed by him September 25th, 1876, sailing in company with turkey buzzards near the town.

Genus **Buteo** *Cuv.*

84. **B. lineatus** *Jard.* RED-SHOULDERED HAWK. Common in the bottoms, about the borders of clearings. Generally two adults with their young were found together.

85. **B. borealis** *Vieill.* RED-TAILED HAWK. Much less common than the preceding. Generally observed soaring over the farms back of town.

Genus **Haliaëtus** *Sav.*

86. **H. leucocephalus** *Sav.* BALD EAGLE. One specimen observed near the river September 4th. (Jencks.)

Family **CATHARTIDÆ.**Genus **Rhinogryphus** *Ridg.*

87. **R. aura** *Ridg.* TURKEY BUZZARD. Very common. Two pairs of unledged young were found the last of July. The first pair were standing on a large fallen tree, beside which they had probably been hatched. The others were found standing in the entrance to a large and deep cavity in the side of a leaning sycamore. Upon being approached they scrambled back to the extremity of the hole. When they were drawn forth one commenced to disgorge the contents of its crop, while the other made ineffectual attempts to use its bill, and when released ran off into the undergrowth.

Family **COLUMBIDÆ**.Genus **Zenædura** *Bonap.*

88. **Z. carolinensis** *Bonap.* CAROLINA DOVE. Very abundant everywhere except in the densely wooded portions of the bottoms.

Family **MELEAGRIDÆ**.Genus **Meleagris** *Linn.*

89. **M. gallopavo** *Linn.* WILD TURKEY. Very common in the bottoms.

Family **TETRAONIDÆ**.Genus **Bonasa** *Steph.*

90. **B. umbellus** *Steph.* RUFFED GROUSE. Not common. A few were observed in the bottoms. Mr. Ridgway informs me that all the ruffed grouse from this locality possess rufous tails.

Family **PERDICIDÆ**.Genus **Ortyx** *Steph.*

91. **O. virginianus** var. **virginianus** *Bonap.* QUAIL. Very numerous on the uplands and remarkably tame. This form is also found in the clearings in the bottoms to some extent, but it is far less numerous than the following. A nest containing fourteen eggs was found in the border of the woods near town August 2nd, and Mr. Ridgway informs me that he has taken the eggs of this species as late as the 24th of September, and that the young are frequently hatched so late that they are killed by the cold weather before they become fully feathered.

91a. **O. virginianus** var. **floridanus** *Coates*. FLORIDA QUAIL. The prevailing form in the bottoms, where the typical *virginianus* is comparatively rare. The specimens obtained are typical of the variety, some having even larger bills than any Florida examples seen, while the other proportions are equally small, and the colors fully as dark. A remarkable characteristic of this form in southern Illinois is its arboreal habits. The males were repeatedly found uttering their song from the tops of tall trees in densely wooded portions of the bottoms, and when a flock became scattered its members would almost invariably take to the trees, and soon their call notes would resound through the forest. Mr. Ridgway's observations regarding the habits of this form in the vicinity of Mt. Carmel coincide with mine and in his collection also are extremes of the var. *floridanus*.

Unfortunately no specimens of quail were preserved from the Mississippi bottoms, so that whether this form is represented there or not is undecided.

Family CHARADRIIDÆ.

Genus *Charadrius* Linn.

92. *C. pluvialis* var. *virginicus* Borc. GOLDEN PLOVER. A few were seen the first of September. (Jencks.)

Genus *Ægialitis* Boie.

93. *Æ. vociferus* Cass. KILLDEER PLOVER. Rare during July; became abundant about the middle of August.

94. *Æ. melodus* Cass. PIPING PLOVER. A specimen observed the last of August. (Jencks.)

Family SCOLOPACIDÆ.

Genus *Philohela* Gray.

95. *P. minor* Gray. WOODCOCK. Abundant in a piece of boggy ground near town the last of July; none seen there later.

Genus *Ereunetes* Illig.

96. *E. pusillus* Cass. SEMI-PALMATED SANDPIPER. A large flock observed August 20th. (Jencks.)

Genus *Totanus* Bech.

97. *T. flavipes* Gmel. YELLOW LEGS. Specimens seen the first of September. (Jencks.)

98. *T. solitarius* Wils. SOLITARY SANDPIPER. Not uncommon about secluded pools during our stay.

Genus *Tringoides* Bonap.

99. *T. macularius* Gray. SPOTTED SANDPIPER. Abundant along the rivers. They would frequently alight upon floating logs and feast upon insects, larvæ, etc., that had taken refuge upon the exposed side as the current carried them swiftly down stream.

Genus *Limosa* Briss.

100. *L. fedoa* Ord. MARBLED GODWIT. A single specimen seen the first of September. (Jencks.)

Family **ARDEIDÆ.**Genus *Ardea* Linn.

101. A. herodias Linn. GREAT BLUE HERON. Abundant. Breeds in the cypress swamp. In a "rookery" visited by us the nests were placed in the tops of tall sycamores, one tree containing nine nests. Although it was the last of July and the young were able to fly, they still kept in the nests and were fed by the old birds. When driven from the nests by the reports of our guns as some of them were shot, they would fly to some adjacent tree and when we were quiet would return. One old bird made her way to the tree, and alighting beside her nest in full view commenced feeding her young. A charge of No. 9 shot with which she was saluted caused her to turn her head sidewise and gaze down at us with a most ludicrous air of amazement, and then she proceeded with her task, and not until she had filled every gaping mouth did she condescend to seek safety in flight.

102. A. egretta Gmel. WHITE HERON. Became common in portions of the bottoms about the last of July.

103. A. candidissima Jacquin. SNOWY HERON. Found with the preceding, but less numerous.

104. A. virescens Linn. GREEN HERON. Common in the bottoms. Became very abundant after the first of August.

Genus *Ardetta* Gray.

105. A. exilis Gray. LEAST BITTERN. One specimen seen the last of July.

Genus *Botaurus* Steph.

106. B. lentiginosus Steph. BITTERN. A single specimen observed September 4th. (Jencks.)

Family **RALLIDÆ.**Genus *Rallus* Bech.

107. R. elegans Aud. KING RAIL. A specimen shot July 7th, was in the collection of Prof. Stein of Mt. Carmel.

Family **ANATIDÆ.**Genus *Aix* Boie.

108. A. sponsa Boie. WOOD DUCK. Abundant about the lagoons in the bottoms.

Family **GRACULIDÆ.**Genus **Graculus** *Linn.*

109. **G. dilophus** var. **floridanus** *Aud.* FLORIDA CORMORANT.
A single specimen observed the last of August. (Jencks.)

Family **LARIDÆ.**Genus **Sterna** *Linn.*

110. **S. regia** *Gamb.* ROYAL TERN. A large tern supposed to be this species was seen over the river the last of August. (Jencks.)

111. **S. antillarum** *Coues.* LEAST TERN. One specimen obtained and others observed the last of August. (Jencks.)

112. **S. fissipes** *Linn.* SHORT-TAILED TERN. Became common along the river about the first of September. (Jencks.)

Family **PODICIPIDÆ.**Genus **Podilymbus** *Less.*

113. **P. podiceps** *Laur.* CAROLINA GREBE. Not common. A pair with half grown young were found in a pond in the bottoms. The female and two young were obtained.

In addition to the above, Mr. Ridgway furnishes the following list of species which he has ascertained to breed at Mt. Carmel:—

1. *Mimus polyglottus*. Common some seasons.
2. *Telmatodytes palustris*. Common.
3. *Cistothorus stellaris*. Common?
4. *Dendroica pinus*. Rare. Found in bottoms, among deciduous trees!
5. *Collurio ludovicianus excubitoroides*. Common?
6. *Passerculus sandwichensis savanna*. Rare?
7. *Guiraca carulea*. Rare?
8. *Eremophila alpestris*. Rare.
9. *Coccyzus erythrophthalmus*. Rare. [Nest of this species and one of *C. americanus* found on adjoining trees in an orchard.]
10. *Antrostomus vociferus*. Abundant.
11. *Antrostomus carolinensis*. Rare?
12. *Ectopistes migratoria*. Perhaps not now breeding there.
13. *Nisus cooperi*. Rare?
14. *Nisus fuscus*. Rare?
15. *Pandion haliaëtus carolinensis*. Rare?
16. *Elanus leucurus*. One pair.

17. *Rallus virginianus*. Rare?
18. *Porzana carolina*. Common.
19. *Porzana noveboracensis*. Rare?
20. *Porzana jamaicensis*. Rare?
21. *Gallinula galeata*. Rare.
22. *Fulica americana*. Rare.
23. *Nyctiardea grisea naevia*. Rare?
24. *Nyctherodius violaceus*. Common?
25. *Anas boschas*. Rare.
26. *Erismatura rubida*. Rare.
27. *Lophodytes cucullatus*. Rare.

Besides the species named above, the following have been observed during the breeding season, though they have not been definitely ascertained to nest in the neighborhood:—

1. *Helminthophaga chrysoptera*. [Breeds in Richland Co.]
2. *Dendroica pennsylvanica*. [Breeds in Richland Co.]
3. *Cyanospiza ciris*. One specimen, a female, June, 1871.
4. *Catharistes atratus*. Rare.
5. *Himantopus nigricollis*. Rare.
6. *Recurvirostra americana*. Rare.
7. *Tantalus loculator*. Common, some seasons.
8. *Falcinellus igneus*. Rare.
9. *Florida carulea*. Rare.
10. *Gallinula martinica*. Rare.
11. *Chrococephalus atricilla*. Rare.
12. *Pelecanus erythrorhynchus*. Rare.
13. *Plotus aninga*. Rare.

Two species, *Campephilus principalis* and *Conurus carolinensis*, the former once rarely found, and the latter so abundant thirty or forty years ago as to be at times a nuisance, have both apparently entirely disappeared.

Fox Prairie, Richland County.

From Mt. Carmel a short trip was made to Fox Prairie, about thirty-five miles northwest of the town. We found the prairie to be partly wild and of a slightly rolling character, crossed by a small stream bordered by banks usually covered with bushes or trees. About the outskirts of the prairie were more or less extended pieces of woodland.

The most striking difference between the avian-fauna of this locality and the vicinity of Mt. Carmel, as would be expected, was in the absence of most of the species found in the densely wooded bottoms and the presence of the prairie frequenting species. In the woods

about the prairie the species found were about the same as those observed in the elevated woods at Mt. Carmel.

The following woodland species were found :—

1. *Turdus mustelinus* Gm. Common.
2. *T. migratorius* L. Rare.
3. *Geothlypis carolinensis* Gray. Not common.
4. *Harporhynchus rufus* Cab. Not common.
5. *Polioptila caerulea* Slat. Common.
6. *Lophophanes bicolor* Bonap. Common.
7. *Mniotilta varia* Vieill. Not common.
8. *Helminthus vermicorus* Bon. One specimen.
9. *Siurus auricapillus* Sw. Common.
10. *Oporornis formosus* Bd. Rather common.
11. *Setophaga ruticilla* Sw. Abundant.
12. *Pyrranga aestiva* Vieill. Common.
13. *Vireo olivaceus* Vieill. Abundant.
14. *V. flavifrons* Vieill. Not common.
15. *Cardinalis virginianus* Bonap. Common.
16. *Cyanurus cristatus* Sw. Common.
17. *Myiarchus crinitus* Cab. Common.
18. *Contopus virens* Cab. Common.
19. *Coccyzus americanus* Bon. Not common.
20. *Picus villosus* L. Rather common.
21. *P. pubescens* L. Common.
22. *Hylotomus pileatus* Bd. Rather common.
23. *Centurus carolinus* Bon. Common.
24. *Melanerpes erythrocephalus* Sw. Not common.
25. *Colaptes auratus* Sw. Not common.
26. *Syrnium nebulosum* Gray. Common.
27. *Scops asio* Bon. Not common.
28. *Nisus cooperi*. One specimen.
29. *Meleagris gallopavo* L. Common.

The species found upon the prairie and about its outskirts were as follows :—

1. *Geothlypis trichas* Cab. In the bushes along edge of fields or woods.

2. *Vireo belli* And. Rather common in the dense patches of bushes on the prairie. The males would appear on the top of a tall bush and utter a queer song entirely peculiar, but so shy were they that at the first alarm they would disappear. Although repeated efforts were made to obtain specimens during the week we were there, only two were shot.

3. *Collurio ludovicianus* Bd. **LOGGERHEAD SHRIKE.** Rather common about the outskirts of the prairie.

4. *Chrysomitris tristis* Bon. Common.

5. *Poæcetes gramineus* Bd. Rather common.

6. *Ammodromus passerinus* Gray. Common on the prairie, but less numerous than in similar situations in the northern portion of the state.

7. *A. henslowi* Gray. Very common, much more numerous than in the northern portions of the state.

8. *Chondestes grammacus* Bonap. Not very common. Most numerous along roadsides.

9. *Spizella pusilla* Bon. Abundant about the borders of the prairie.

10. *Peucaea aestivalis* Cab. This species was rather common in a half-cleared field between Mt. Carmel and the prairie.

11. *Euspiza americana* Bon. Not very common.

12. *Cyanospiza cyanea* Bd. About the borders of the prairie.

13. *Pipilo erythrophthalmus* Vieill. A nest containing three eggs situated in a bush about three feet from the ground was taken on the border of the prairie.

14. *Eremophila alpestris* var. *leucolæma* Cs. Common upon the prairie.

15. *Molothrus pecoris* Sw. A few seen about the farms.

16. *Sturnella magna* Sw. Rather common.

17. *Corvus corax* var. *carnivorus* Bartr. A raven was killed in a field on one side of the prairie the week before we were there.

18. *Tyrannus carolinensis* Bd. About the border of the prairie.

19. *Empidonax pusillus* var. *trailli* Bd. Quite numerous along the sides of a shallow ravine intersecting the prairie.

20. *Trochilus colubris* L. Common about the borders of the prairie.

21. *Nauclerus forficatus* Ridgw. Five specimens were observed passing over the prairie one of the first days of our stay; after this only one or two single specimens were seen, although in years previous to this my friend Mr. Ridgway has found these birds abundant here at this season.

22. *Ichinia mississippiensis* Gray. Only a few specimens were observed. They were usually found circling over a herd of cattle which caused grasshoppers and other large insects to rise, thus giving the kites a good opportunity to procure their food with little labor.

23. *Buteo borealis* Vieill. A few specimens were observed soaring over the prairie.

24. *Buteo swainsoni* Bonap. During our first day upon the prairie a pair of the Swainson's hawks were secured, and the following day a boy guided us to a tree on the outskirts of the prairie, where he stated the birds we had killed had raised young that season. This we

found to be true, as two young of the year were obtained from the very tree, and in which could be seen the remains of a poorly constructed nest.

25. *Rhinogryphus aura* Ridgw. Abundant.

26. *Zenaidura carolinensis* Bonap. Very common. A nest containing two fresh eggs was found on a knoll on the prairie. The wheel of our wagon nearly ran over the female as we were driving by.

27. *Cupidonia cupido* Bd. Not very numerous.

28. *Ortyx virginianus* Bonap. Not as numerous as in the bottoms near Mt. Carmel.

29. *Egialitis vociferus* Cass. Common.

30. *Totanus solitarius* Wils. A few specimens were seen about small ponds of water on the prairie.

31. *Actiturus bartramius* Bonap. Very numerous on the prairie.

32. *Tringoides macularius* Gray. Several observed about the small ponds.

33. *Ardea herodias* Linn. Two specimens kept about the prairie ponds.

34. *Ardea egretta* Gmel. One specimen observed with the preceding.

35. *Ardea virescens* Linn. A few specimens observed.

At this locality, Mr. Ridgway observed in June, 1871, *Mimus polyglottus* (not rare), *Vireo gilvus* (common), *Helminthophaga chrysoptera* (rare), *Dendroica pennsylvanica* (rare), *Geothlypis philadelphia* (rare), *Passerculus savanna* (rare), *Buteo lineatus*, *Falco sparverius*, and *Nisus fuscus*; while in August, of the same year, a specimen of *Asturina plagiata* Licht. was seen.

Cairo and Vicinity.

The observations in this vicinity extended from August 17th to 31st. A portion of the time was passed either at Cairo or six miles above at Mound City, but an excursion to Anna, Union County, was made between the 19th and 26th, the results of which will be given in a supplementary list.

The country near Cairo, along the Illinois side of the Ohio to the mouth of the Cache River and several miles up the Mississippi, with the included country, is very low and, near the rivers, interspersed with swampy lagoons and marshy openings in the woods. These form favorite haunts for herons and other water birds, while the heavy woods of the bottom lands, which at this place are situated back from the river, are frequented by nearly the same species as occur in the bottoms at Mt. Carmel. Above the point where the Cache flows into the Ohio, as well as on the opposite shore in Kentucky and across the Mississippi into Missouri, the woods end abruptly on the river banks.

In the immediate vicinity of Cairo the country is open and treeless, but about a mile back from town a growth of bushes commences which extends back to the heavy forests of the bottoms. It is in this bushy belt that many of the lagoons are situated. Opposite Mound City, six miles above Cairo, is a large cypress swamp and cane brake.

As the bottoms had been flooded a short time before my visit, the small woodland species were present in much smaller numbers than would otherwise have been the case, while to this cause may be partly accredited the immense numbers of herons I found there.

Family **TURDIDÆ**.

Genus **Turdus** *Linn.*

1. **T. mustelinus** *Gm.* WOOD THRUSH. Common in the higher portions of the bottoms.

2. **T. migratorius** *Linn.* ROBIN. A few were observed near Mound City.

Genus **Mimus** *Boie.*

3. **M. polyglottus** *Boie.* MOCKING BIRD. Rare. Only observed at Mound City. A specimen of *Collurio ludovicianus* was pointed out as one of these birds by one of the inhabitants who could not be convinced to the contrary.

Genus **Galeoscoptes** *Cab.*

4. **G. carolinensis** *Cab.* CAT BIRD. Not common. A few were seen near Mound City.

Family **SAXICOLIDÆ**.

Genus **Sialia** *Sw.*

5. **S. sialis** *Bd.* BLUE BIRD. Common near Mound City.

Family **SYLVIIDÆ**.

Genus **Polioptila** *Scl.*

6. **P. cærulea** *Sclat.* BLUE-GRAY GNATCATCHER. Abundant in the elevated portions of the bottoms.

Family **PARIDÆ**.

Genus **Lophophanes** *Kaup.*

7. **L. bicolor** *Bonap.* TUFTED TITMOUSE. Everywhere common in the woods.

Genus *Parus* Linn.

8. *P. carolinensis* Aud. CAROLINA TITMOUSE. Not uncommon in the bottoms about the borders of ponds and lagoons.

Genus *Sitta* Linn.

9. *S. carolinensis* Gm. WHITE-BELLIED NUTHATCH. Not so numerous as at Mt. Carmel.

Family TROGLODYTIDÆ.

Genus *Thryothorus* Vieill.

10. *T. ludovicianus* Bonap. CAROLINA WREN. Not common. A single pair were observed near Mound City.

Family SYLVICOLIDÆ.

Genus *Mniotilta* Vieill.

11. *M. varia* Vieill. BLACK AND WHITE CREEPER. Common throughout the woods.

Genus *Protonotaria* Bd.

12. *P. citrea* Bd. PROTHONOTARY WARBLER. Very uncommon, probably owing to the late high water. Only a few were observed about the borders of lagoons in dense bushes.

Genus *Dendroica* Gray.

13. *D. æstiva* Bd. YELLOW WARBLER. Not common. A few observed in bushes along roadsides near Mound City.

14. *D. cærulea* Bd. CERULEAN WARBLER. Numerous in low woods back of Mound City and in Cache River bottoms.

Genus *Siurus* Sw.

15. *S. auricapillus* Sw. GOLDEN-CROWNED THRUSH. Common in the bottoms.

16. *S. motacilla* Coues. LARGE-BILLED WATER THRUSH. Not common; found in low situations near Mound City and in the Kentucky and Missouri bottoms.

Genus *Oporornis* Bd.

17. *O. formosus* Bd. KENTUCKY WARBLER. Common in heavily timbered bottoms on both sides of the rivers.

Genus *Geothlypis* *Cab.*

18. *G. trichas* *Cab.* MARYLAND YELLOW-THROAT. Not common. A few were seen in the weeds along the railroad track near Cairo.

Genus *Setophaga* *Sw.*

19. *S. ruticilla* *Sw.* RED-START. Abundant in low woods near Mound City and in the Missouri bottoms.

Family *HIRUNDINIDÆ*.Genus *Progne* *Boie.*

20. *P. subis* *Bd.* PURPLE MARTIN. During the first half of my visit but few martins were to be seen, but the last of August they appeared in immense numbers about the towns and over the rivers.

Genus *Petrochelidon* *Bd.*

21. *P. lunifrons* *Bd.* CLIFF SWALLOW. Abundant with the preceding.

Genus *Hirundo* *Linn.*

22. *H. horreorum* *Barton.* BARN SWALLOW. This and the two preceding species, in company with the chimney swifts, towards the last of August would appear over the rivers in immense numbers about an hour before sunset and until dark would circle and dart back and forth over the smooth surface of the water in pursuit of their prey.

Genus *Stelgidopteryx* *Bd.*

23. *S. serripennis* *Bd.* ROUGH-WINGED SWALLOW. Rather common along the river banks, usually found perching in groups at mid-day on dead branches overhanging the river.

Genus *Cotyle* *Boie.*

24. *C. riparia* *Boie.* BANK SWALLOW. Very abundant.

Family *VIREONIDÆ*.Genus *Vireo* *Vieill.*

25. *V. olivaceus* *Vieill.* RED-EYED VIREO. Abundant throughout the bottoms.

26. *V. flavifrons* *Vieill.* YELLOW-THROATED VIREO. Rather common near Mound City and in the Kentucky and Missouri bottoms.

27. *V. noveboracensis* Bonap. WHITE-EYED VIREO. Abundant in swampy thickets near the river in Missouri and not uncommon near Mound City.

Family **LANIIDÆ.**

Genus *Collurio* Vig.

28. *C. ludovicianus* Bd. LOGGERHEAD SHRIKE. A few pairs observed near Mound City.

Family **TANAGRIDÆ.**

Genus *Pyranga* Vieill.

29. *P. rubra* Vieill. SCARLET TANAGER. Very few observed. Only seen near Mound City.

30. *P. æstiva* Vieill. SUMMER RED BIRD. Like the preceding, not common.

Family **FRINGILLIDÆ.**

Genus *Chrysomitris* Boie.

31. *C. tristis* Bon. GOLDFINCH. A few observed near Mound City.

Genus *Spizella* Bonap.

32. *S. pusilla* Bonap. FIELD SPARROW. Common along roadsides and on the outskirts of the towns.

33. *S. socialis* Bonap. CHIPPING SPARROW. Rather common with the preceding.

Genus *Cyanospiza* Bd.

34. *C. cyanea* Bd. INDIGO BIRD. A few were observed near Mound City.

Genus *Cardinalis* Bonap.

35. *C. virginianus* Bonap. CARDINAL GROSBEAK. Not common. A few were observed about clearings in the bottoms.

Genus *Pipilo* Vieill.

36. *P. erythrophthalmus* Vieill. TOWNEE. Not common. A few specimens observed near Mound City.

Family **ICTERIDÆ.**Genus **Molothrus** *Sw.*

37. **M. pecoris** *Sw.* COW BUNTING. A few were observed along the levee near Mound City.

Genus **Icterus** *Auct.*

38. **I. baltimore** *Daud.* BALTIMORE ORIOLE. A single pair were seen in an old orchard in Kentucky, opposite Mound City.

Genus **Quiscalus** *Vieill.*

39. **Q. pupureus** *Bartr.* var. *æneus* *Ridg.* PURPLE GRACKLE. A few specimens were seen along the Ohio levee.

Family **CORVIDÆ.**Genus **Corvus** *Linn.*

40. **C. americanus** *Aud.* Crow. Only observed near Cairo, where they were not common. They were usually found in company with turkey buzzards along the river banks.

Genus **Cyanurus** *Sw.*

41. **C. cristatus** *Sw.* BLUE JAY. Common everywhere in woods.

Family **TYRANNIDÆ.**Genus **Tyrannus** *Cuv.*

42. **T. carolinensis** *Bd.* KING BIRD. But few observed; found along the levees and the borders of the woods near Mound City.

Genus **Myiarchus** *Cab.*

43. **M. crinitus** *Cab.* GREAT-CRESTED FLYCATCHER. Abundant in the bottoms.

Genus **Sayornis** *Donap.*

44. **S. fuscus** *Bd.* BRIDGE PEWEE. Common along the levee near Mound City.

Genus **Contopus** *Cab.*

45. **C. virens** *Cab.* WOOD PEWEE. Abundant in the woods near Mound City.

Genus **Empidonax** *Cab.*

46. **E. pusillus** var. **trailli** *Bd.* TRAILL'S FLYCATCHER. A few observed near Mound City.

47. **E. acadicus** *Bd.* SMALL GREEN-CRESTED FLYCATCHER. More plentiful than the preceding. Found in the bottoms.

Family **ALCEDINIDÆ.**Genus **Ceryle** *Boie.*

48. **C. alcyon** *Boie.* KINGFISHER. Common along the rivers.

Family **CYPSELIDÆ.**Genus **Chætura** *Steph.*

49. **C. pelagica** *Bd.* CHIMNEY SWIFT. Very abundant. I obtained a nest of this species from an immense hollow sycamore stub in the Missouri bottoms opposite Cairo. It was about ten feet from the ground and attached to the interior of the cavity in the usual manner.

Family **TROCHILIDÆ.**Genus **Trochilus** *Linn.*

50. **T. colubris** *Linn.* RUBY-THROATED HUMMING BIRD. A few observed near Mound City.

Family **CUCULIDÆ.**Genus **Coccyzus** *Vicill.*

51. **C. americanus** *Bonap.* YELLOW-BILLED CUCKOO. A single specimen observed on a timbered island in the Ohio.

Family **PICIDÆ.**Genus **Picus** *Linn.*

52. **P. villosus** *Linn.* Hairy WOODPECKER. Not common.

53. **P. pubescens** *Linn.* Downy WOODPECKER. More numerous than the preceding. Found throughout the woods.

Genus **Hylotomus** *Bd.*

54. **H. pileatus** *Bd.* PILEATED WOODPECKER. Not uncommon in the bottoms. Frequently observed flying across the Ohio and Mississippi.

Genus *Centurus* Sw.

55. *C. carolinus* Bonap. RED-BELLIED WOODPECKER. Common in the bottoms.

Genus *Melanerpes* Sw.

56. *M. erythrocephalus* Sw. RED-HEADED WOODPECKER. Common in clearings in the bottoms.

Genus *Colaptes* Sw.

57. *C. auratus* Sw. YELLOW-SHAFTED FLICKER. Two specimens observed near Mound City.

Family **FALCONIDÆ.**Genus *Falco* Auct.

58. *F. sparverius* Linn. SPARROW HAWK. Common everywhere about clearings and the borders of woods.

Genus *Nauclerus* Vig.

59. *N. forficatus* Ridg. SWALLOW-TAILED KITE. Numerous in the immediate vicinity of Cairo, where I was informed it had been abundant the week previous to my arrival.

At the junction of the Ohio and Mississippi Rivers is a long point bearing a growth of cottonwoods. The river was so high during my visit that the land was submerged, thus causing a great many grasshoppers to take refuge in the tree tops. This afforded the kites a fine opportunity for capturing their prey, of which they were not long in taking advantage. The kites would first appear about ten o'clock and in a small flock would proceed to work in the following manner: The trees were situated in an oblong patch and the kites would hunt around the border, making a complete circuit. They kept but a few feet above the tree-tops and when a grasshopper was observed, by a turn of the long tail and a sweep of the wings, the bird would dart towards its prey until within reach, when with a sudden upward turn it would reach forth its feet and, grasping the insect, proceed with outstretched wings to feed upon the remains of its victim while passing slowly along with its companions. As each grasshopper was captured the bird's abdomen and tail would brush against the leaves with a loud "swish;" in consequence the feathers upon the abdomen and under tail coverts were badly worn and discolored.

Their hunting usually continued until about one o'clock, P. M., when they would leave to return at the usual time the next morning.

Genus *Ictinia* Vieill.

60. *I. mississippiensis* Gray. MISSISSIPPI KITE. Abundant. This species would appear at the same time in the morning as the preceding, but would remain until late in the afternoon. Instead of choosing the same hunting ground as the swallow-tail, this bird kept about the open, marshy piece of land between Cairo and the woods and about the border of the latter. They were also more numerous than the other species; nearly fifty were counted at one time, all circling about over the marshy land just outside the town.

Their power of sight is truly wonderful. I saw them repeatedly dart with unerring aim upon some luckless grasshopper, from an elevation of at least one hundred yards.

No less remarkable is their power of flight, in force and rapidity far excelling that of the preceding. Near Mound City they were common about the border of the woods and here their power of flight was exhibited to a better advantage. I repeatedly saw them dart down from a great height with such velocity that it would seem an impossibility for them to escape being dashed to pieces on the ground, but instead, when within a few feet of the earth, they would suddenly spread their wings and the reaction would lift them with almost equal rapidity to about one-half their former elevation. They were so shy that it was impossible to get within gunshot of them.

Genus *Buteo* Cuv.

61. *B. lineatus* Jard. RED-SHOULDERED HAWK. Common everywhere about clearings containing dead trees or on the borders of woods.

62. *B. borealis* Vieill. RED-TAILED HAWK. Only two or three specimens observed.

Family CATHARTIDÆ.

Genus *Rhinogryphus* Ridg.

63. *R. aura* Ridg. TURKEY BUZZARD. Very numerous and much more familiar than at Mt. Carmel.

Family COLUMBIDÆ.

Genus *Zenædura* Bonap.

64. *Z. carolinensis* Bonap. CAROLINA DOVE. Not common. A few were seen along the railroad tracks and the levees.

Family **MELEAGRIDÆ.**Genus *Meleagris* *Linn.*

65. M. gallopavo *Linn.* WILD TURKEY. Abundant in the wilder portions of the bottoms, especially in Kentucky and Missouri.

Family **PERDICIDÆ.**Genus *Ortyx* *Steph.*

66. O. virginianus *Bonap.* QUAIL. But few were seen, although they were reported to be common.

Family **CHARADRIIDÆ.**Genus *Ægialitis* *Boie.*

67. Æ. vociferus *Cass.* KILLDEER. Not common. A few were observed on sandbars along the Ohio.

Family **HÆMATOPODIDÆ.**Genus *Streptilas* *Illig.*

68. S. interpres *Ill.* TURNSTONE. A single specimen, in winter plumage, was observed August 30th, on a sandbar near Mound City.

Family **SCOLOPACIDÆ.**Genus *Tringoides* *Bonap.*

69. T. macularius *Gray.* SPOTTED SANDPIPER. Common along the rivers.

Family **CICONIIDÆ.**Genus *Tantalus* *Linn.*

70. T. loculator *Linn.* WOOD IBIS. Very common about Mound City. A large flock containing about fifty individuals frequented a sandbar at the mouth of a creek near Mound City. They would commence fishing early in the morning and by seven or eight o'clock would be comfortably gorged, when they would gather in small groups on the sandbar and stand dozing in the sun until about noon or after, when some of the number would rise high overhead and soar about with motionless wings in company with the buzzards. When standing upon the sandbar I found them not easily approached, but becoming alarmed they would fly back a short distance and alight in dead

trees, when I did not have much difficulty in procuring several specimens. Those killed early in the morning were so gorged that when they fell the fish would protrude from their bills, and they presented a most filthy appearance. One specimen, which was brought down with a broken wing, fought viciously, making a spirited but ineffectual charge when approached. These birds are known to many of the inhabitants as "Black-winged Pelicans." I was informed that they made their appearance in large numbers every year about the first of August, and remained until the last of September.

Family ARDEIDÆ.

Genus *Ardea* Linn.

71. *A. herodias* Linn. GREAT BLUE HERON. Common about the lagoons.

72. *A. egretta* Gm. WHITE HERON. Very numerous about streams and lagoons.

73. *A. cærulea* Linn. LITTLE BLUE HERON. Exceedingly abundant everywhere through the bottoms along streams and about lagoons and ponds. Not a pool was visited in the bottoms that did not have from one to a dozen of these birds about it, and along the Cache River they were found by hundreds, and they were equally abundant about all the larger bodies of water. During the day the various species of herons were generally distributed through the bottoms, but towards evening they commenced passing toward a common roosting place, which was in a large opening in the Mississippi bottoms about six miles from Cairo, known as the "deadening." At first, about an hour before sunset, a few straggling parties would be seen passing over and just before sunset they were flying in full force, often a dozen or more flocks, numbering from two or three to fifty or more individuals, could be seen at once. Often one of the larger species would start alone and be joined by small parties of the little blue and snowy herons until quite a company was formed.

74. *A. candidissima* Jacquin. SNOWY HERON. Far less numerous than the preceding. Found in the same locations.

75. *A. rufa* Bodd. REDDISH EGRET. This species was quite common about the borders of lagoons and open marshy situations. They were exceedingly shy and rather solitary, being generally found away from the other species and when startled from a feeding place, instead of going off in company with the others, they usually took another direction.

76. *A. virescens* Linn. GREEN HERON. Numerous along the Cache and about lagoons.

Family **ANATIDÆ.**Genus **Aix** Boie.

77. **A. sponsa** Boie. WOOD DUCK. Common about ponds in the bottoms.

Family **PLOTIDÆ.**Genus **Plotus** Linn.

78. **P. aninga** Linn. SNAKE BIRD. Not common. A few were observed perching on dead sycamores over a lagoon near Cairo.

Family **LARIDÆ.**Genus **Sterna** Linn.

79. **S. antillarum** Coues. LEAST TERN. Not uncommon in small flocks along the rivers.

Vicinity of Anna, Union County.

My visit to this locality extended from August 19th to 26th. In the immediate vicinity of Anna the country is hilly and well wooded. About eight miles west the surface changes abruptly to the flat Mississippi bottoms. The bottoms here were somewhat different from any hitherto visited. The ponds were considerably larger and sheltered several species not before noted during the summer.

The species found on the wooded hills about Anna were as follows :

1. *Turdus mustelinus*. Common.
2. *Galeoscoptes carolinensis*. Not very common.
3. *Harporhynchus rufus*. Not very common.
4. *Sialia sialis*. Not common.
5. *Poliophtila cærulea*. Common.
6. *Lophophanes bicolor*. Abundant.
7. *Sitta carolinensis*. Common.
8. *Mniotilta varia*. Common.
9. *Dendroica æstiva*. Not common.
10. *Siurus auricapillus*. Common.
11. *Geothlypis trichas*. Not common.
12. *Setophaga ruticilla*. Common.
13. *Progne subis*. Not common.
14. *Petrochelidon lunifrons*. Common.
15. *Hirundo horreorum*. Common.
16. *Vireo olivaceus*. Abundant.
17. *Vireo flavifrons*. Rather common.

18. *Collurio ludovicianus*. Rare.
19. *Pyranga rubra*. Not common.
20. *Chrysomitris tristis*. Common.
21. *Spizella pusilla*. Common.
22. *Spizella socialis*. Not common.
23. *Melospiza melodia*. Two or three seen.
24. *Euspiza americana*. Not common.
25. *Cyanospiza cyanea*. Not common.
26. *Cardinalis virginianus*. Not common.
27. *Pipilo erythrophthalmus*. Rather common.
28. *Molothrus pecoris*. Common.
29. *Icterus baltimore*. Several pairs seen.
30. *Quiscalus purpureus*. Common.
31. *Corvus americanus*. Not common.
32. *Cyanurus cristatus*. Common.
33. *Tyrannus carolinensis*. Rather common.
34. *Myiarchus crinitus*. Rather common.
35. *Sayornis fuscus*. Not common.
36. *Contopus virens*. Common.
37. *Chordeiles popetue*. Migrating August 24.
38. *Chatura pelagica*. Few seen.
39. *Trochilus colubris*. Not common.
40. *Picus villosus*. Not common.
41. *Picus pubescens*. Common.
42. *Hylotomus pileatus*. Abundant.
43. *Centurus carolinus*. Numerous.
44. *Melanerpes erythrocephalus*. Not common.
45. *Colaptes auratus*. Not common.
46. *Falco sparverius*. Not common.
47. *Ictinia mississippiensis*. One specimen seen.
48. *Buteo borealis*. Not uncommon.
49. *Rhinogryphus aura*. Not common.
50. *Zenædura carolinensis*. Abundant.
51. *Ortyx virginianus*. Very common.

During a day passed in the Mississippi bottoms about ten miles west of Anna, the following species were noted :

1. *Turdus mustelinus*. Abundant.
2. *Galeoscoptes carolinensis*. Not common.
3. *Polioptila cærulea*. Numerous.
4. *Lophophanes bicolor*. Very common.
5. *Parus carolinensis*. Common.
6. *Thryothorus ludovicianus*. Not common.

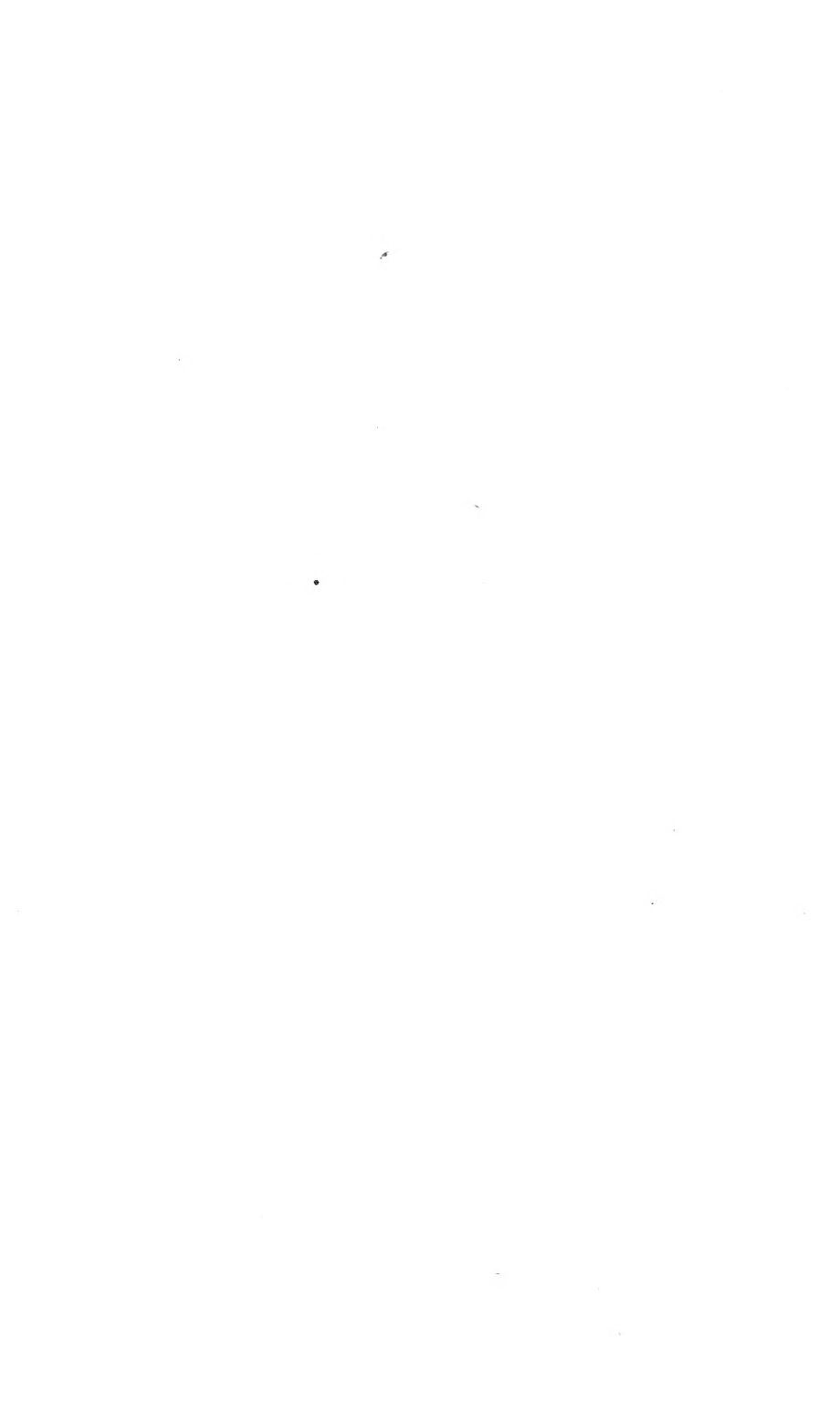
7. *Mniotilta varia*. Numerous.
8. *Protonotaria citrea*. Common.
9. *Dendroica caerulea*. Common.
10. *Siurus auricapillus*. Very common.
11. *Siurus motacilla*. Common.
12. *Oporornis formosus*. Not common.
13. *Geothlypis trichas*. One or two seen.
14. *Icteria virens*. One specimen seen.
15. *Setophaga ruticilla*. Very numerous.
16. *Cotyle riparia*. Abundant.
17. *Stelgidopteryx serripennis*. Common.
18. *Vireo olivaceus*. Abundant.
19. *Vireo flavifrons*. Common.
20. *Vireo noveboracensis*. Common.
21. *Pyrranga rubra*. Not common.
22. *Pyrranga aestiva*. Not common.
23. *Cyanospiza cyanea*. Numerous.
24. *Cardinalis virginianus*. Not common.
25. *Pipilo erythrophthalmus*. Not common.
26. *Agelaius phoeniceus*. Several seen.
27. *Icterus baltimore*. Not common.
28. *Quiscalus purpureus*. Abundant.
29. *Corvus americanus*. Not common.
30. *Cyanurus cristatus*. Common.
31. *Tyrannus carolinensis*. Common.
32. *Myiarchus crinitus*. Abundant.
33. *Contopus virens*. Common.
34. *Empidonax acadicus*. Common.
35. *Ceryle alcyon*. Rather common.
36. *Chaetura pelagica*. Not common.
37. *Trochilus colubris*. Common.
38. *Coccyzus americanus*. Common.
39. *Picus villosus*. Rather common.
40. *Picus pubescens*. Numerous.
41. *Hylotomus pileatus*. Common.
42. *Centurus carolinensis*. Numerous.
43. *Melanerpes erythrocephalus*. Not common.
44. *Syrnium nebulosum*. One seen.
45. *Buteo lineatus*. Not common.
46. *Rhinogryphus aura*. Common.
47. *Zenaidura carolinensis*. Abundant.
48. *Meleagris gallopavo*. Said to be common.
49. *Ortyx virginianus*. Common.
50. *Agialitis vociferus*. Common.

51. *Tringoides macularius*. Numerous.
52. *Tantalus loculator*.
53. *Ardea herodias*. Common.
54. *Ardea egretta*. Not common.
55. *Ardea candidissima*. Not common.
56. *Ardea virescens*. Common.
57. *Botaurus lentiginosus*. One seen.
58. *Gallinula galeata*. Several pairs with full-grown young were seen in a large pond.
59. *Branta canadensis*. A number were observed, and I was informed by a farmer that they nested about the ponds every year.
60. *Anas discors*. A few observed.
61. *Aix sponsa*. Very abundant in the ponds.
62. *Mergus cucullatus*. Several pairs with full-grown young were found in a pond and one specimen obtained.
63. *Sterna fissipes*. Several were seen about the ponds.

A COMPLETE LIST OF THE BIRDS OBSERVED IN SOUTHERN ILLINOIS,
BETWEEN JULY 19TH AND SEPTEMBER 4TH, 1876.

- | | |
|---------------------------------------|---|
| 1. <i>Turdus mustelinus</i> . | 33. <i>Hirundo bicolor</i> . |
| 2. " <i>migratorius</i> . | 34. <i>Cotyle riparia</i> . |
| 3. <i>Galeoscoptes carolinensis</i> . | 35. <i>Stelgidopteryx serripennis</i> . |
| 4. <i>Mimus polyglottus</i> . | 36. <i>Vireo olivaceus</i> . |
| 5. <i>Harporhynchus rufus</i> . | 37. " <i>gilvus</i> . |
| 6. <i>Sialia sialis</i> . | 38. " <i>flavifrons</i> . |
| 7. <i>Poliophtila cerulea</i> . | 39. " <i>noveboracensis</i> . |
| 8. <i>Lophophanes bicolor</i> . | 40. " <i>belli</i> . |
| 9. <i>Parus carolinensis</i> . | 41. <i>Collurio ludovicianus</i> . |
| 10. <i>Sitta carolinensis</i> . | 42. <i>Pyranga rubra</i> . |
| 11. <i>Thryothorus ludovicianus</i> . | 43. " <i>astiva</i> . |
| 12. " <i>bewicki</i> . | 44. <i>Chrysomitris tristis</i> . |
| 13. <i>Mniotilta varia</i> . | 45. <i>Poocetes gramineus</i> . |
| 14. <i>Protonotaria citrea</i> . | 46. <i>Ammodromus passerinus</i> . |
| 15. <i>Helmitherus vermivorus</i> . | 47. " <i>henslowi</i> . |
| 16. <i>Helminthophaga pinus</i> . | 48. <i>Chondestes grammacus</i> . |
| 17. <i>Parula americana</i> . | 49. <i>Spizella pusilla</i> . |
| 18. <i>Dendroica aestiva</i> . | 50. " <i>socialis</i> . |
| 19. " <i>maculosa</i> . | 51. <i>Melospiza melodia</i> . |
| 20. " <i>caerulea</i> . | 52. <i>Peucaea aestivalis</i> . |
| 21. " var. <i>albilora</i> . | 53. <i>Euspiza americana</i> . |
| 22. <i>Sinus auricapillus</i> . | 54. <i>Cyanospiza cyanea</i> . |
| 23. " <i>motacilla</i> . | 55. <i>Cardinalis virginianus</i> . |
| 24. <i>Oporornis formosus</i> . | 56. <i>Pipilo erythrophthalmus</i> . |
| 25. <i>Geothlypis trichas</i> . | 57. <i>Eremophila</i> var. <i>leucolama</i> . |
| 26. <i>Icteria virens</i> . | 58. <i>Dolichonyx oryzivorus</i> . |
| 27. <i>Myiodyctes mitratus</i> . | 59. <i>Molothrus pecoris</i> . |
| 28. " <i>canadensis</i> . | 60. <i>Agelaius phoeniceus</i> . |
| 29. <i>Setophaga ruticilla</i> . | 61. <i>Sturnella magna</i> . |
| 30. <i>Progne subis</i> . | 62. <i>Icterus baltimore</i> . |
| 31. <i>Petrochelidon lunifrons</i> . | 63. " <i>spurius</i> . |
| 32. <i>Hirundo horreorum</i> . | 64. <i>Quiscalus purpureus</i> . |

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| 65. <i>Corvus corax.</i> | 100. <i>Cupidonia cupido.</i> |
| 66. " <i>americanus.</i> | 101. <i>Ortyx virginianus.</i> |
| 67. <i>Cyanurus cristatus.</i> | 102. <i>Claytonia virginicus.</i> |
| 68. <i>Tyrannus carolinensis.</i> | 103. <i>Egialitis vociferus.</i> |
| 69. <i>Myiarchus crinitus.</i> | 104. " <i>melodus.</i> |
| 70. <i>Sayornis fuscus.</i> | 105. <i>Streptopelia interpres.</i> |
| 71. <i>Contopus virens.</i> | 106. <i>Philohela minor.</i> |
| 72. <i>Empidonax var. traillii.</i> | 107. <i>Ereunetes pusillus.</i> |
| 73. " <i>acadicus.</i> | 108. <i>Totanus flavipes.</i> |
| 74. <i>Ceryle alcyon.</i> | 109. " <i>solitarius.</i> |
| 75. <i>Chordeiles pictus.</i> | 110. <i>Tringoides macularius.</i> |
| 76. <i>Chatura pelagica.</i> | 111. <i>Actitis bartramia.</i> |
| 77. <i>Trochilus colubris.</i> | 112. <i>Limosa fedoa.</i> |
| 78. <i>Coccyzus americanus.</i> | 113. <i>Tantalus loculator.</i> |
| 79. <i>Picus villosus.</i> | 114. <i>Ardea herodias.</i> |
| 80. " <i>pubescens.</i> | 115. " <i>egretta.</i> |
| 81. <i>Hylonomus pileatus.</i> | 116. " <i>candidissima.</i> |
| 82. <i>Centurus carolinus.</i> | 117. " <i>carulea.</i> |
| 83. <i>Melanerpes erythrocephalus.</i> | 118. " <i>rufa.</i> |
| 84. <i>Colaptes auratus.</i> | 119. " <i>virescens.</i> |
| 85. <i>Syrnium nebulosum.</i> | 120. <i>Ardea exilis.</i> |
| 86. <i>Scops asio.</i> | 121. <i>Botaurus lentiginosus.</i> |
| 87. <i>Bubo virginianus.</i> | 122. <i>Fallus elegans.</i> |
| 88. <i>Fulco sparverius.</i> | 123. <i>Gallinula galbata.</i> |
| 89. <i>Nauclerus torquatus.</i> | 124. <i>Branta canadensis.</i> |
| 90. <i>Ictinia mississippiensis.</i> | 125. <i>Anas discors.</i> |
| 91. <i>Nisus cooperi.</i> | 126. <i>Aiz sponsa.</i> |
| 92. <i>Buteo lineatus.</i> | 127. <i>Mergus cucullatus.</i> |
| 93. " <i>borealis.</i> | 128. <i>Graculus var. floridanus.</i> |
| 94. " <i>swainsoni.</i> | 129. <i>Plotus aninga.</i> |
| 95. <i>Haliaetus leucorephalus.</i> | 130. <i>Sterna regia?</i> |
| 96. <i>Rhinogryphus aura.</i> | 131. " <i>antillarum.</i> |
| 97. <i>Zenaidura carolinensis.</i> | 132. " <i>fissipes.</i> |
| 98. <i>Meleagris gallopavo.</i> | 133. <i>Podilymbus podiceps.</i> |
| 99. <i>Bonasa umbellus.</i> | |



BULLETIN

OF THE

ESSEX INSTITUTE.

VOL. 9. SALEM, APR., MAY, JUNE, 1877. NOS. 4, 5, 6.

REGULAR MEETING, MONDAY, MARCH 5, 1877.

MEETING this evening. The PRESIDENT in the chair.
Records read.

Mr. JAMES H. EMERTON gave a very interesting communication on cobwebs. He mentioned that :

The only kinds of web made by all spiders are the egg cocoons, which in their simplest form consist of two saucer-shaped pieces fastened together at the edges. These are not made of a single thread like those of caterpillars, but of a great number of very fine threads drawn out at once, so that the cocoon cannot be unwound.

Like the cocoons are the bags which many spiders make to protect themselves during the winter or while moulting or laying eggs. A bag of this kind is made by the water spider, *Argyronata*, under water, attached to plants. The air which remains among the hairs and spinnerets when the spider comes down from above the surface collects in this bag, and finally fills it, so that the spider lives as in a diving bell.

Almost all spiders have the habit of lining their holes with silk. Some Lycosidæ dig holes a foot deep in sand, lining them with threads and fastening round the rim a ring of sticks and rubbish to prevent caving in. The trap door spiders go a step farther and make a door of web and earth fastened to the tube by a hinge at one side.

The simplest form of web for catching insects is an extension of the margin of a tube into a flat sheet made of strong threads crossed by others finer and more numerous. Of this kind are the webs of *Agalena* which cover grass fields and become visible when wet with dew. Of this kind also are the large webs of *Tegenaria* in cellars, where they are often a foot in width and remain for years.

Another kind of flat web is made by *Linyphia*. Here a thin sheet of web is held in place by threads from above and below and the spider stands underneath, holding on by its claws. *L. marginata* makes its web in the shape of a dome and stands under the highest part. The webs of *Theridion* consist of irregular threads without the flat sheet, but with a more closely woven portion as a little tent under which the spider shelters itself.

The most complicated cobwebs of all are those which consist of threads regularly arranged, part of which are adhesive. Among these we must place the webs of *Dictyna* and *Amamobius*, the adhesive threads of which are curled by a comb on the hind legs and attached to other threads previously spun. Allied to these is the web of *Hyptiotes* which consists of four radiating lines crossed by several independent adhesive threads. From this we pass to the web of *Uloborus*, the adhesive thread of which is made in the same way, but arranged in a spiral on threads radiating like the spokes of a wheel and at first held in place by a spiral of simple thread, which is taken out as it is replaced by the adhesive one.

The webs of the Epeiridæ differ from these last only in the structure of the adhesive thread, which has when span a viscid coating which soon collects in drops along the thread. These webs are not always complete circles, many species making a number of looped threads extending only part way round, and some, as *Nephila plumipes*, always leaving a segment of the web without adhesive threads.

VICE PRESIDENT F. W. PUTNAM called the attention of the Institute to a very interesting relic which had recently been received by the Peabody Museum of Archaeology and Ethnology at Cambridge, and of which he exhibited a plaster cast. This important piece of Mexican sculpture was found about twenty years ago, in a cave near Acapulco, by Dr. Sharp, and given by him to Commodore Parker, now in command at the Charlestown Navy Yard. Within a few weeks Commodore Parker had presented it to the Peabody Museum. It is carved from a hard rock, dolerite, and has had two coats of paint, the internal of which is red and the external black, so that the natural surface of the stone is seen only on such parts as have been exposed and greatly rubbed, as is the case with the posterior surface.

The image now represents the head and neck of a man broken off just above the shoulders. That it was broken is shown by the uneven fracture and slight chippings from some of the projecting points, as if this interesting work of probably ancient Mexican art had been roughly handled either at the time of finding, of which, unfortunately, a record cannot be secured, or at an earlier period.

The great interest in the relic will be seen, at once, to centre in the peculiar manner in which this human head is dressed with the skin of the puma, or "American lion," and the remarkable resemblance which it has to the head

of the Hercules found by Cesnola at Cyprus and believed to be an Assyrian representation of the god. In each the animal's head has been drawn over the human head in such a manner as to represent the upper jaw of the lion resting on the forehead of the human head. The mere fact that an ancient Mexican god, or distinguished person, should be represented with a head-dress of the skin of the puma, or of any other animal, would in itself be of little moment, as it is well known that the skins of animals have been and still are used by several American peoples in this way; but there is in this Mexican relic an additional resemblance to the Assyrian specimen in the long, four-sided pendant hanging from the top of the head down to the shoulder just behind the left ear. What this pendant represents is difficult to say, and in the Assyrian Hercules there is one on the right side of the head also. This coincidence, added to the general resemblance in the manner in which the animal's head is drawn over the human, is certainly interesting, and seems to indicate the possibility of the origin of the idea involved and expressed one from the other, while at the same time the distinctively Mexican features are as well preserved in the one, as the Assyrian in the other, showing that while the idea may possibly have had a common origin, or have been in some way transmitted, the work of the Mexican was not a copy in very recent times. This singular coincidence is, possibly, of some importance when taken in connection with several other resemblances between old and new world productions, and the many little things which, from time to time, have been observed as indicating resemblances between the ancient nations of America with those of Egypt and Assyria, and with the oft recurring mention of the white man in the old myths of the new world.

From what I have said I beg not to be misunderstood as conveying the impression that I think there are facts

sufficient to establish a connection of the more advanced nations of America with the early civilizations of the old world, either by migration or direct or indirect intercourse, but that I simply wish to call your attention to some of the resemblances between these old peoples, which may be merely the necessary coincidences of similar periods of development of man in all places, at particular periods of the growth of nations.

Mr. JAMES KIMBALL presented, in behalf of Mr. John Conway of Marblehead, several old papers written during the period of the Revolution. Adjourned.



REGULAR MEETING, MONDAY, MARCH 19, 1877.

MEETING this evening at 7.30 o'clock. The PRESIDENT in the chair. Records read.

Mrs. J. F. Machado, of Salem, was elected a resident member.

Mr. JOHN ROBINSON gave a lecture on the fertilization of flowers by the wind and by insects.

He commenced his remarks by alluding to Sprengle, Müller, Darwin and Lubbock, and said he should confine his lecture to what these and other botanists and investigators had observed and written upon the subject.

The lecture was divided as follows:—

Definition of close, self, and cross-fertilization, and hybridization; close-fertilization considered; how close-fertilization is prevented in many plants; fertilization by wind; fertilization by insects; observations by different persons, particularly Mr. Darwin, on the effects of close and cross-fertilization.

Summary—That *self-fertilization* in many plants is

possible, and in a *few known cases* is the usual mode of reproducing the species.

That *cross-fertilization* is the *prevailing* means by which species are reproduced, and is almost absolutely necessary once in a while, to reinvigorate the species, and to keep down vagaries.

Mr. Robinson's remarks were illustrated by diagrams and blackboard sketches. A mammoth model of a pink, taken to pieces, exhibiting the various parts of the flower magnified to great size, served well to make the subject easily understood.

Mr. Robinson alluded to the kindness of Prof. Goodale of Cambridge on this and other occasions, and closed by saying the enormous reproduction of plants by seed continually going on, with the comparatively few examples of self-fertilized plants, and the overwhelming number of cross-fertilized species which have thus far been observed, proves beyond a doubt the great extent to which cross-fertilization predominates.

This renders the aid of the wind and of insects imperative; for without their agency only a small portion of our vegetation would produce healthy and abundant fruit.

Rev. E. C. BOLLES presented specimens of the new "crayontype" from crayon drawings on paper, by the photo-electrotype process invented by W. H. Mumler.

Rev. Mr. BOLLES announced the death of our associate member, Mr. E. Bicknell, who died at Lynn this morning, one of our most promising microscopists, and a very skillful preparator of microscopic specimens. On his motion a committee was appointed, consisting of Messrs. E. C. Bolles, G. A. Perkins and T. L. Perkins, to prepare a series of resolutions and to report at the next meeting.

NOTES ON THE HIRUDINEI OBSERVED IN MICHIGAN.

BY A. SAGER.¹

BUT two of the genera of this family have hitherto been observed in this vicinity, viz.: *Nephelis* and *Clepsine*; the former representing the subfamily with red blood, and the latter comprising all those that possess blood either transparent or having a slight yellow tint.

The following species of the genus *Clepsine* have been observed, most, if not all, of which appear to be non-descript, viz.:

Clepsine marmorata s. n. sp.? Body above straw-colored, marbled with brown, a mesial longitudinal band of the former extending the whole length of the body, with seven abrupt dilatations of unequal size and form, the first distinctly triangular; the margins on the dorsal surface marked with short transverse brownish bars on every third segment; numerous warty tubercles on the dorsum, somewhat in five longitudinal series. Ventral surface marked with twelve longitudinal green stripes, the margins with short transverse green bars on every third segment; margin of the posterior sucker also marked with fourteen or fifteen bars. Eyes two. Length at rest $1\frac{1}{4}$ inches, width 6 lines. Found on the *Emysaurus*, of Dum., and also *Emys marginata*.

Clepsine sex-puncto-lineata n. sp. Length from 6 to 8 lines; width from 3 to 4 lines. Color above olive brown, with the surface marked with six rows of yellow or white dots covering elevated points or tubercles, the outer rows being marginal. Beneath flesh-colored, minutely dotted with brownish or greenish points; generally

¹ Published first in the *Peninsula Journal of Medicine and the Collateral Sciences* in July, 1856.

a central clear stripe and two lateral dark ones; corresponding dark lines on the dorsum passing through or connecting a series of yellow spots. Eyes six. Ova yellow, enclosed in transparent membranous ovisacs, of which five or six were collected together, but not cohering, nor adhering to the ventral surface, but deposited on dead leaves and covered by the body of the leech. Number of ova in each ovisac varying from eight to fifty. Found May 3d, and probably deposited a few days previous.

Clepsine minima n. sp. Body flesh-colored, translucent; above delicately lined with black or dark green points. Beneath minutely and irregularly dotted with points that, under the microscope, present the usual radiated appearance of pigment cells. Length 6 lines, width $1\frac{1}{4}$ lines. Eyes two. Eggs in several ovisacs attached to the venter and carried about by the leech; color pale red. Body of leech contracted so as to enclose the ovisacs.

Of the genus *Nephelis* but one clearly defined species was observed. This we believe to be the *Hirudo lateralis* of Say; of which a marked variety having numerous fawn-colored blotches on the dorsal surface, and also nearly a uniform fawn color beneath, was observed.

The ova of both genera, but especially of the *Clepsine*, afford to the embryologist a fine opportunity for studying the segmentation of the yolk, the gradual histogenic transformations, and the final development of organs, the several stages of the process occupying three or four weeks.

Not only as a process of animal building by the various stages of histogenetic and morphological transformation is the embryology of these animals peculiarly interesting, but it furnishes also an opportunity of studying the completed structure, in consequence of the transparency of

the tissues at early periods, obviating to some extent the necessity of the more difficult anatomical investigations.

In the newly completed organism of the *Nephelis* the character and course of the circulation can be distinctly traced, the wave-like contractions of the vessels being indicated by their colored blood; in the lateral vessels proceeding from behind forward on one side and downward on the opposite. I have not been able to discover the irregular movements described by some writers, now advancing and again retreating in the same vessel, at different times.

In the embryo of the *Clepsine sex-puncto-lineata* the histogenic transformation distinctly occurs at first in the superficial strata of cells, which as they change become translucent, while the interior is still composed of the minute yellow cells of the original yolk. At an early period also the number of segments of the body is but twenty-one or twenty-two, corresponding with the number of pairs of ganglia that at a little later period can be rendered visible by moderate compression. The earliest traces of the lateral cœca of the stomach appear when the yolk substance is reduced to an elongated central mass, as short yellow tubercles produced apparently by the constriction of the rudimentary stomach; they then elongate and gradually acquire the branching character of maturity. The embryo is born before the completion of the alimentary canal and without an oral orifice, but the posterior sucker is already fully developed for attachment to the body of the parent. It remains in that position until, through a more complete development, it becomes capable of an independent existence. In short the entire process of development which has been minutely traced by Grube, Weber, v. Rathke, Leuckart and others admits of more facile examination than the embryology of the

fresh-water gasteropod molluscs, and therefore to be preferred for early studies.

According to Dujardin and Owen sexual contact occurs in the warm season, especially in August, the ova being deposited in from fifteen to thirty or forty days afterwards. In Michigan the ova are deposited by both genera about the first of May and as before stated are incubated in three or four weeks. Are there not, then, at least two broods in one season?



REGULAR MEETING, MONDAY, APRIL 2, 1877.

MEETING this evening at 7.30 o'clock. The PRESIDENT in the chair. Records of last meeting read.

Rev. E. C. BOLLES, from a committee appointed at a previous meeting, reported the following resolutions:—

WHEREAS: Mr. Edwin Bicknell, for many years associated with the Essex Institute, has recently been removed by death from his labors in the cause of science; and it thereby becomes the appropriate duty of that body to place on record its appreciation of the skill and character of its lamented member; it is therefore

Resolved, That the Essex Institute has long recognized with pleasure, the merited distinction which Mr. Bicknell has attained by his profound acquaintance with the theory and practice of the microscope, and his unrivalled skill in the manipulation of that instrument, as well as in the preparation of specimens for its use;—a distinction which was as widely spread as the employment of the microscope itself, and which will always place his name among the most successful laborers in microscopic investigation.

Resolved, That his valuable services have been known and honored, not only in the Essex Institute, but also in other eminent societies of Natural History; while it was his peculiar worth which gave him a place with the first scientific teacher of our country, at the Cambridge Museum of Comparative Zoology and the Anderson School of Natural History at Penikese.

Resolved, That his unexpected decease must be regarded as a great misfortune to the practical science of our day; and that sorrow at the close of a life in the full course of such usefulness must extend beyond the immediate circle of specialists in Microscopy to all who are occupied in studying the forms of Natural History or investigating their development.

Resolved, That a copy of these resolutions be entered upon the Records of the Essex Institute at Salem, Mass., and that they be also transmitted to Mrs. Clara B. Walker of Lynn, the only surviving relative of Mr. Bicknell.

Prof. E. S. MORSE and Rev. Mr. BOLLES spoke of the late Mr. BICKNELL and of his untiring devotion to science, and the resolutions were unanimously adopted.

VICE PRESIDENT F. W. PUTNAM offered remarks on "The Development of the Ceramic Art and Ornamentation among the American Nations."

By means of blackboard drawings, specimens of pottery, and numerous photographs, Mr. Putnam illustrated the several lines of development of pottery and its ornamentation, from the earliest times to a comparatively modern period in North, Central and South America. Several early styles of ornamentation, showing similarity of design, were traced through corresponding periods of different nations, not only of America but of other parts of the world as well. He also particularly showed how the development of the "key" or "fret," which is a common pattern of ornamentation in the later period of barbarism in Central and South America, was evidently a development of the earlier "coil" pattern of South America, and not, as has been generally stated, an early form of the "curved" and "wave" pattern. He showed how much easier it was to make the coil pattern in several of its forms than the straight lines of the fret, and exhibited specimens to prove that his statement was true to the fact.

He also called attention to the interesting fact of the owl being often copied on South American and Mississippi valley pottery, as it was on that of the Old World, especially on old pottery from Etruria, and from the excavations at Hissarlik, as shown in the work of Schlie-

man. These similarities gave rise to a most suggestive discussion. Some of the specimens (belonging to the Peabody Museum, in Cambridge) shown by the lecturer were very curious and valuable. The various questions proposed by Prof. Morse, Rev. Mr. Bolles and others, which were promptly answered by the lecturer, gave a very pleasant variety to the evening, and were very instructive.



REGULAR MEETING, MONDAY, APRIL 16, 1877.

MEETING this evening. The PRESIDENT in the chair. Records read. Correspondence and donations to the Library and to the Museum were announced.

There were also exhibited collections of grasshopper eggs, taken from prairie soil in Plymouth Co., Iowa, three hundred miles west of Dubuque, received from Gen. Horace Poole of Dubuque, who thought that some of the members of the Institute would desire to observe the development of these insects, now that the matter has become of such importance as to enlist the attention of the National Government, which has just appointed a scientific commission to investigate the grasshopper pest. The President called on Prof. A. S. PACKARD, recently appointed a member of this commission, who briefly described the hatching of the eggs, and spoke of the habits and the great size of the swarms as they fly through the air. He also replied to several questions which were proposed.

The remainder of the evening was occupied by Mr. J. S. Kingsley in a lecture on the crustacea, illustrated by blackboard drawings.

Miss Ella Farman was elected a member.

REGULAR MEETING, MONDAY, MAY 7, 1877.

MEETING this evening. The PRESIDENT in the chair. Records read. Correspondence and donations announced.

Rev. HENRY W. FOOTE, of Boston, gave a very interesting and valuable historical lecture, descriptive of the church and state under Sir Edmund Andros. He first described the chief town in the colony, Boston, in those early days half a century after the first settlement of Massachusetts, and pictured the every day life and some characteristic manners and customs of the people. He then spoke of the influence and power of the clergy, drew vivid pictures of the five Boston ministers who took a prominent part in the proceedings of the period, viz.: James Allen and Joshua Moody of the First Church, Increase and Cotton Mather of the Second, and the Rev. Samuel Willard of the South Church; also of Sir Edmund Andros and others of the court party, as well as of Judge Sewall, who was spoken of as the Pepys of New England, and whose diary is soon to be published by the Massachusetts Historical Society; and closed with a description of the arrest and imprisonment of Andros, 188 years ago on the 18th of April, and imagined one of the old Puritans coming back to find the face of everything changed.



ANNUAL MEETING, MONDAY, MAY 21, 1877.

MEETING this evening at 7.30 o'clock. The PRESIDENT in the chair. Records read. The annual reports of the Secretary, Treasurer, Curators and Standing Committees

were read and accepted, and from them the accompanying

RETROSPECT OF THE YEAR

has been compiled, presenting the work of the Institute, in the various departments, since the last annual meeting.

MEMBERS.—Changes occur in the list of our associates by the addition of new names and the withdrawal of some by resignation, removal from the county or vicinity, or by death. Nine resident members have died, and we have received information that two of our correspondents have passed away in a serene and happy old age.

James A. Smith, of Salem, son of William and Lydia (Norwood) Smith, carpenter, died May 15, 1876, aged 58. Admitted a member March 11, 1858.

Simeon Flint, of Salem, son of Benjamin and Eunice (Stowell) Flint of North Reading, mason, died July 12, 1876, aged 59. Admitted a member April 4, 1855.

Joseph Osgood, of Peabody, son of Joseph and Mary (Beckford) Osgood of Salem, physician, died Sept. 30, 1876, aged 71. Admitted a member Jan. 29, 1851.

John Fiske Allen, of Salem, son of Edward and Ann (Fiske) Allen, merchant, died Oct. 18, 1876, aged 69. Admitted a member 1834.

John G. Felt, of Salem, son of Nathaniel and Hannah (Reeves) Felt, painter, died Nov. 14, 1876, aged 70. Admitted a member Feb. 15, 1854.

Joseph H. M. Bertram, of Salem, son of Joseph and Clara (Macintire) Millet, merchant, died Feb. 3, 1877, aged 41. Admitted a member, July 6, 1864.

William Maloon, of Salem, son of William and Abigail (Allen) Maloon, tanner, died March 13, 1877, aged 64. Admitted a member Jan. 10, 1855.

Edwin Bicknell, microscopist, died at Lynn, Mar. 19, 1877, aged 47. Admitted a member Nov. 5, 1866.

Ephraim Emmerton, of Salem, son of Jeremiah and Elizabeth (Newhall) Emmerton, merchant, died March 22, 1877, aged 85. Admitted a member 1834.

Thomas Spencer, died at Bransby, England, Sept. 4, 1876, aged nearly 84 years. A resident of Salem from 1820 to 1839.

Nehemiah Cleaveland, son of Nehemiah Cleaveland of Topsfield, died at Saugatuck, Conn., April 17, 1877, aged 80.

Short biographical notices of the above will be prepared for the Historical Collections.

MEETINGS.—During the summer, two *Field Meetings* were held. *First*, at Beachmont, on the line of the Boston, Revere Beach & Lynn Railroad, July 22, which was attended by about one hundred persons. Messrs. E. S. Morse of Salem, George Dixon of North Carolina, F. W. Putnam of Salem, George A. Otis of Washington, D.C., and D. M. Balch of Salem, addressed the meeting. *Second*, at Manchester, August 10, 1876, about one hundred and thirty present. This meeting proved to be of more than usual interest. The following gentlemen took part in the afternoon session: the President, F. W. Putnam, John Robinson, E. S. Morse, Rev. George Gleason of Manchester, Rev. James F. Clarke, R. H. Dana, jr., and Rev. C. Bartol of Boston.

Regular Meetings, twenty-five, usually on the first and third Monday evenings of each month. The following communications received and lectures delivered may be specified:—J. A. Allen, "List of Birds collected by Mr. Charles Linden near Santarem, Brazil;" E. W. Nelson, "Birds of North Eastern Illinois;" William P. Upham,

"History of Stenography, with a proposal for a new system of Phonetic Short-hand Writing;" John McNeil, "On Artificial Fish-breeding and Collateral Topics;" E. W. Nelson, "Notes upon Birds observed in Southern Illinois between July 17 and Sept. 4, 1875;" A. Sager, "Notes on the Hirudinei observed in Michigan;" F. W. Putnam, "On the Development of the Ceramic Art and Ornamentation among the American Nations;" J. H. Emerton, "On Cobwebs;" F. W. Putnam, "Remarks on a specimen of Mexican Sculpture found in a Cave near Acaapulco;" J. S. Kingsley, "On the Crustacea;" H. W. Foote, a lecture descriptive "of the Church and State under Andros;" F. W. Putnam, "Remarks on a Number of Gold Images, principally from graves near Bogota, New Grenada;" John Robinson, "On the fertilization of Flowers by Wind and by Insects."

LECTURES AND CONCERTS.—A course of seven lectures under the direction of the Lecture Committee were as follows: 1st, on Tuesday, Dec. 5, 1876, by Charles Wyllys Elliott, "How the Pilgrims lived at Plymouth," illustrated by lantern pictures. 2d, on Monday, Dec. 11, 1876, by C. Pfoundes, "On Japan and the Japanese." 3d, on Tuesday, Jan. 9, 1877, by Major J. W. Powell, the U. S. Geologist in charge of the Exploration and Survey of the Colorado Region, "On the North American Indians." 4th, on Monday, Jan. 15, 1877, by Major Powell on "The Cañons of Colorado." 5th, on Monday, Jan. 29, by Prof. Henry Carmichael of Bowdoin College, "On Flame." 6th, on Monday, Feb. 12, 1877, by Prof. Alexander Graham Bell "On the Telephone." 7th, on Monday, Feb. 26, 1877, by S. G. W. Benjamin, "The Theory and Practice of Art."

Under the personal direction of the curator of Music,

seven concerts have been given. 1st, on Monday, Nov. 27, 1876, by the Mendelssohn Quintette Club. 2d, on Monday, Dec. 18, 1876, the Cæcilia Quartette of Boston. 3d, Monday, Jan. 8, 1877, by Mr. B. J. Lang and Miss Grace Sampson and Mrs. C. H. Goss. 4th, Monday, Jan. 22, 1877, by Miss Clara L. Emilio, Messrs. George W. Sumner, August Fries, and Wulf Fries. 5th, Monday, Mch. 12, 1877, by Miss Ita Welsh and others. 6th, Wednesday, Mch. 21, 1877, by Mr. H. G. Tucker and others. 7th, Wednesday, Mch. 28, 1877, by Miss Lilian Bailey and Messrs. Wulf Fries and Arthur W. Foote.

The lectures proved exceedingly instructive and compared favorably with the courses of previous years. The concerts were a very creditable series of musical entertainments of a high order of merit.

CENTENNIAL EXHIBITION.—By a vote of the directors, and in response to an invitation from a committee of the Historical Department of the Centennial Exhibition, an historical exhibit of the settlement of Salem was made in June last in Philadelphia, six portraits and many other articles of historical interest were sent. In the commissioners' report of the Historical Exhibit, the Institute is credited with having made one of the best and most carefully arranged collections in the Exhibition. The collection remained in Philadelphia, at the urgent request of the gentlemen interested, until March, when it was safely returned to Salem.

Four excursions to the Centennial Exhibition were made under the auspices of the Institute, during the months of June, September and October, and over two hundred of our citizens, including many members and friends of the Society were enabled to visit the Exhibition under favorable conditions, and at a comparatively small expense.

These excursions were under the personal direction of the Secretary and the Rev. E. S. Atwood, who took the entire charge of the last one and rendered efficient aid in carrying out the arrangements.

A pleasant gathering of members and their families was held at the rooms on the evening of the first of January. Short addresses were made by Messrs. Loring, Atwood and Bolles, on the general effect of this international exposition on the scientific and educational interests of the country. After the speaking an hour was pleasantly spent in social intercourse.

ART DEPARTMENT.—A large number of instructive and very valuable books in the various branches of art have been deposited in the rooms. Many of these volumes are rare and finely illustrated with engravings, etchings, water colors, etc. This department is receiving increased attention, and the books now on the shelves must prove of great value to the lovers of art and students who are privileged to consult them.

MUSEUM.—Many valuable specimens in Natural History, including those in Ethnology and Archæology, have been given during the year, and are on deposit with the trustees of the Peabody Academy of Science, in accordance with previous arrangements. These have been reported at our meetings, and have been duly acknowledged to several donors. The following may be specified: Royal M. Shute, Mrs. Anstiss T. Bowditch, Mrs. T. Hunt, J. L. Hammond, Miss Caroline Follansbee, Alfred Peabody, W. R. Cloutman, Miss Ann Smith, Alfred S. Peabody of Cape Town. In addition to these several interesting specimens of an historical character have been arranged in the rooms, and contribute very much of interest and

value to the antiquarian and historical portion of the Museum. The following donors may be specified: J. F. Wood, Geo. A. Perkins, W. R. Cloutman, Mrs. G. W. Estes, T. F. Hunt, Mrs. Lewis Titcomb, W. J. Foster, W. P. Upham, James Kimball, David Pingree, M. A. Stickney, S. G. Henderson, Daniel C. Bowditch, Miss Martha Whipple, Mrs. N. D. Cole, Miss Kate Johnson, John J. Dennis of Beverly, Miss Mary Ellen Briggs, Miss E. Wheatland, F. Lamson, Miss Rebecca Wallis, James A. Chamberlain, Miss Martha G. Wheatland, S. B. Ives, C. C. Perkins, and Miss Harriet King. To the collection of the fine and industrial arts many contributions have been received, some of exceeding value from the completeness of the series, especially that from J. L. Hammond and Edward L. Wilson of Philadelphia, the former of the textile manufactures of China, the latter some 700 unmounted Photographs of the Centennial Exhibition. E. C. Bolles, J. W. & J. S. Moulton, James C. Stimpson, J. J. Latting of New York, George Perkins, J. H. Emerton, Thomas A. Taylor, Mrs. J. P. Cook, J. P. Peabody, and John Robinson were also contributors.

The Eastern anteroom, in which many of the above collections are arranged, has been thoroughly renovated, the walls neatly tinted, the portraits and historical pictures have been cleaned and hung, the cabinets rearranged and the various specimens labelled. The room is now in good order.

HORTICULTURAL.—The annual exhibition opened on Tuesday evening, Sept. 12, 1876, and continued to the Friday evening following. The display was much better than had been anticipated, considering the season. The vegetables from the Plummer School Farm and from Baker's Island were worthy of particular mention. The hot

house plants from Mrs. C. Hoffman, the ferns from Mr. John Robinson, the gladioli from Mr. C. A. Putnam, the floral exhibit from A. H. Dunlap of Nashua, and many others, attracted great admiration.

The contributors were as follows :—*Apples*, Charles A. Ropes, C. H. Buxton, Charles M. Richardson, George Chambers, Mrs. E. H. Valentine, James P. Cook, Caleb Foote, Andrew E. Elliott, Miss Belle Leavitt, John G. Waters, and Aaron Nourse. *Pears*, James P. Cook, Miss E. P. Richardson, W. H. Dennett of Beverly, George Bowker, Aaron Nourse, Andrew E. Elliott, T. P. Symonds, Charles A. Ropes, Joseph A. Goldthwaite, Charles M. Richardson, Caleb Foote, Miss Martha G. Wheatland, David Roberts, George Chambers, C. H. Buxton, Dorcas Nourse, Mrs. W. F. Gardner, Mrs. Walter Leavitt, and Miss Belle Leavitt. *Peaches*, George Bowker, C. M. Richardson, Miss Lizzie Goldthwaite, and Mrs. John Barlow. *Grapes*, T. P. Symonds, Miss E. P. Richardson, George Russell, Joseph A. Goldthwaite, Andrew E. Elliott, Charles B. Fowler, J. Fiske Allen, Thorpe Fisher, Jos. T. Fuller, A. Nourse, George A. Perkins, Mrs. Walter Leavitt, George Bowker and Miss Belle Leavitt. *Plums*, Mrs. Wm. G. Kilham. *Vegetables*, J. H. Sears of Danvers, C. A. Johnson of Plummer Farm School, T. G. Gilbert of Baker's Island, and W. H. Dennett of Beverly. *Pot Plants*, Mrs. Charles Hoffman, John Robinson, and George F. Sheldon. *Flowers*, A. H. Dunlap & Son of Nashua, N. H., Mrs. L. P. Weston of Danvers, Charles A. Putnam, Miss Martha Horton, Mrs. W. F. Gardner, Miss Bessie Safford, Miss Lizzie Sanborn, Miss A. W. Kimball, John Robinson, Mrs. Charles Osgood, Miss Mary A. Ropes, and John Webster. *Miscellaneous*, Mrs. W. F. Gardner, Orrin Weston, Miss Anna Frye, Miss Dorcas Nourse, Mrs. C. Osgood, and George Russell.

LIBRARY.—During the year the following additions have been received :—

By Donation.

Folios,	30	Pamphlets and Serials, . .	10,995
Quartos,	46	Almanacs,	15
Octavos,	379		
Duodecimos,	229	Total,	11,010
Sexdecimos,	21	Total of bound volumes, .	705
Total of bound volumes, . .	705	Total of Donations, . . .	11,715

By Exchange.

Quartos,	3	Pamphlets and Serials, . .	1,371
Octavos,	87	Total of bound volumes, .	97
Duodecimos,	7		
	—	Total of Exchanges, . . .	1,468
Total of bound volumes, . .	97	Total of Donations, . . .	11,715
By Purchase,			18
Total of Additions,			13,201

Of the total number of pamphlets and serials, 7,930 were pamphlets, and 4,436 were serials.

The donations to the Library for the year have been received from 129 individuals and fourteen societies and departments of the General and State Governments. The exchanges from 113 societies and incorporate institutions, of which sixty-six are foreign; also from editors and publishers.

The library has been carefully examined and found in good order and condition. The work of preparing the material for a catalogue is being carried on by the Assistant Librarian. A printed catalogue would be a very great convenience and is very much needed, but would require a greater expense than can at present be afforded.

Donations or exchanges have been received from the following :—

	Vols.	Pam.
Abbot, F. E., Boston, Mass.,	3	
Agassiz, A. E. R., Cambridge, Mass.,		14
Allen, S. M., Boston, Mass.,	1	

	Vols.	Pam.
American Association Advancement of Science,	1	
Anagnos, M., Boston, Mass.,		1
Andover (Mass.) Theological Seminary,		1
Appalachian Mountain Club,		2
Atkinson, Miss L. D.,		6
Atwood, Rev. E. S.,		52
Augsburg Naturhistorischer Verein,	1	
Baker, C. H., Annapolis, Md.,		1
Baltimore, Peabody Institute,		2
Batavia, Societe des Arts et des Sciences,		7
Belfast Naturalist Field Club,		2
Bemis, Luke, West Chester, Pa.,	1	
Berlin, Gesellschaft Naturforschende,	1	
Berlin, Verein zur Beförderung des Gartenbaues,	1	
Berlin, Zeitschrift für die gesammten Naturwissenschaften,		2
Bern, Naturforschende Gesellschaft,		2
Berwickshire Naturalist Club,		1
Boardman, S. L., Augusta, Me.,	3	
Bolles, Rev. E. C.,	9	82
Bologna, Reale Accademia delle Scienze,	1	
Bonn, Naturhistorischer Verein der preussischen Rhein- lande und Westphalens,		2
Boston, American Academy Arts and Science,		1
Boston Athenæum,	1	
Boston, City of,	13	
Boston, Congregational Library Association,		63
Boston Public Library,		4
Boston Society of Natural History,		9
Boynton, N., Estate of,	6	
Braunschweig Archiv der Anthropologie,		2
Brazil Centennial Commission,	3	
Bremen, Naturwissenschaftlichen Vereine,		2
Briggs, Daniel C.,	1	
Briggs, Miss M. E.,	4	
Bristol Naturalist Society,		1
Brooks, Henry M.,	6	
Brooks, W. G., Boston, Mass.,		15
Brown, A., Boston, Mass.,		2
Brünn, Naturforschender Verein,	1	1
Bruxelles, Académie Royale des Sciences, des Lettres et des Beaux-Arts de Belgique,	5	
Bruxelles, Société Entomologique,		2
Bruxelles, Société Malacologique,		8

	Vols.	Pam.
Buffalo Historical Society,	13	
Buffalo Society of Natural Sciences,		2
Buffalo Young Men's Association,	2	4
Caen, Académie Royale des Sciences, Arts et Belles-Lettres,	1	
Cambridge, Museum of Comparative Zoology,		3
Canada Geological Survey,	1	
Canadian Institute,		5
Cassino, S. E.,	1	
Chamberlain, J. A.,	2	23
Chaney, Rev. G. L., Boston, Mass.,		2
Chemnitz, Naturwissenschaftlichen Gesellschaft,		2
Cherbourg, Société Nationale Sciences Naturelles,	1	
Childs, E. V., Newton, Mass.,	1	
Cloutman, W. R.,	1	
Colby University, Waterville, Me.,		1
Cole, Mrs. N. D.,		12
Connecticut Academy Arts and Sciences,		1
Crosby, Mrs. M. K.,	22	3821
Currier, John J., Newburyport, Mass.,		1
Cutter, A. E., Charlestown, Mass.,		1
Dale, T. Nelson, Jr.,		1
Danzig, Naturforschende Gesellschaft,		1
Davenport, Iowa, Academy Natural Science,	1	
Dawson, C. C., New York,		1
Dresden, Naturwissenschaftliche Gesellschaft "Isis,"		1
Durrie, Dan'l S., Madison, Wis.,	2	
Emdem, Naturforschende Gesellschaft,	1	
Emilo, L. F., San Francisco, Cal., Newspapers.		
Emmerton, James A.,		250
Erlangen, Physikalisch-medicinische Societat,	1	1
Falmouth, Eng., Royal Cornwall Polytechnic Society,		1
Farley, E. W.,		1
Fitch, O. H., Ashtabula, O., Newspapers.		
Follansbee, Miss C. L.,	12	
Foote, Caleb, Newspapers,	1	
Foster, William H.,		168
Frankfurt, Zoologische Gesellschaft,		5
Georgia Historical Society,	3	3
Geneve, Institut National Genevois,	1	
Geneve, Société de Physique et d'Histoire Naturelle,		1
Goodell, A. C., Jr.,		139
Goss, E. H., Melrose,		2
Gottingen, Konigliche Gesellschaft der Wissenschaften,	1	

	Vols.	Pam
Gravenhague, Entomological Society,		2
Green, S. A., Boston, Mass.,	13	170
Hale, R. S.,		1
Hamburg, Naturwissenschaftlicher Verein,	2	1
Hart, C. F., Philadelphia, Penn.,		15
Hartranft, John F., Philadelphia, Penn.,	1	
Harvard College,		2
Haskell, Geo., Ipswich, Mass.,		2
Hayward, Rev. S., Gilsum, N. H.,		1
Hewes, Rev. J. T., Fitchburg, Mass.,	1	2
Hunt, Mrs. T.,	3	1
Hunt, T. F.,	93	91
India Geological Survey,		9
Indiana Geological Survey,		1
Ives, H. P.,	1	
Ives, S. B.,	27	78
Jameson, P. H.,		2
Jenison, O. A., Lansing, Mich.,		12
Johnson, Rev. Sam'l,	14	
Johnson, Thos. H.,	3	
Kansas Historical Society,		1
Kimball, James, Newspapers, x,		8
Kingsley, J. S., Newspapers,		2
Kjbenhavn, Kongelige Danske Videnskabernes Selskab, .	3	
Königsberg, Königliche Physikalisch-Oekonomische Gesell- schaft,		2
Lander, Miss E. B.,	8	
Lausanne, Société Vaudoise des Sciences Naturelles, .		1
Lawrence, Abbott, Boston,	1	
Lee, John C., Newspapers.		
Leeds Philosophical and Literary Society,	1	
Le Mans, Société d'Agriculture, Sciences et Arts de la Sarthe,	1	2
Lincoln, F. H., Boston,		6
Liverpool, Literary and Philosophical Society,	1	
London, Royal Society,		11
Lyon, Société d'Agriculture, d'Histoire Naturelle et des Arts utiles,	2	
Lyon, Société Linnéenne,	2	
Mack, Miss E. C.,	6	
Mack, William,	39	83
Madrid, Observatorio,	8	
Manchester Literary and Philosophical Society,	5	

	Vols.	Pam.
Mannheim, Verein für Naturkunde,		4
Manning, R. C., Newspapers, xc,	7	
Manning, Robert,		20
Marburg, Gessellschaft zur Beförderung der Gesammtten Naturwissenschaften,		2
Massachusetts Historical Society,	2	
Massachusetts Horticultural Society,		1
Maryland Historical Society,		3
Mecklenburg Vereins der Freunde,	1	
Merritt, Mrs. L. F., Newspapers.		
Miller, Misses,	138	196
Mills, Rev. R. C.,		9
Minnesota Historical Society,	1	3
Morse, Edward S.,		286
Munchen, Königlich Bayerischen Akademie der Wissen- schaften,		25
Munsell, Joel, Albany, N. Y.,	3	40
Nelson, H., Georgetown, Mass., Newspapers.		
Neuchatel, Société des Sciences Naturelles,		2
New England Historic-Genealogical Society,		5
Newhall, Thomas A., Germantown, Penn.,	6	
New Haven Historical Society,	1	
New Jersey Historical Society,		1
New York, American Geographical Society,		1
New York Chamber of Commerce,	1	
New York Genealogical Biographical Society,		3
New York Mercantile Library,	1	1
Norris, Chas. H.,		1
Northey, Wm.,		49
Nourse, Miss D. C.,	5	
O'Donnell, John,		1
Ohio Historical and Philosophical Society,		2
Oliver, S. C.,	3	36
Orange, N. Y., New England Society,		1
Osgood, Chas. S.,	3	
Ourt, A. J., Harrisburg, Penn.,	1	
Packard, A. S., Jr.,		2
Packard, P. W.,		1
Palfray, C. W., Newspapers,	1	59
Paris, Institut Historique,		6
Paris, Journal de Conchyliologie,		4
Paris, Société d'Acclimation,	1	
Paris, Société d'Anthropologie,		3
Peabody, Alfred,		1

	Vols.	Pam.
Peabody, Peabody Institute,		1
Pennsylvania Historical Society,	1	1
Perkins, A. C., Exeter, N. H.,		1
Perkins, A. T., Boston, Mass.,		1
Perkins, Geo.,		49
Perkins, Geo. A.,	2	
Perkins, Samuel C., Philadelphia, Penn.,		2
Perley, M. V. B., Springfield, Mass.,	1	
Perry, Rev. W. S., Geneva, N. Y.,		7
Philadelphia Academy Natural Science,		1
Philadelphia, American Philosophical Society,		3
Philadelphia Carpenter's Company,	1	1
Philadelphia Zoological Society,		1
Phippen, Geo. D.,	24	19
Pool, W., Wenham,		2
Portuguese Centennial Commission,		4
Putnam, Rev. A. P., Brooklyn, N. Y.,		2
Putnam, Mrs. E. A., and F. W.,	62	714
Putnam, H. W.,	8	83
Quincy, Edmund, Quincy,	1	
Regensburg, Königliche Bayerische botanische Gesellschaft,	1	
Rhode Island Historical Society,	2	22
Robinson, John,		177
Sacken, C. R. O., Newport, R. I.,		1
Salem, City of,	1	
Salem, Ladies' Centennial Committee,	5	
Salem Young Men's Christian Association, Newspapers.		
Saltonstall, L., Boston, Mass.,		10
Sanborn, Geo.,	5	75
Scudder, Samuel H., Cambridge,		2
Sewall, Rev. C. C., Medfield, Mass.,		1
Skinner, Mrs. R.,	1	
Smith, G. W.,	1	
Smith, Mrs. S., Pembroke, Mass.,	1	
Smithsonian Institution,	5	3
Smucker, Isaac, Newark, Ohio,	1	
Spofford, A. R., Washington, D.C.,	1	1
St. Gallen, St. Gallische Gesellschaft,		1
Stickney, M. A.,	1	11
St. Louis Academy Science,		1
Stockholm, Kongliga Svenska Vetenskaps-Akademien,	3	
Stone, B. W.,	2	
Stone, Rev. E. M., Providence, R. I.,		1
Story, Augustus,	48	95

	Vols.	Pam.
Story, Miss E. A.,	1	
St. Petersburg, Imperat Akademya Nauk,		13
Tasmania Royal Society,	1	
Tenney, Mrs. H. A., Lansing, Mich.,		1
Thompson, C. P., Gloucester,	13	
Trowbridge, Thos. R., New Haven, Conn.,	1	
Tucker, Jona.,		6
Upham, Wm. P.,		1
Upsal, Kongliga Vetenskaps-Societeten,		2
U. S. Bureau of Education,	11	88
U. S. Bureau of Statistics,	12	
U. S. Dept. of Interior,	38	2
U. S. Dept. of State,	5	1
U. S. Engineer Dept.,	3	
U. S. Navy Dept.,	3	
U. S. Patent Office,		36
U. S. Treasury Dept.,	1	
Vermont Historical Society,	2	
Very, Miss L. L. A.,	1	
Victoria Centennial Commission,	3	5
Waterbury, Conn., Bronson Library,		2
Waters, E. Stanley,		65
Waters, Joseph Linton,		6
Watson, Miss C. A.,	1	
Welsh, Wm. L.,	2	15
Wheatland, Miss M. G.,		20
Wheatland, Stephen G.,	22	48
White, Rev. W. O., Keene, N. H.,		1
Wien, K. K. Zoologische botanische Gesellschaft,	1	
Williams, Henry L.,		80
Williams, James, Columbus, O.,	1	
Willson, Rev. E. B.,	1	
Winthrop, Robert C., Boston, Mass.,		3
Wisconsin Academy of Science, Arts and Letters,	1	
Wisconsin Historical Society,		1
Wisconsin Natural History Society,		1
Woodbridge, W. E.,	1	
Woods, Mrs. K. T.,	1	
Worcester, American Antiquarian Society,		2
Worcester Free Institute,		1
Worcester Society of Antiquity,		1
Wurzburg, Physikalisch-medicinische Gesellschaft,		4
Zurich, Naturforschende Gesellschaft,		1

The following have been received from editors or publishers :—

American Journal of Education.	Lynn Reporter.
American Journal of Science.	Lynn Transcript.
American Naturalist.	Nation.
Beetle and Wedge.	Nature.
Boston Globe.	Peabody Press.
Bradford New Era.	Peabody Reporter.
Dexter Smith's Paper.	Quaritch's Catalogue.
European Mail.	Sailors' Magazine and Seamen's
Forest and Stream.	Friend.
Gardener's Monthly.	Salem Gazette.
Hardwicke's Science Gossip.	Salem Observer.
Haverhill Gazette.	Salem Post.
Ipswich Chronicle.	Salem Register.
Lawrence American.	Turner's Public Spirit.
Lynn City Item.	Vox Humana.

PUBLICATIONS have been issued as heretofore,—the BULLETIN, vol. 8, and the HISTORICAL COLLECTIONS, vol. xiii, Nos. 3 and 4. The exchange list, with few exceptions, continues the same as last year. A new price list of the Publications has been printed and distributed to the prominent libraries, historical societies, colleges, and also to booksellers throughout the country. The By-Laws, adopted at the close of the preceding year, have been printed in a convenient form for reference and the use of members.

FINANCIAL.—The Treasurer's Report shows an increase in the annual income, yet additional means are requisite to perform the various duties, which are reasonably expected, in a fitting manner.

DEBITS.

General Account.

Athenæum, for Rent and Librarian,	\$350 00
Salaries, \$745.00; Coal, \$140.00; Gas, \$51.96,	936 96
Lectures, \$87.87; Publications, \$1,134.20,	1,222 07

Express and Postage, \$81.46; Insurance, \$40.00; Binding, \$22.00,	143 46
Excursions, \$4,902.38; Sundries, \$144.85; Stationery, 25.68,	5,072 91
Secretary, 1875 to 1877,	1,690 00
	<hr/>
Balance in hands of Treasurer,	\$9,415 40
	7 85

Historical.

Books,	52 00
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Ditmore Fund.

Deposited in Five Cents Savings Bank,	\$1 000 00
Note receivable,	1,100 00
Paid F. S. Perkins,	128 64
	<hr/>
	2,228 64
	<hr/>
	\$11,703 89

CREDITS.

General Account.

Dividends Webster Bank,	\$20 00
Assessments, \$1,112.00; Publications, \$430.05,	1,542 05
Sundries, \$1.00; Life Memberships, \$60.00,	61 00
Athenaeum, proportion of coal and janitor,	158 44
Excursions, \$5,549.65; Lectures and Concerts, \$319.63,	5,860 28
Subscriptions for Secretary's Salary,	1,225 00
	<hr/>
	\$8,866 77
By Balance,	65 85

Historical.

Dividends Naumkeag Bank,	16 00
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Natural History and Horticulture.

Dividends P. S. & P. R. R.,	\$12 00
Dividends Lowell Bleachery,	32 00
Horticultural Exhibition,	32 63
	<hr/>
	\$76 63

Davis Fund.

Coupons Burlington and Missouri R. R.,	140 00
Coupons Dixon, Peoria and Hannibal R. R.,	240 00
	<hr/>
	380 00

Ditmore Fund.

Coupons Chicago City Bonds,	70 00
Executor of Miss Ditmore's Estate,	2,006 76
Interest received,	131 88
	<hr/>
	2,208 64
	<hr/>
	\$11,703 89

The routine work of the Institute has prospered favorably, and considerable amount has been done in preparing a large quantity of printed matter relating to the Centennial Exhibition for binding. The Ladies' Centennial Commission of Salem, by a generous money contribution, has enabled the society to purchase and place in the library, for reference, many valuable books, pamphlets, photographs, maps, catalogues, etc.

The following officers were then elected, until others shall be chosen in their stead:—

PRESIDENT:

HENRY WHEATLAND.

Vice-Presidents:

ABNER C. GOODELL, Jr.

WILLIAM SUTTON.

FREDERICK W. PUTNAM.

DANIEL B. HAGAR.

Secretary:

GEORGE M. WHIPPLE.

Treasurer:

HENRY M. BROOKS.

Auditor:

RICHARD C. MANNING.

Librarian:

WILLIAM P. UPHAM.

CURATORS:

History—JAMES KIMBALL.

Botany—GEORGE D. PHIPPEN.

Manuscripts—W. P. UPHAM.

Zoology—EDWARD S. MORSE.

Archæology—F. W. PUTNAM.

Horticulture—CALEB COOKE.

Numismatics—M. A. STICKNEY.

Painting & Sculpture—T. F. HUNT.

Geology—ALPHEUS S. PACKARD, Jr.

Technology—EDWIN C. BOLLES.

Music—ARTHUR W. FOOTE.

COMMITTEES:

Finance:

JOHN C. LEE. JAMES UPTON. JAMES O. SAFFORD. H. M. BROOKS.

Library:

CHAS. W. PALFRAY.

JOSEPH G. WATERS.

HENRY F. KING.

GEORGE F. FLINT.

WM. NEILSON.

Publications:

ABNER C. GOODELL, Jr.	EDWARD S. ATWOOD.
EDWIN C. BOLLES.	JAMES KIMBALL. T. F. HUNT.

Lectures:

WILLIAM D. NORTHEED. A. H. JOHNSON. F. W. PUTNAM. A. L. HUNTINGTON.

Field Meetings:

GEO. COGSWELL, Bradford.	LEWIS N. TAPPAN, Manchester.
GEORGE D. PHIPPEN, Salem.	FRANCIS H. JOHNSON, Andover.
GEORGE PERKINS, Salem.	R. S. SPOFFORD, Newburyport.
E. N. WALTON, Salem.	N. A. HORTON, Salem.
FRANCIS H. APPLETON, Peabody.	

Messrs. Fielder Israel and Joshua Phippen, jr., both of Salem, were elected resident members. The President read a letter from Rev. R. M. Chipman of Lisbon, Conn., suggesting the propriety of a celebration in Sept., 1878, the 250th anniversary of the landing of Gov. Endicott. Referred to the President and Messrs. Kimball and Upham.



MONDAY, MAY 28, 1877.

An adjournment of the annual meeting was held this evening. The PRESIDENT in the chair. The unfinished business was considered and acted upon.

The Secretary read a letter from Mrs. Anna C. Warren of Boston, donating to the Institute an oil painting of Daniel Webster. Mr. Hunt mentioned that he had seen the painting, which was a fine copy, by Miss Jane Stuart, from the original. The thanks of the Institute were tendered to Mrs. Warren for her liberal donation.



REGULAR MEETING, MONDAY, JUNE 4, 1877.

MEETING this evening. The PRESIDENT in the chair. Records read. Correspondence and donations announced.

Messrs. George E. Merrill, James A. Emmerton and Charles H. Flint, of Salem, and H. B. Craine, of Amesbury, were elected members.

The PRESIDENT mentioned that Mr. James Kimball had found among the papers in the Court House a map of Merrimack River from Haverhill to the source, drawn by John Gardner, supposed to be original. A paper for the HISTORICAL COLLECTIONS, giving a full account of the same with accompanying documents is in preparation.

ADDITIONS TO THE FERNS OF ESSEX CO., MASS.

(Bulletin, March, 1875, and Addenda, Oct., 1875.)

NEW LOCALITIES.

WOODWARDIA ANGUSTIFOLIA Sm. Magnolia Swamp, June, 1877. J. H. Sears and J. Robinson.

PRIGOPTERIS HEXAGONOPTERA Fée. Chebacco woods, Aug., 1876. J. H. S. and J. R.

OPHIGLOSSUM VULGATUM L. Boxford, 1876-7. J. R.

LYCOPodium INUNDATUM L. Plum Island, and near Coffin's Beach, Gloucester (very fine).

SPECIES NEW TO LIST.

BOTRYCHUM LANCEOLATUM Angs. Near Georgetown, Aug. 11, 1876. Mrs. Horner.

ASPIDIUM CRISTATUM var. CLINTONIANUM Eaton. Danvers, June, 1877. J. R. and J. H. S.

CORRECTION.

For ISOCTES ECHINOSPORA var. BRAUNII read the same species var. MURICATA.

We have now in the herbarium of the Peabody Academy of Science the completed collection of Ferns, Equisetums and Lycopods of the County.

JOHN ROBINSON.

Salem, June 30, 1877.

BULLETIN

OF THE

ESSEX INSTITUTE.

VOL. 9. SALEM, JULY, AUG., SEPT., 1877. Nos. 7, 8, 9.

FIELD MEETING AT BOXFORD, TUESDAY, JUNE 26, 1877.

THE members and their friends assembled at the chapel of the village church in Boxford about 10.30, A. M., and after a cordial welcome from a committee of the citizens, dispersed in groups for the ramble in search of plants, insects and other objects of interest. A gentle rain at noon interfered with the collecting of specimens, yet several were obtained.

The afternoon session was called to order at 2 o'clock, the Secretary reading the records of the last meeting, and the President opening the proceedings with a general statement of the objects of the Institute, particularly that feature of the institution which treasures facts and papers pertaining to the civil or natural history of the county.

MR. WILLIAM P. UPHAM, of Salem, gave some account of the old elm tree on the James M. Hubbard place in North Andover close to the Boxford line, which measured this day, six feet from the ground, 18 feet 10½ inches in circumference, having increased since 1858 [at that time

measured by him], fourteen inches. The ordinary estimate of the age of a tree of this kind is about an inch of circumference for a year, and upon this basis, this elm must be over 200 years of age. Mr. Upham also spoke of the elm tree at Mrs. Isaac Hale's in Boxford, which six feet up measured in circumference 12 feet 8 inches, and the spread 107 feet 6 inches in diameter, and is probably not surpassed in general beauty and symmetry by any in the county. He also alluded to other trees and exhibited drawings of several.

Some further remarks upon large trees were made by Mr. John Robinson, Rev. William S. Coggin and others.

Rev. E. C. BOLLES, of Salem, had made no collections, and was consequently not prepared to offer anything in his own particular department of scientific investigation. He, however, had something to say growing out of the thought that often in the most limited things in nature are revealed the wonders of a world, and about specialty in science with particular reference to enforcing the idea that there is not a person in any of these towns who is not capable of contributing something to the world's store of knowledge.

ANCILL DORMAN, Esq., one of the selectmen, on being called upon to say something pertaining to the history of the town, said the original settlement dated back as far as 1650. In 1680 there were twenty or thirty families. It was incorporated in 1685, the land being previously a part of Rowley, the early settlers coming from Topsfield and a part from Ipswich. At the time of the Revolution there were about 1000 inhabitants, and this is about the present population. The church in this parish was founded in 1702; and that in the west parish in 1736.

MR. JAMES H. EMERTON, of Salem, spoke of the manner in which the cocoons of spiders are made, and described the methods followed by *Epeira strix* and *Attus mystaceus*. The first makes a ball of loose wrinkled silk, lays its eggs in it and covers the whole thickly with strong threads. The *Attus* makes first a large silken bag in which it lives for some time. Finally it discharges the eggs against the upper surface of the bag, where they adhere and are immediately covered by fine silk. Mr. Emerton showed a cocoon of *Epeira caudata* found on a berry bush in the pine woods; also several female *Lycosa* carrying their cocoons fastened to their spinnerets.

DR. GEORGE A. PERKINS, of Salem, described the sundew (*drosera*), and spoke of several other plants of the same habits.

MR. JOHN ROBINSON, of Salem, followed with a more detailed account of these plants, including the pitcher plant, with habits similar to those of the *drosera*. The peculiarity of this class of plants which received particular attention were those trap-like appliances by which they catch and hold insects which die, decay, and serve as a fertilizer to nourish the plant. Mr. Robinson described a number of plants that had been collected by Mrs. Horner of Georgetown.

MR. JOHN ROBINSON, in reply to a question which was proposed on the subject of planting pine trees, explained the structure of the pine cone, the position of the seed therein, time and manner of sowing, alluding briefly to the diminution of our forests. On this latter subject a discussion followed, Mrs. C. H. Dall and Mrs. Mary S. Blake of Boston and the Rev. Messrs. Israel and Bolles of Salem and others taking part.

REV. SERENO D. GAMMELL, of Boxford, in this connection, called attention to the consideration that pines when arrived at maturity ought to be cut. There are citizens here in Boxford who have tilled land where there are trees now growing. There are more trees in Boxford than there were some years ago; and with us the evil of cutting down trees carries its own remedy. There are not so many acres of large timber, but more of wood growth.

After some additional remarks, Mr. N. A. HORTON, of Salem, spoke of the spirit of hospitality which characterized the Boxford people, and offered a resolve "that the cordial thanks of the Essex Institute be tendered to Rev. Mr. S. D. Gammell and wife, to Rev. William S. Coggin, to Miss Coggin and to other citizens of the town of Boxford, for many kind attentions received this day; and also to the proprietors of the congregational church, for the use of the church and chapel."

This resolution was unanimously adopted and the meeting adjourned.



REGULAR MEETING, MONDAY, JULY 2, 1877.

MEETING this evening. The PRESIDENT in the chair. Mr. JOHN ROBINSON was elected Secretary *pro tem*. Records read.

Isaac J. Osburn, of Salem, was elected a resident member.

AN EXAMINATION OF TYPES OF SOME RECENTLY
DESCRIBED CRUSTACEA.

BY T. HALE STREETS, M.D., AND J. S. KINGSLEY.

THE PEABODY ACADEMY OF SCIENCE having received from Mr. W. N. Lockington, of San Francisco, some of the types of the Crustacea described by him in the "Proceedings of the California Academy of Sciences," we have thought it best to place on record the results of our study of the specimens, especially since many of his new genera and species would be, without his labels, impossible to identify. We have only "Author's extras," and so cannot quote the volume and page of his descriptions.

Microphrys platysoma A. M. Edw. *Milnia platysoma* Stimpson, Annals N. Y. Lyceum Nat. Hist., vii, p. 180. *Pisoides? celatus* Lockington, Proc. Cal. Acad., July 17, 1876.

Of this species we have two specimens. The two spines on the branchial region are close together.

Microphrys depressa Streets & Kingsley. *Fisheria depressa* Lockington, l. c., July 17, 1876.

This species differs from *M. platysoma* in having the digits excavate at the extremity, in being more granulated, in having the laminiform process on the branchial region somewhat imbricated. There is a spine between and below the processes on the branchial and hepatic regions and three spinous tubercles beneath the hepatic process, on the infero-lateral portion. The posterior margin of the carapax has a row of bead-like tubercles as in *M. platysoma*. The laminiform processes on the propodal joints of the

ambulatory feet are as in *M. platysoma*. Mr. Lockington was apparently led to separate this from his *Pisoides? celatus* by working with the synopsis of genera given in Dana's Crustacea of the U. S. Exploring Expedition where the Malidae are divided into two groups according as the digits are acuminate or excavate. Mr. Lockington's generic description would totally mislead one in this instance, but his specific is tolerably good. In the specimen sent (a male), however, the chelipeds are not "enormously long," but are fully as short proportionally as in *Microphrys bicornuta* of Florida.

Thoe sulcata Stm., Ann. Lyc., vii, 177. *Platypes edentata* Lockington, l. c., March 20, 1876; *id.*, July 17, 1876.

The specimens sent are plainly *Thoe sulcata*. Contrary to the generic diagnosis given by Mr. Lockington, the rostrum is bifid and the preorbital is prominent.

Othonia Pietoli de Saussure, Revue et Magazin de Zoologie, 1853, II, v, 357, pl. XIII, f. 2; Stimpson, Journal Boston Society Nat. Hist., vi, p. 455. *Micippa ovata* Lockington, l. c., July 17, 1876.

The specimens sent agree exactly with Saussure's description and figure, and certainly do not belong to the genus *Micippa*.

Mithraculus areolatus? S. & K. *Mithrax areolatus* Lockington, l. c., July 17, 1876.

This is plainly a *Mithraculus*, but whether it be new or not we cannot say, as we have not Bell's description of *M. denticulatus* at hand. It is not *M. coronatus* Stm. nor *Mithrax armatus* Saussure.

Inachodes Hemphilli Lockington, l. c., Feb. 7; *id.*, July 17, 1876.

The specimens sent are very near *I. lavisi*, but differ from Stimpson's description in having a spiniform tubercle on the gastric region; the dactyli are flattened and curved

but not enough to call falciform; the rostrum is regularly tapering. The proportions of the carapax are also different, the length being to the breadth as three to two. The modification of the diagnosis of the genus proposed by Mr. Lockington cannot be allowed, as the postocular is present though small.

Inachodes brevicrostrum Lockington, l. c., July 17, 1876.

A single dry specimen of this apparently good species was received.

Epialtus minimus Lockington, l. c., July 17, 1876.

This apparently new form differs greatly from the other species of the genus with which we are acquainted.

Anaptychus cornutus Stm., Ann. Lyc., vii, 184, pl. II, f. 1. *Ala spinosa* Lockington, l. c., July 17, 1876.

The specimens in no way differ from the description and figure quoted above.

Atergatis rotundatus Stm., Ann. Lyc., vii, p. 202. *Atergatis cristatissimo* Lockington, l. c., March 20, 1876; *id.*, Sept. 4, 1876.

One specimen received.

Xanthodius Sternberghii Stm., Ann. Lyc., vii, p. 52. *Acteodes mexicanus* Lockington, l. c., May 20 and Sept. 4, 1876.

The two specimens sent agree with Stimpson's description and with specimens in the Museum of the Academy from Panama. Mr. Lockington had the paper of Stimpson's quoted above.

Xanthodes Taylora Stm., Ann. Lyc., vii, p. 208, pl. V, f. 3. *Xantho spinituberculatus* Lockington, l. c., Feb. 7 and Sept. 4, 1876.

The single specimen agrees perfectly with Stimpson's description and figure.

Panopeus purpureus Lockington, l. c., Sept. 4, 1876.

Is very near *P. validus* Smith, but the front is not as

prominent and less sinuate than in specimens in the Peabody Academy identified by Prof. Smith. There is also a crest on the upper portion of the propodus while in *P. validus* this crest is obsolete. The ambulatory feet are also less hairy and more nearly cylindrical.

Panopeus affinis Streets & Kingsley. *Panopeus transversus*? Lockington, l. c., Sept. 4, 1876 (non Stimpson)

Is very near *P. transversus* Stm. and *P. crenatus* Edw. & Lucas, but has the rostrum more nearly rectangular than in either, and as prominent as in the latter. The front is bilobed, the lobes being slightly arcuate, truncate, not sinuate. A sulcus on the rostrum near the orbits. Orbits with two obsolete fissures above. The notch between front and orbits as in *transversus*. The surface of the carapax is uneven near the antero-lateral teeth, being crossed by grooves running inward from the emarginations between the teeth. There is also, as in *P. crenatus*, slight indications of a separation of the angle of the orbit from the second normal tooth. The sub-hepatic regions are granulate as in *P. transversus*. The spine on the inner margin of the carpus occupies a median position instead of being near the distal extremity as in both species with which this has been compared.

Chlorodius Fisheri Lockington, l. c., Sept. 4, 1876.

This species is probably new, but as the specimens are somewhat mutilated we cannot positively say. It differs considerably from Stimpson's short diagnosis of *C. occidentalis*.

Pilumnus lunatus Edw. et Lucas, D'Orbigny, Voy. dans l'Amer. Meridionale, Crust., 20, pl. IX, f. 2; Stimpson, Ann. Lyc., vii, 216.

Heteractaea pilosus Lockington, l. c., Sept. 4, 1876.

The single specimen we have agrees with the short de-

scription given by Stimpson, but we have not had access to the work of Edwards & Lucas.

Pilumnus spino-hirsutus Streets & Kingsley. *Acanthus spino-hirsutus* Lockington, l. c., Feb. 7 and Sept. 4, 1876.

This species is plainly a *Pilumnus* and contrary to the description given by Mr. Lockington of his proposed "new genus" the pre-labial ridge is quite plain.

Callinectes bellicosus Ordway, Jour. Boston Soc'y Nat. Hist., vii, p. 577.
Lupa bellicosa (Sloat MS.) Stm., Ann. Lyc., vii, 57; Lockington, l. c., Sept. 4, 1876.

The specimen sent, a male, agrees well with the various descriptions quoted above.

Achelous panamensis? Stimpson, Annals Lyc., x, 112. *Amphitrite paucispinis* Lockington, l. c., Sept. 4, 1876.

The specimen sent agrees well with Stimpson's description, except in having no spine on the meros joint of posterior feet. There is in this form a spine on the upper margin of the propodus of the first pair, as in *Achelous Gibbesii*, two-thirds the distance from the base to the articulation of the dactylus. Stimpson makes no mention of such spine. The proportions of length to breadth are closely similar. Stimpson gives it as 1:1.87. In this case it is 1:1.82.

Pinnixa longipes Streets & Kingsley. *Tubicola longipes* Lockington, l. c., Apr. 17, 1876.

This is a *Pinnixa*, but differs from the only species (*P. faba* Stm.) hitherto described from the Pacific coast in the greater breadth of the carapax. Mr. Lockington speaks of this as the only case known of a crustacean being commensal with an annelid, but Stimpson (Annals N. Y. Lyceum, vii, 68 and 236) reports similar habits of *Pinnixa chaetoptera* and *P. cylindrica*.

Crangon nigricauda Stm., Proc. Cal. Acad., i, 89; Jour. Bost. Soc., vi, 496. *Crangon vulgaris* Owen, Zool. Beechey's Voyage, p. 87; Dana, U. S. Ex. Ex. Crust., i, 536. *Crangon nigromaculata* Lockington, l. c., Feb. 7, 1876.

Nothing but a color variety of *C. nigricauda*.

In addition we have received types of the four following species, but reserve them for further study: *Mithraculus triangulatus*, *Xantho novem-dentatus*, *Xanthodes? angustus*, and *Xanthodes leucomanus*.

In the five papers by Mr. Lockington, quoted above, he describes fifty-eight supposed new species and institutes eight new genera. His *Libinia setosa* is a valid species and has since been redescribed in "Bulletin No. 7" of the National Museum by Dr. Streets as *L. semizonale*. Mr. Lockington's name, however, will hold. *Idotea pulchra* Lockington, is, we are informed by the describer, *I. bicuspidata* Owen. *Idotea marmorata* Packard (Memoirs of the Boston Society, Vol. i, p. 296, pl. viii, f. 6) also appears to be the same.

Concerning the other species described by Mr. Lockington, we have nothing to say. Only by a study of his types can one be sure of what species he had before him. His work, as will be seen by our review of the few of his types that have come under examination, has been extremely careless and untrustworthy. With so little access to the literature of the subject, he should not have attempted systematic work.

FIELD MEETING AT LANESVILLE, WEDNESDAY,
JULY 18, 1877.

THE second field meeting the present season was held at Lanesville, a precinct in Gloucester, this day. The place of gathering was at the Congregational Church, which was placed at the disposal of the Institute for the day.

The afternoon session was commenced at 2 P. M. The PRESIDENT in the chair. Records of preceding meeting read.

The PRESIDENT remarked briefly on the former meetings held in Gloucester, and of the interest manifested in the objects of the Society by the people of the place, speaking particularly of the late Rev. S. Barden, the minister of Rockport, and an indefatigable student of the mineralogy and geology of this section of the county.

Mr. JAMES H. EMERTON, who during the forenoon had, with the party under his direction, found many specimens of marine animals, and had arranged them on the tables, explained the structure and habits of several of the species, illustrating his remarks by blackboard drawings. He also showed by the microscope, after the adjournment of the meeting, the eggs of the Monk fish (*Lophius*), and the worms (*Spirorbis*) which make the spiral shells on sea weed.

Mr. CHARLES H. SARGENT, of Gloucester, exhibited several specimens of minerals which he had found while making a survey near by. He gave the localities where found and other information.

Rev. FIELDER ISRAEL, of Salem, and Rev. BYRON G. RUSSELL, of Rockport, spoke briefly in regard to the ob-

jects of these meetings and the benefits accruing therefrom. Mr. Russell expressed the hope that the Institute would hold another meeting in Rockport at an early day ; he said that the people would extend a cordial welcome.

Mr. GRANVILLE P. PUTNAM, of Boston, a summer resident at the Cape, mentioned some of the minerals he had found in his rambles. He also spoke of the algæ of the Cape, and was followed by Mr. JOHN ROBINSON, who continued the subject of the marine plants, alluding particularly to the fructification and growth of the common algæ.

Prof. EDWARD HITCHCOCK, of Amherst, explained some of the Indian relics which were brought in for examination, and made some interesting remarks upon the habits of the aborigines.

Mr. D. B. HAGAR, of Salem, said that one of the chief objects of an Essex Institute field meeting was to awaken a local interest in natural history, and that wherever such a meeting was held, the people of the place ought to get new ideas, and that any man or woman, boy or girl, might, by giving attention to the subject, be the means of starting a Natural History Society. Mr. Hagar spoke in complimentary terms of the hospitality of the Lanesville people who had furnished such ample refreshments, and offered the following vote :

Voted, That the very cordial thanks of the Essex Institute are hereby tendered to Mr. George Barker, Rev. Mr. Toulman, Mr. Lane and other gentlemen of the place, and to the ladies who had arranged so nicely the dinner of the day ; also to the proprietors of the Congregational Church for the use of the church and chapel for the various exercises of the day.

The vote was unanimously adopted.

CONTRIBUTIONS TO THE MYOLOGY OF TACHYGLOSSA
HYSTRIX, ECHIDNA HYSTRIX (AUCT.).

BY J. W. FEWKES, PH.D.

I HAVE enjoyed the opportunity of dissecting a single specimen of that rare and highly interesting mammal, *Tachyglossa hystricæ*. The specimen was given to me by the Museum of Comparative Zoology at Cambridge. Especial attention has been paid in this dissection to the myology of the head and neck, as it is my impression that the descriptions of the muscles of these parts by others are more or less unsatisfactory. I add a more detailed account than has yet appeared of the more important deeper layers of that complex cutaneous muscle, the Panniculus carnosus. A description of these muscles is all the more interesting, considering that they play such an important part in the movements of the fore-leg.

To this is added a new interpretation of certain muscles of the fore and hind limbs, and a description of muscles of the tail, and digits of the fore and hind legs, which appear to have been thus far unnoticed.

MUSCLES OF THE HEAD.

The descriptions which we have of the muscles of the head of this abnormal animal are very meagre and few in number. The work of Duvernoy, "De la langue considérée, comme organe de prehension, &c." (Mem. de la Société d'Hist. Nat. de Strasbourg, 1830), seems to be the first attempt to figure and describe the muscles of the

head and tongue of this animal. This author gives three figures of the tongue, and the lingual muscles, but does not make mention of other important muscles of the head, as those of the jaw, the Masseter, the Pterygoid, Temporal and the Digastric.

From the similarity in function of the tongue, in the Ant Eater and Tachyglossa, it would be a cause of wonder if the myology of the head of the Ant Eater by Owen did not prove of the greatest value. Although the difference in systematic position between these two animals is great, the muscles of the tongue, at least, are in many respects quite alike.

In the valuable paper on the Myology of the Echidna *Hystrix* by St. George Mivart (Trans. Linn. Soc., 1866), the muscles of the head and neck were only in part described. The specimen, from which the dissection was made, had its head destroyed in a trap, and on this account he failed to make out the myology of these parts.

From the character of the mouth and face of Tachyglossa, we should expect that the muscles of these parts of the head would be wanting or very slightly developed. I have been unable to discover any trace of the different facial muscles, Orbicularis Oris, Depressor Angulis Oris, Zygomaticus Major and Minor. In the tough skin, which covers most of the bill, in advance of the orbital foramen, there are muscular fibers, which may represent these, and other facial muscles. To determine their homologies, however, would be a very difficult task.

The muscles of the jaw are the Temporalis, the Masseter, Pterygoideus Externus, and Pterygoideus Internus. To these may be added a Digastricus, which, like the same muscle in many other forms, passes directly from its origin to its insertion, without passing under the slip at the hyoid bone.

M. Temporalis.

This is small and fan-shaped, and arises from the whole inner surface of the posterior part of the orbital foramen. It is inserted into the coronoid process of the lower maxillary bone. The front margin of this muscle may be seen through the orbital foramen, just back of the eye. The insertion at that part of the jaw, which corresponds to the coronoid process, is directly above that of the most superficial slip of the Myloglossus. The length of the muscle is about 10 . Its function is similar to that of the Temporalis in human anatomy.

M. Masseter.

The Masseter is a small muscle of almost quadrangular shape, with a muscular origin and insertion. Its anterior margin is slightly shorter than its posterior, which lies directly under the curved tube of the ear (meatus auditorius externus) and the distal portion of the Sternomastoideus. The muscle arises from what corresponds to the lower edge of a zygomatic process. This origin begins about half an inch in advance of the anterior edge of the orbital foramen, and extends directly backward for about an inch. It is inserted into a curved line corresponding with a sigmoid notch, extending from the coronoid process to the angle of the jaw. The length of the insertion is about the same as the length of the origin.

There are two Pterygoid muscles, which are well marked, corresponding with the Pterygoideus Externus and Pterygoideus Internus.

M. Pterygoideus Externus.

The Pterygoideus Externus is a larger muscle than

those of the head, which has been already mentioned. When the Temporalis is removed, the Pterygoideus Externus at its upper part is plainly to be seen through the orbital foramen. This is brought about by the fact that the muscle extends forward, from its insertion to its origin, under the Temporalis.

The Pterygoideus Externus arises from a ridge on the orbital foramen, just posterior to the orbit of the eye, and beneath the Temporalis. It is inserted into the anterior part of that portion of the condyle, where a little projection is formed for that purpose, and also the whole internal surface of the condyle of the jaw. This latter part of the insertion is muscular, while the former is tendinous. The origin throughout is by muscular fibers.

M. Pterygoideus Internus.

The Pterygoideus Internus is of a quadrate form, and shorter than the Pterygoideus Externus. It has both origin and insertion by muscular fibers. It arises in advance of the origin of the Pterygoideus Externus, from the walls of the skull. It is inserted into the inner side of the lower maxillary bone, opposite the insertion of the Masseter, extending from the angle of the jaw, to the point directly under the coronoid process.

M. Digastricus.

The homologue of the Digastricus is very well shown on a superficial dissection. It arises from the temporal bone, directly in front of the opening of the meatus auditorius externus, on the under side of the skull. Its origin is by muscular fibres. From its origin it extends to its insertion on the posterior aspect of the angle of the jaw, posterior to the ridge, upon which the Masseter finds

its insertion. The action of the muscle is to draw the lower jaw backward, and perhaps to open the mouth by the short lever, whose length is the interval between its insertion and the glenoid fossa. There is considerable doubt whether this muscle can be the homologue of the Digastricus.

The muscles of the tongue are very complicated, and of great size. This fact is directly connected with the varied movements which the tongue has, together with the probable motion of a peculiar structure at its base. The posterior part of the tongue is armed with rows of teeth-like bodies, which also appear on the roof of the mouth above. Their function may be to clear the tongue of the insects which adhere to it, or in a measure to bruise the food before it passes into the oesophagus.

M. Sterno-glossus Superior.

The two Sterno-glossi are the most abnormal of all the muscles of Tachyglossa. When the neck of the animal is opened from the side, there appears a round muscle of about the size of a pipe-stem, which is easily confounded with the oesophagus. This round muscle is composed of the Sterno-glossus Superior and Inferior united together. The Sterno-glossus Superior arises on the under side of the Sternum, and its fibres are continued into the tongue, forming, with its fellow, the interior of that organ. Before it is prolonged into the tongue it is crossed by layers of flat muscles, which extend over it, in front of the posterior portion of the tongue. There is no tendinous part to this muscle. Its width is uniform and about 5^{mm}. Its length from the origin to the base of the tongue is 70^{mm}. The action of the muscle is to draw back the long tongue. The muscular fibres, binding it down at the base of the

tongue, change the action in a way which will be explained further on.

M. Sterno-glossus Inferior.

This muscle acts together with the Sterno-glossus Superior. They both also unite to form the round muscle mentioned above. It arises with the Sterno-glossus Superior, from the under side of the sternum, and is inserted into the base of the posterior part of the tongue. It is very small, with numerous slips of insertion. A slip from the muscle, or a small one bound up with it and the Sterno-glossus Superior, becomes a separate muscle, passing from the larynx to the tongue, and may be known as a Laryngoglossus.

M. Myloglossus.

The Myloglossus is a very complicated muscle and may conveniently be divided into two parts. The first and most superficial part is very thin and arises from the raphé in the middle line, midway between the rami of the lower jaw.

The origin from the raphé is of course connected with the deeper parts of the Myloglossus. The superficial portion is inserted into the lower maxillary bone, just below the Coronoid process, by means of a small tendon. This part of the muscle is fan shaped. A second part of the Myloglossus is much larger, and more important than the one already mentioned. It arises from a common raphé, with its fellow of the opposite side, along the mid-line of the throat, together with an M. Annulus Inferior. It is inserted upon the under side of the skull, in a line extending from the anterior portion of a styloid region, to a point under the angle of the jaw. The length of the attachment to the skull is 20^{mm}. In addition to these two parts of the

Myloglossus there is posterior to them all, a muscle quite distinct, which may be a portion of the Myloglossus. I have, however, described it as an M. Stylo-glossus.

The function of the Myloglossus muscle is to combine with the annular muscle, yet to be mentioned, in pressing the posterior part of the tongue, against the roof of the mouth. The Myloglossus is mentioned by Duvernoy as a Mylohyoid.

M. Stylo-glossus.

Intimately connected with the M. Myloglossus, more especially with its deeper and larger portion, is a Styloglossus. It forms a distinct muscle from the preceding. It arises from the stylo-hyal cartilage at its upper and proximal end; and forms with its fellow of the opposite side, a loop extending to its insertion, in a median raphé behind the Myloglossus, and, superficial to it.

Near its origin it is tendinous. It broadens and flattens as it nears its insertion. Its origin is just back of the ear tube (meatus auditorius externus) above the origin of the Stylo-hyoideus. The length is about 35^{mm}. The function of this muscle is, in part to press the posterior portion of the tongue against the roof of the mouth. In that it acts with the Myloglossus; it may also serve to draw the whole dental portion of the tongue backward, combining its function with that of the Sterno-glossus. It is then an opponent of the Genio-glossi Postici, and the Genio-glossi.

M. Annulus Inferior.

The Myloglossus and Styloglossus act as circular muscles of the throat. Just below the Myloglossus we find a second circular muscle, the Annulus Inferior. This is a broad, thin muscle arising from the raphé, in connection with the more superficially placed muscles, and embracing

the Sterno-glossus. It is inserted by a strong attachment, forming the back of the tongue. In front of the hyoid bone, the muscle has a loose, membranous portion, which in advance of the stylo-hyal forms a part of the back of the mouth. The object of this muscle, is to press the base of the tongue against the roof of the mouth.

It also may, by binding against the Sterno-glossus, form a firm attachment for the Sterno-glossus, on the posterior part of the tongue. The Sterno-glossus may then act to draw this part of the tongue backward. When the base of the tongue is brought against the roof of the mouth, the Genio-glossi and the Sterno-glossi act in different directions, drawing the tongue back and forth.

M. Annulus Intimus.

A second circular muscle below the Annulus Inferior binds down the Sterno-glossus to the Pharyngo-glossus. It appears to be simply a continuation and enlargement of the proper circular muscles of the tongue. It has an origin from the lateral aspect of the back of the tongue, and also from the base and median, ventral line. It forms a loop, through which the Sterno-glossus acts, firmly binding it in place.

Three pair of muscles serve to draw that portion of the base of the tongue, which is armed with teeth, forward. They belong to the same layer as the Genio-glossi, and the lower seems to be continued into them. Of these three muscles one is inserted into the outer side of the base of the tongue, above the Annulus Intimus. Two also are situated on the inner side of the origin of the same muscle.

To these muscles, I give the names M. Genio-glossus, Posticus Externus, and M. Genio-glossus Posticus Internus.

Below the last mentioned muscle, there is a continuation

of the Genio-glossus, inserted on the inner side of the Sterno-glossus, above the Annulus Intimus.

M. Genio-glossus Posticus Externus.

This is a small muscle without tendons, and has an origin a little in advance of a line drawn from the anterior border of one orbital foramen, to the other. It originates from the Genio-glossus, and in part from the inner edge of the lower jaw, with the M. Genio-glossus Posticus Internus. It is inserted into the outer side of the base of the tongue, at its posterior margin, and just above the outer part of the Annulus Intimus.

M. Genio-glossus Posticus Internus.

This muscle is thinner than the Genio-glossus Posticus Externus. It arises from the same place, but is inserted upon the inner side of the Sterno-glossus in a medial position, just above the Annulus Internus at its inner origin. It lies superficially to the Genio-glossus. Both the Genio-glossi Postici blend so intimately at their origins, that they may both be simply a part of the true Genio-glossus.

M. Rectus Capitis Posticus Major.

This is a very small muscle, which arises from the anterior extremity of the spinous process of the axis, and is inserted into that position of the skull, which corresponds to the inferior curved line of the human occiput. The insertion is more or less tendinous. The muscle does not broaden as it nears its insertion, but its width throughout is about the same. It lies in a groove between the Rectus Capitis Posticus Minor, and the Obliquus Superior.

M. Rectus Capitis Posticus Minor.

This muscle is much larger and broader than the Rectus Capitis Posticus Major. As in the human subject, it lies in the triangle between the Rectus Capitis Posticus Major, and the midline of the neck. It is a broad flat muscle, with origin and insertion muscular. It has a curved origin from the posterior rim of the atlas, and is inserted into the occiput in a curved ridge, just back of, and below the insertion of the Splenius. It is relatively much larger, when compared with the Rectus Capitis Posticus Major, than it is in man.

The Rectus Capitis Posticus Major is very small and, except from its apparent homology to this muscle, does not merit the name which has been applied to it.

M. Obliquus Capitis Inferior.

This muscle is large and of irregular trapezoidal form. It has a muscular origin from the side of the spine of the axis, throughout its entire length, and also from the spine of the third cervical vertebra. Its insertion is also muscular into the lateral process, along its whole length, and opposite the origin of the Obliquus Superior.

M. Obliquus Capitis Superior.

This muscle is smaller than the M. Obliquus Inferior. It has a muscular origin from the transverse process of the atlas, and is inserted just behind and above the opening of the Meatus Auditorius Externus into the skull. This insertion is just above that of the M. Rectus Capitis Anticus Minor. Mivart says, "The Rectus Capitis Posticus Major and Minor, as well as the Obliquus Capitis Superior and Inferior are all normal, but the Obliquus Supe-

rior is large, thick and strong," If I am not mistaken, the Superior and Inferior Obliquus are not normal, and the Superior Oblique, I should not designate as large, thick and strong.

MUSCLES OF THE NECK.

M. Sterno-Mastoideus.

The Sterno-mastoideus is a long muscle of uniform size, nowhere of any great width. It arises, with its fellow, on the midline of the outer surface of the manubrium. It is inserted by a flat tendon, into the side of the skull, in what may correspond to a mastoidal region. Its length is about four inches, and its width about one half an inch.

Owen says that in the *Ornithorhynchus* it is a double muscle on both sides, one portion being superficial to another, deeper seated part.

Each portion arises separately from the episternum and is separately inserted into the mastoid region.

In *Tachyglossa* I find no such condition nor does Mivart make mention of it in the specimen which he dissected.

M. Sterno-hyoideus.

I think that the *M. Sterno-hyoideus* and *M. Sterno-thyroideus* may have been confounded by Mivart with the *M. Sterno-glossus*, which is one of the most marked muscles of the neck, and intimately connected with these two. Such a mistake would be a very natural one, if the insertions were destroyed, as they must have been in the specimen, which he dissected. He says the Sterno-hyoid is continued up, under the larynx, and appears to be continued on, into the *Hypoglossus* as in *Ornithorhynchus*. I

am also inclined to doubt such a condition, and it seems highly probable to me that the Hypoglossus is in reality a muscle, which I describe as *M. Myloglossus*, not following in that respect, Duvernoy, who calls it a Mylohyoid.

M. Stylohyoideus.

A *Stylohyoideus* muscle is largely developed. It arises just behind the base of the tube of the meatus auditorius externus, by means of a tendon, and spreads out forming a flat muscle on the median line of the neck. Along the median line there is a slight groove and raphé. In its anterior portion, the muscle is simply joined, with its fellow of the opposite side. Farther back it is joined to the hyoid bone itself.

M. Stylothyroideus.

The *Stylothyroideus* is a small, delicate muscle, which arises from the stylohyal bone and runs down back of and parallel with the stylohyal and epihyal, and is inserted into the thyrohyal on its posterior and upper border. This insertion is tendinous. The origin from the stylohyal is muscular. The length of the muscle is 17^{mm}.

M. Hyothyroideus.

A broad flat hyothyroid muscle, of quadrangular shape arises from the posterior edge of the thyrohyal and the epihyal, and is inserted into the thyrohyal along the projection extending obliquely from the process, above the insertion of the *Stylothyroid* muscle. It is from 8–10^{mm}. long, and 6^{mm}. broad.

M. Genio-hyoideus.

The *Genio-hyoid* is well marked and answers the de-

scription given by Duvernoy. It is seen upon turning back the Mylohyoideus or Myloglossus, and the Annulus Inferior. It runs along above the Genio-glossus and is inserted into the hyoid bone.

M. Genio-glossus.

The Genio-glossus proper, or, as it might be known in comparison with the Genio-glossus Posticus, the Genio-glossus Anticus, has an extensive origin along the inner edge of the ramus of the lower jaw, from the Genio-glossus Posticus to within a short distance of the symphysis of the jaw. The muscular anterior part of the origin ends at a point 35^{mm}. distance from the tip of the snout. The muscle also has a firm attachment to the thick membrane which forms the floor of the mouth, and is attached firmly to a large muscle that lies underneath it and in the interval between the tongue and the lower maxillary bone, from a little in advance of the condyle, to the end of the jaw. The Genio-glossus is inserted into the median raphe of the posterior part of the tongue, below the broad insertion of the Genio-glossus Posticus Interus. The general shape of the Genio-glossus is that of a very obtuse angled triangle, whose larger angle is at a point of its insertion into the inner side of the lower maxillæ, under the origin of what I have named a Genio-glossus Posticus Interus, about 10^{mm}. in advance of the coronoid process of the lower jaw.

Mm. Splenius Capitis et Splenius Colli (?).

The muscle which I identify as a Splenius Capitis is in two parts, one superficial to the other, but so distinct are they, that we might call them Splenius Capitis Inferior and Superior. The most superficial arises from the lat-

eral parts of the fourth to the seventh cervical vertebræ, and in part by fibres from the first dorsal vertebræ. Another origin is tendinous from the midline of the neck upon muscular fibres of the other side, and not from the processes of the cervical vertebræ. This portion combines with the other origin and is inserted by a broad aponeurosis on the occiput on a line above the insertion of the Trachelo Mastoid, extending forward obliquely to the middle line of the top of the skull. The fibrous insertion gets shorter and shorter, and on the medial line of the head it becomes muscular.

M. Splenius Capitus Inferior (?).

Just below the preceding we find another large, flat muscle which may be a part of the Splenius Capitis, or a new muscle, Splenius Capitis Inferior.

It arises from the median dorsal process of the axis, and is inserted directly below by a muscular and somewhat tendinous insertion into the occiput, from the median line to the neighborhood of the insertion of the Trachelomastoid, and a little behind it. Both muscles are large, thin and well marked.

M. Laryngoglossus Superior.

The Laryngo-glossus Superior forms the back part of the muscular mass just in advance of the hyoid bone (base hyal, epi hyal) and also of the larynx. It extends from the back of the base of the tongue to the larynx. Its origin is intimately blended with that of the Laryngoglossus Inferior. The length of the muscle is about 20^{mm}.

Laryngo-glossus Inferior.

This muscle lies inside of the Laryngo-glossus Supe-

rior and just posterior to the Sterno-glossus Superior; it is very easily seen when the neck is opened from the ventral side. A thin superficial muscular layer covers more or less of the inner part of the head between the rami of the lower jaw and the front of the insertion of the Sterno hyoid. It is inserted on the inner side of the lower jaw below the insertion of the Temporal and in advance of the Masseter.

DEEPER MUSCLES OF THE PANNICULUS CARNOSUS.

The whole back and sides of the animal are covered with a thick cutaneous muscular mass, in which are embedded the spines. This is known as the Panniculus Carnosus. Its fibres are inserted into the bases of the spines, and by this means the spines, are elevated or depressed. The Panniculus is firmly united with the skin, and is thickest upon the sides of the body. As it approaches the head and extremities the Panniculus becomes much thinner, and the direction of the muscular fibres more uniform. The Panniculus is firmly attached to the head and ulna. Passing from the inner surface of the Panniculus Carnosus to different parts of the fore-leg and neck, we find certain deeper portions of the muscle, which I have deemed worthy of a description, and name.

M. Dermo Dorsi Cervicalis.

The Dermo Dorsi Cervicalis is a long thin muscle, forming, with its fellow of the opposite side, an irregular ellipse upon the back. Its breadth is not uniform; its posterior and anterior ends are broader than the middle portion. The muscle arises from the eighth, ninth and tenth vertebræ and ribs, and from the Aponeurosis of the posterior trapezius. The origin of the fibres nearest the

midline of the back, is about 20^{mm}. from a median line, and is by a slip which is joined to the eleventh rib.

The muscle is inserted into the Panniculus Carnosus of the neck, spreading into a fan-shaped portion and also united with its fellow of the opposite side.

Fibres of this insertion run down on the sides of the neck. The width of the Dermo Dorsi Cervicalis is about 20^{mm}. Its length is 150^{mm}.

This Dermo Dorsi Cervicalis is probably homologous with those concentric fasciculi of muscles, which Owen mentions in *Erinaceus*, and have the same function, only more limited in nature.

M. Dermo Flexor Antebrachii.

The muscle which Mivart identifies as the posterior part of the Latissimus Dorsi, I consider as simply one of those deeper layers of the skin muscle.

I do this, because, although its origin is the same, or nearly the same as that of the Latissimus of man, its insertion is very different. Moreover at its upper edge it is slightly separated from the anterior part of the Latissimus, by the Dermo Dorsi Cervicalis already mentioned. This muscle is of a triangular shape and quite long. It arises by digitations from the eighth to the thirteenth rib, and is inserted along the Antibrachium, where it unites with the Flexor Carpi Ulnaris. The function of this muscle is to help flex the fore-leg, and is thus an opponent of certain other cutaneous muscles to be described. These muscles which act as flexors of the fore-leg, are necessarily large, considering the fossorial habits of *Tachyglossa*.

M. Dermo Brachialis Anterior.

This acts with the Dermo Flexor Antebrachii as a flexor

of the leg. It is quite conspicuous on a superficial dissection, at its dermal end, lying above the insertion of the Dermo Flexor Antebrachii.

The muscle is fanshaped and has the wider part at its dermal origin. It is inserted into the greater tuberosity of the humerus above the insertion of the Pectoralis Major. The width of this muscle is 15^{mm}.

M. Dermo Brachialis Posterior.

This muscle is smaller than the former, and arises lower down, on the under side of the Panniculus Carnosus. It has the same insertion as the Dermo Brachialis Anterior. The width of this muscle is about 10^{mm}. The insertions of both these muscles are tendinous. Their function may be the same as that of the Latissimus Dorsi, or perhaps they may help in the flexion of the fore-leg.

In addition to these two larger dermal muscles, which I have called Dermo Brachialis Anterior and Posterior, there are others situated very near them well marked, and two in number, with an origin from the Panniculus Carnosus and an insertion, with the common insertion of the Panniculus Carnosus, into the fore-leg. These lie just below and behind the Dermo Brachialis Posterior.

The extensors of the fore-leg, opponents of the Dermo Flexor Antebrachii, are Dermo Extensor Brachialis Intimus, Inferior, and Superior. These three muscles lie one above the other. They arise from the sides of the neck, along the inner surface of the Panniculus Carnosus, and extending downward, are inserted along the ulna, the bones of the wrist and the Panniculus which covers them. These muscles are all of about the same size, 10^{mm}. wide and 100^{mm}. long. The lowest is the longest; its fanshaped insertion into the Panniculus, extends under the Dermo Dorsi Cervicalis, and much higher than the others

in the neck, even to the median line. The deepest of the dermal extensors of the fore-leg, is the Dermo Extensor Brachialis Intimus.

Above it, having a common insertion into the fore-arm and an origin below the Dermo Extensor Brachialis Intimus, about 15^{mm}. distance, are muscular fibres distinct from the former. They form a flat muscle of about the same width as, and shorter than the Dermo Extensor Brachialis Intimus. It may be called the Dermo Extensor Brachialis Inferior. Above this there is a third extensor, shorter and broader than the others. Its origin extends up under that of the Dermo Extensor Brachialis Inferior, and it has a common insertion with the last mentioned muscle, and may be known as the M. Dermo Extensor Brachialis Superior. It is the most superficial of all the layers of the skin muscles which act as extensors of the fore-limb. Above it, however, the direction of the muscular fibres of the Panniculus is the same as that of the muscles already described.

M. Dermo Cervicis Triangularis.

This muscle is of a broad, thin, triangular shape, and connected at its insertion with the Dermo Extensor Brachialis. It arises from the midline of the back, above the anterior part of the Trapezius, and joins its fellow of the opposite side. Its connection over the neck is by means of a thin aponeurosis. It is inserted along with the other dermal muscles of the fore-limb, into the front edge of the ulna. The longitudinal muscle of the Panniculus, which covers the fore-arm, has the same insertion. From it a well marked slip can be separated having an insertion into the Panniculus, alongside another muscle which extends over the external tube of the ear. Its position is such that it is easily confounded with the muscles of the

ear. All the deeper muscles of the Panniculus Carnosus are quite large, and easily to be seen when the great superficial covering of the animal is removed. On the hind-leg there is a muscle, which, from its similarity to the M. Dermo Flexor Antebrachii, both in its origin and insertion, I have considered as a skin muscle. It is described by Mivart as a M. Gluteus Maximus. I have called it the Dermo Flexor Cruris.

M. Dermo Flexor Cruris.

This is quite a large, broad, and elongated muscle, which arises from the aponeurosis, connected with the sacral and last coccygeal vertebræ. Its posterior margin is united with the under surface of the Panniculus Carnosus. The muscle passes downward, narrows and thickens, and ends in a broad, flat tendon, which is inserted into the lower part of the posterior surface of the tibia, on the peroneal aspect, and also into the anterior portion of the same, where it blends more or less with the Tibialis Anticus, and other muscles of the leg.

The similarity of this insertion to that of the Dermo Flexor Antebrachii into the ulna, is very marked. In a part of the origin, too, it resembles the cutaneous muscle of the fore-leg, since both arise from the Panniculus; the one wholly, the other in part. The muscle which Mivart calls the Gluteus Medius, I think may be better known as the Gluteus Maximus. He even indicates that this muscle, the Gluteus Medius, may be a part of the muscle which he calls the Gluteus Maximus, and which I consider a cutaneous muscle and name the Dermo Flexor Cruris. It certainly has many resemblances to the Gluteus Maximus, and if I am right in my interpretation of the muscle which lies partly above it, the Dermo Flexor Cruris, is the homologue of the Gluteus Maximus. If, as Mivart

suggests, that is the case, the muscle described by him as a *Gluteus Minimus* is in reality a *Gluteus Medius* and *Minimus* combined. I think there is every evidence that such is the case.

My dissection of the manus of *Tachyglossa* differs considerably from that which Mivart describes and figures. In the first place, he states, that of the five smaller tendons, formed by a division of the great tendon of the *Flexor Communis Digitorum*, all, with the exception of that to the thumb, are bound down by a ligament.

In the specimen which I dissected, the tendon of the pollex passed under a ligament, similar to that of the other digits. The *Abductor Pollicis*, which Mivart describes as "Some muscular fibres" which "arise from the *Trapezius*, and are inserted into the radial side of the *Pollex*," was in my specimen a well developed muscle.

M. Flexor Brevis Pollicis.

A well developed muscle of uniform size, represents in function a *Flexor Brevis Pollicis*. It arises from the combined flexor of the wrist (*Flexor Communis Digitorum*), on the radial side of the flexor tendon of the pollex. It separates from this tendon, passes parallel with it, and is inserted into the radial side of the pollex, proximally placed to the insertion of the tendon of the pollex, which comes from the *Flexor Communis Digitorum*. Its origin from the tendon of the *Flexor Communis Digitorum*, recalls to mind the origin of the same muscle in human anatomy, from the annular ligament.

M. Flexor Brevis Digitorum.

The *Flexor Brevis Digitorum* is represented by a small muscle below the plantar fascia. It arises from a bone

which corresponds wholly or in part to an os calcis, and divides into four parts. The first of these divisions of the Flexor Brevis Digitorum is inserted on the hallux side of the distal end of the metatarsal of the index finger. The second is inserted on the hallux side of the distal part of the metatarsal bone of the second finger, and the third and fourth slips are inserted on both sides of the distal extremity of the metatarsal bone of the third finger. A small slip also goes to the little finger, and is inserted on the hallux side.

**M. Flexor Brevis Minimi Digiti and Abductor
Minimi Digiti.**

A comparatively large mass of muscular fibres which, perhaps, represents these muscles, arises from the tarsal bone of the tibial side of the leg and is inserted into the peroneal side of the digit of the little finger.

Mm. Lumbricales.

Mivart found only four Lumbricales in the manus; one pair arising between the flexor tendons of the index and middle digits, and going to the contiguous surfaces of those digits; another pair arising between the flexor tendons of the middle and fourth digits, and passing to the contiguous surface of those digits. In addition to these four there were in my specimen, two more arising from the under side of the common tendon, between the flexors of the fourth and fifth digits, and inserted into the contiguous sides of those digits. These three pair of Lumbricales can best be found, by cutting the common flexor tendon at the wrist, about an inch from the division into five tendons, and turning the divided tendon backward over the digits.

By carefully dissecting out the Lumbricales, they may be found, each pair with an origin on the under side at the point of bifurcation of the tendons, to the appropriate digits. Their size is uniform.

Mm. Interossei.

The results of my dissection of these muscles differ from those obtained by Mivart. Two small muscles arise from the thick tendon of the Flexor Carpi Radialis, and pass to each side of the distal phalanx of the pollex. They are inserted by small tendons; one on the radial and the other on the opposite side of the phalanx. Two muscles very much resembling these, but larger, arise from the base of the metacarpal bone of the index, and are inserted in a similar manner to the former, into the distal phalanx of the index. These insertions are also by small tendons on the radial, and opposite surface of the index. Another pair, differing from the preceding, by being more widely separated, and not at all connected at the base, as in the case of those of the index and pollex, arise from below the os magnum, and have an insertion into the distal phalanx of the third digit. A small interosseous muscle arises on the radial side of a strong tendon, passing obliquely across the palmar region of the manus. It is inserted into the radial surface of the distal phalanx, of the fourth digit. The oblique tendon, near which, this interosseous muscle lies, is a continuation of the Flexor Carpi Ulnaris.

Mivart mentions another interosseous muscle of the fourth digit which I have been unable to make out. As it lies directly under the pair of Lumbricales, which he missed in his dissection, or at least has not described, I suggest that he mistook a Lumbricalis, for an Interosseous muscle. Situated superficially to the great tendon of the

Flexor Communis Digitorum, there is a small bundle of muscular fibres, not mentioned by Mivart, which I am inclined to look upon as an anomaly. It arises from the surface of the common tendon, a short distance before its division, and passes downward between the tendons of the index and middle digits where its insertion is lost in connective tissue and could not be made out by me.

M. Teres Minor.

Mivart says this muscle appears to be wanting, unless represented by a portion of the Deltoid. I find it well represented in a short thick muscle, which arises from the outer surface of the scapula, just at its base and above the glenoid cavity. This origin is by muscular fibres. It is inserted into the whole surface of the humerus, between the insertion of the Teres Major, the ridge running down from the lesser tuberosity of the humerus, and the head of the humerus itself.

M. Levator Cloacæ.

A small, thin muscle passes from the under side of the cloaca, to the transverse processes of the coccyx. It arises just back of the ischium and above the origin of the Ischio Coccygeus, and passes downward and joins its fellow of the opposite side, just behind the base of the clitoris. Its function appears to be to raise the cloaca, which is about an inch in diameter and runs parallel with the caudal vertebræ, and beneath them.

M. Ischio Coccygeus Anterior.

Just in advance of the Ischio Coccygeus, we find a well marked muscle, more or less tendinous at its insertion, and muscular at its origin.

It arises from the transverse processes of the coccyx just in advance of the Ischio Coccygeus, and is inserted on the upper edge of the pelvis, on the posterior upper edge of the base of the circular ridge, which encloses and forms the acetabulum.

The Rectus Capitis Articus Major, and the Rectus Capitis Articus Minor, the Scalenus, the Complex and the anterior part of the Trapezius have all been correctly described by Mivart. The same is true also of the Trachelo-mastoid.

Constrictors of the œsophagus are well developed. Two of these are well marked.

M. Constrictor Superior.

This constrictor is the largest of all. It is a broad, flat muscle, which arises from the whole length of the hyal bones above the thyrohyal. The muscle is inserted into a median raphé along the front of the neck. Intimately connected with this Constrictor Superior is a flat muscle, which from its position and character, I have identified as a Stylo-pharyngeal. It arises by a broad origin above the Superior Constrictor, *i. e.*, between this muscle and the neck, and is inserted into the median raphé blending with the same constrictor. The Superior Constrictor may thus be regarded as representing both the Superior and Inferior of Anthropotomy. Another constrictor of the œsophageal region arises from the thyroid cartilage, just above a Crico thyroid, and is inserted into the median tendinous raphé of the back of the œsophagus. It is smaller than the Superior which has been already mentioned.

Still lower down, below this constrictor, we have a small muscle which arises from the same tendinous raphé of the œsophagus, and extends downward under the pos-

terior lateral projections of the thyroid cartilage, and is inserted into the cricoid cartilage. This muscle is probably a portion of the lower constrictor, with a very different insertion.

MUSCLES OF THE EAR.

The external Meatus of the ear is a long tube composed of numerous rings resembling very much the rings of the tracheæ. It ends in large flat cartilaginous plate or pinna. The pinna is moved by cutaneous muscles. One of the best marked of the cutaneous muscles of the ear arises from the inner surface of the Panniculus, under the Dermo Extensor Brachialis, and extending forward, passes under the flat pinna of the ear. It then becomes fan shaped and is inserted on the inner surface of the Panniculus of the neck. Another flat, deeper layer of this muscle, with the same function passes over the pinna in a manner similar to that in which the former passes over the meatus auditorius externus. The function of both, seems to be to close the ear. The one by pressing the pinna flat upon the skin and the other by approximating the inner walls of the tube of the ear. In addition to these muscles, we have a set whose function is to move the ear. They have an origin from the Panniculus and are inserted on the projection of the lower part of the upper surface of the pinna.

M. Attollens Aurem.

A very small muscle has for its function the elevation of the ear. It has an insertion into the projection at the lower part of the external surface of the pinna. It is of triangular shape. Its origin is from the Panniculus Carnosus, where it interdigitates with fibres of the Panniculus Carnosus which there have a longitudinal direction.

M. Depressor Aurem.

A Depressor Aurem is much more developed than the Attollens Aurem. It arises from the Panniculus and extends upward to an insertion with the Attollens Aurem on the pinna.

MUSCLES OF THE EYE.

The muscles of the eyes of the specimen which I dissected were in a very poor condition. I was able, however, to distinguish two recti muscles and one oblique, which was possibly an internal oblique. This last was of much greater size and breadth than the others. Their origins and insertions were normal, differing but little from those of ordinary mammals.

EXPLANATION OF PLATES.

PLATE I.

FIG. 1. View of the superficial muscles of the head and neck.

a, Sterno-glossus. *b*, Oesophagus. *c*, Trachea. *d*, Sternum. *e*, Styloglossus. *f*, Myloglossus. *g*, Stylopharyngeus. *h*, Stylohyal. *i*, Superficial portion of the Myloglossus. *j*, Temporalis. *k*, Genio-glossus posticus. *l*, (?) *m*, Sterno mastoideus. *n*, Ear tube. *o*, Masseter. *p*, Annulus inferior. *q*, Sublingual gland. *r*, Aorta. *s*, Genio-glossus posticus Externus. *t*, Genioglossus posticus internus. *u*, *v*, Genio glossus. *w*, Thyrohyal. *x*, Pharynx. *y*, Pterygoideus Externus.

FIG. 2. Palmar surface of the manus with the common flexor tendon cut and held back over the toes.

a, Adductor pollicis. *bbb*, Lumbricales. *c*, Tendon of the Flexor communis digitorum. *oooo*, Interossei.

FIG. 3. Pterygoideus Externus.

a, Coronoid process. *b*, Line of insertion of the Masseter. *c*, Angle of the jaw. *d*, Condyle. *e*, Pterygoideus Externus.

FIG. 4. Muscles of the eye.

aa, Recti. *b*, Longus palpebrarum. *c*, Obliquus internus. *d*, Levator palpebrarum.

PLATE II.

FIG. 1. Dermal muscles of the foreleg.

a, Dermo dorso cervicalis. *b*, Dermo Extensor brachialis inferior. *c*, Dermo Extensor brachialis intimus. *d*, Dermo Extensor brachialis superior. *e*, Dermo brachialis posterior. *f*, Dermo-brachialis anterior. *g*, Dermo flexor antebrachii. *h*, Trapezius. *i*, Panniculus carnosus. *j*, Coraco-brachialis. *k*, Posterior portion of trapezius.

FIG. 2. Deeper muscles of the neck and head.

a, Annulus intimus. *b*, Myloglossus. *c*, Stylo-pharyngeus. *d*, Sterno mastoideus. *e*, Pharynx. *f*, Stylohyal cartilage. *g*, Digastricus. *h*, Masseter. *i*, Superficial portion of myloglossus. *j*, *k*, Genio glossi postici. *p*, Annulus inferior.

FIG. 3. Flexor muscles of the foreleg.

a, Flexor brevis pollicis. *b*, Dermo flexor antebrachii. *c*, Flexor carpi ulnaris. *d*, Coraco-brachialis. *e*, Biceps. *f*, Flexor communis digitorum. *g*, Latissimus dorsi. *h*, Anconeus (?).

REGULAR MEETING, MONDAY, AUGUST 6, 1877.

MEETING this evening. In the absence of the PRESIDENT, Mr. JAMES KIMBALL was requested to take the chair. Records read.

The following communications were presented by the Secretary and ordered to be put upon record :

SALEM, JUNE 19, 1877.

G. M. WHIPPLE, Secretary of the Essex Institute.

DEAR SIR :

Please make the following record in proper place in your manuscript journal.

That yesterday, Monday, 18th June, 1877, I planted in three small coves of the Ipswich River, at Hamilton, twenty-four seeds of the *Nelumbium luteum*, the great water lily of our southern waters.

The seeds were sent to me by our former townsman, and patron of the Institute, John C. Holmes, Esq., of Detroit, and planted at his suggestion. The seeds were soaked in water five or six weeks, then filed on one or more sides, then imbedded in moist turf and dropped in deep and still water. They were lively seed, for three others of the lot had been proved by sprouting.

GEORGE D. PHIPPEN.

MT. WASHINGTON, JULY 18, 1877.

DEAR SIR :

I send you by this afternoon's mail a copy of "Burts among the Clouds," being the second copy sold. I was a moment late to secure the first, which goes to Detroit, Michigan, and the third copy to S. Legier prez Vevay, Switzerland. It is a novelty in its way, being the first paper printed on the summit of Mt. Washington, and I trust you will find a place for it in the Essex Institute, and oblige,

Yours respectfully,

ROBERT R. ENDICOTT,

of Beverly, Mass.

Voted, That the thanks of the Society be given to Mr. Endicott for his kindness, and the Secretary was instructed to inform Mr. Endicott of the vote.

FIELD MEETING AT ASBURY GROVE, HAMILTON,
WEDNESDAY, AUGUST 8, 1877.

THE third field meeting the present season was held, this day, in this very pleasant grove, a place dedicated by the Methodist denomination, a few years since, for their yearly out-door meetings. Some spent the forenoon in roaming over these grounds and noticing the improvements in progress, the beautifying of the cottages, the erection of new ones, and the construction of avenues and paths. There are now nearly 275 cottages built here, and about 350, including the wooden frames which are covered with canvas at the time of occupancy. Many persons, owning or hiring cottages, occupy them during the season, particularly during the heated months of July and August. There is one week of camp-meeting, usually in August, and religious services on Sundays, which are well attended.

Others visited the botanical places in the woods and meadows adjacent, and collected many interesting specimens.

The afternoon session was called to order at 2.45 o'clock at the preacher's stand. The PRESIDENT in the chair. The records of preceding meeting read.

The PRESIDENT referred to the fact that it was eleven years since the Institute held a meeting in this place, and on this occasion our associate member, James F. Almy, gave an interesting history of the Association, the owners of this grove, and paid a fitting tribute to the memory of Francis Asbury, who came to this country in 1771, the first Bishop of the Methodist Episcopal Church ordained in America, and a zealous missionary for forty-five years until his death, which occurred in Spottsylvania, Va.,

Mar. 31, 1816. A more suitable name could not be selected to designate this place. He also called attention to the desirableness of making a complete collection of printed matter pertaining to Essex county and invited co-operation in this direction.

Mr. JAMES H. EMERTON, of Salem, being first called upon, said that he had found in the woods between the railroad and the grove two spiders of peculiar structure and habits, *Cyllopothia cavata*, whose web is described by Prof. Wilder in the Proc. Am. Assoc. for the Adv. Sci. for 1873, and *Argyrodes trigonum*, which usually lives among the outer threads of the webs of larger spiders, several individuals occupying the same web without interfering with each other or with the owner. These spiders do, however, sometimes live by themselves, and one was found in a web apparently of her own make, between two maple leaves. The spider held herself partly hidden under the upper leaf and below hung her two cocoons of eggs. These spiders resemble in color and size the scales which drop from the pine buds and hang in the webs and are easily mistaken for them.

Several residents at the grove called attention to great numbers of insects going up the trunks of the trees. These were the young of a species of *Psocus*. They live on mould and other microscopic plants and wander over the trees after them in flocks of several hundred individuals. Some persons believed they had been stung by them, but this is improbable, as the insects have no stings and their jaws are short and not adapted for piercing the skin.

Mr. J. P. MAGEE, Secretary of Asbury Grove Association, who was next called upon, spoke of camp meet-

ings, which he said originated by two brothers Magee, one a Presbyterian, the other a Methodist, in 1799, and which have become one of the Institutions of Methodism. The first permanent arrangement of these meetings in New England was at Eastham on Cape Cod, where a meeting was held in 1828. After this time to 1836 three others were held. This year the ground and grove containing ten acres was purchased by an association formed for that purpose, and an act of Incorporation was obtained from the Massachusetts Legislature in 1838. It is called Millennium Grove, and is a most beautiful and attractive spot, and exceedingly well located and adapted for the purpose.

Another was established in 1835 at Martha's Vineyard. It still continues and has grown to be a great city of cottages. This Asbury Grove corporation was established in 1859; the first meeting was held in August of that year and these meetings have since been continued annually in the month of August. During this month there will be no less than two hundred of these gatherings in the different parts of this country; they will be in the interest not only of religion but of temperance and science.

Prof. GEORGE H. DIXON, of Hampton, Va., alluded to the introduced plants from Europe that had been acclimatized here, some of which seem to thrive better in these places of their adoption. He presented a collection of the land and fluviatile shells of England, and made some interesting remarks in relation to the habits and characteristics of several of the species. He spoke of the different strata of shell deposits with the view of showing the importance of a knowledge of the mollusca to the geologist.

Mr. GEORGE D. PHIPPEN, of Salem, said that it gave

him pleasure to come here once more to visit these woods where he had derived so much pleasure in the past. He exhibited and described numerous plants that had been collected during the day; among them may be enumerated the Clethra, the Viburnums and Cornel, several varieties of the Orchis, Mikamia and several species of the compositæ, and others. The introduced plants seem to multiply more numerous than the native, and give the agriculturists the most trouble as weeds.

Rev. E. C. BOLLES, of Salem, said that if Prof. E. S. Morse was here he could have his old enthusiasm aroused at the sight of this collection of shells. He described several of the specimens, and added a few words concerning the transportation of shells, plants, etc., from other lands, and of his own collection of shells of the English coast. On the American coast he had found specimens belonging to the same species as the land snails of England, with certain variations showing that they have become Americanized. The part of the country in which Mr. Dixon happens to be at the present time is particularly barren of both land and fluviatile shells, but more will be found on the coast of Maine. In this world, life swarms about us at every point, and from this fact he drew reflections upon the revelations of life and order, and said that these scientific camp-meetings are intended to diffuse information of nature, just as the religious camp-meetings are intended to spread a knowledge of that Creator from whom religion and all these natural wonders spring.

Hon. ALLEN W. DODGE, of Hamilton, gave some facts concerning Rev. Dr. M. Cutler, and of his predecessor, Rev. Mr. Wigglesworth, both of whom had long pastorates in this town. Dr. Cutler was a remarkable man, not

only in scientific attainments, but political foresight. He was the pioneer in the settlement of Ohio; his influence was conspicuous in the passage of the ordinance of 1787 which made the northwest Territory free forever; and he has conferred great distinction upon the town of Hamilton. He spoke of natural historical pursuits as giving a better idea of the wonders of the Creator.

Mr. JAMES F. ALMY, of Salem, made enquiries regarding the peculiar formation of the land here, resembling the dungeons (so-called) of South Salem, which are generally associated with the glacial period. He said that there were several of these curious hollows between the village and this place. He had something to say about the literature of the Methodists; and gave statistics of its "Book Concern," which begun in 1789, and has become the largest publishing house in America; its seminaries of learning, numbering in 1874, twenty-seven universities and colleges, sixty-nine seminaries and academies, also five theological schools, one of which is in Germany and one in India; and its periodicals, consisting of one quarterly, five monthly and thirteen weekly publications. He spoke of the wide influence which has been exerted by the ablest expounders of the faith. With Mr. Magee he extended a hearty welcome to this society.

Dr. GEORGE A. PERKINS, of Salem, moved the following vote of thanks, which was unanimously adopted:

Voted, That the hearty thanks of the Essex Institute be given to the Asbury Grove Camp Meeting Association for their cordial reception this day, and to the ladies who have so kindly assisted in rendering the visit so pleasant and agreeable.

REGULAR MEETING, MONDAY, AUGUST 20, 1877.

MEETING this evening, the PRESIDENT in the chair. Records read. Correspondence and donations announced.

Dr. J. W. Goodell and Mr. E. L. Sargent, both of Lynn, and Mr. George C. Peirce, of Peabody, were elected resident members.



FIELD MEETING AT MARBLEHEAD NECK, WEDNESDAY,
AUGUST 22, 1877.

THE field meeting this day was very largely attended by members and friends. It is almost twenty years since the Institute held a meeting in this locality, and during this interval many changes have taken place, the most important of which is the building of a very fine road around this beautiful peninsula and the laying out of the grounds for sea-side residences, several having been erected.

Mr. J. J. H. GREGORY took some of the party to visit the most interesting of the historic localities of the town. Undoubtedly every one of the party had heard more or less of Marblehead, her hills, streets and ancient buildings, but very few had probably before realized the extent of the town's resources in that direction. The following may be specified: the place where "Flud" Ireson lived, his true character and mode of life; where Moll Pitcher was born; the beach upon which the British soldiers landed from the Frolic when coming to Salem to be repulsed at the North Bridge; where lived Vice President Gerry, Gen. Glover, Col. Lee, and a host of other celebrities; where the first house in town stood, and the beauty

of the location; where may be found the comparatively well preserved dwelling given away as a marriage present from a fond father to his daughter in 1666. Many courtesies were also rendered by Mr. William D. Northend and Mrs. E. D. Kimball, who are spending the summer at this cool and pleasant retreat. At the close of the rambles lunch was spread in an unoccupied cottage owned by Thomas Ryan, Esq.

The afternoon session was held in a small hall, recently erected by the liberality of the summer residents and friends, at 2.45 o'clock. After the reading of the records of the preceding meeting, the PRESIDENT opened the discussion with allusions to the manner of studying the marine fauna and the various systems of classification based either upon anatomical structure, geological periods or geographical distributions. He spoke of his own experience in collecting specimens some thirty or forty years since, by an examination of the stomachs of fishes, or by the hand dredge from a dory or sail boat, and contrasted the same with the present method, by which, with the use of a donkey engine in a government steamer, extensive collections can be obtained and a vast amount of information elicited.

Mr. JAMES H. EMERTON, of Salem, being called upon, said that during the last month some interesting dredgings have been made in this neighborhood for Prof. Spencer F. Baird, United States Commissioner of Fisheries. In the year 1871 Prof. Baird was appointed by Congress to collect information in regard to the supply of fish in the United States waters, to ascertain the causes on which the fish supply depends, and to see what can be done to increase its value and prevent its waste. Several state governments had already begun the

improvement of river fisheries which had been almost destroyed by dams and over fishing, and one of the principal duties of the U. S. Commissioner has been to aid in this work by experiments in breeding and transporting young fishes, and the introduction of new and promising kinds. In regard to the sea fisheries there exists among interested persons the greatest variety of opinions. Some consider them as practically inexhaustible, while others are equally sure the enlarged market and improved methods of fishing are slowly reducing the supply on the best fishing grounds. In order to collect what is known on the subject, printed lists of questions are sent to fishermen and other persons along the coast and the answers to these are classified and recorded, and the most useful published in the commissioner's reports. Every summer Prof. Baird and several other naturalists visit some town on the coast, and make direct observations on the fishes and other marine animals. As complete a collection as possible is made of the fishes in the neighborhood. The stomachs of fishes are examined to learn on what they feed and a general collection made of all the marine animals and plants. The shallower waters are explored between tides, and the deeper by sounding and dredging. For the latter purposes a government steamer is usually placed at the service of the Commissioner for a month or two.

The dredging is superintended by Prof. Verrill of Yale College, and all the animals collected, except the fishes, are sent to him at New Haven for further study. The first season was spent at Wood's Hole, and the results are published in the Second Report of the Fish Commissioner. The following seasons were spent at Eastport and Portland on the coast of Maine, and at Noank, Connecticut. This year it was decided to explore the fisheries of Massachusetts Bay, and for this purpose Prof. Baird, Prof.

Verrill and Messrs. Goode and Bean of the Washington Museum spent part of July and August at Salem. One of the old stores on Derby wharf was used for the shore work, and a steamer was sent by the Navy department to carry on the dredging. The time was too short to spend much of it on the shallow water animals, and every day, when the weather allowed, the steamer was used for dredging in the deeper water ten to twenty miles from shore in depths of forty to one hundred fathoms. The instrument usually employed is a dredge consisting of an oblong frame of iron about two feet wide, behind which drags a net protected by canvas. After ascertaining the depth and temperature of the water and character of the bottom by sounding, the dredge is lowered and the vessel allowed to drift with the current, drawing the dredge slowly over the bottom and scraping up whatever it meets. After sufficient time, the dredge is hauled in by the help of a steam windlass, and the contents tipped into a sieve hung over the ship's side; the larger animals are picked out and the dirt is washed by a stream of water until the finest part passes through the sieve and leaves the shells and larger objects in sight. The contents of the sieve are then carefully picked over and the animals either put into vessels of clear water, to be carried ashore living, or into alcohol. On smooth bottoms a larger kind of dredge, called a trawl, is used. This consists of a net fifteen or twenty feet wide at the mouth, the upper half of which is attached to a beam supported at the ends by runners, while the lower half is weighed down so as to drag on the bottom. The net has, along the sides, pockets in which fishes trying to escape find themselves entangled. In the trawl not only the bottom fishes, but all the animals that are not buried in the mud, are brought up. Sometimes a stone weighing several hundred pounds

gets into the net and needs all the strength of the engine and crew to get it on board, but it usually has quantities of small animals attached to it that pay for the trouble. On muddy bottoms a dredge is sometimes used with a rake attached in front of the mouth, the rake stirs up the mud, and the worms and mollusks are washed out of it into the net. On a rocky bottom even, where it is too rough for the dredge, a tangle is used. This consists of bunches of untwisted rope fastened to chains, by which they are drawn over the bottom, sweeping up the rough echinoderms and crustacea as with a mop. The animals hold on to the hemp and are so brought to the surface.

By these various methods, in the course of a fortnight, over three hundred species of animals were obtained, among them several rare fishes and many other animals of entirely new species. A complete list of these is promised by Prof. Verrill for the Society's BULLETIN, and we shall then have as complete a knowledge of the deep-water fauna of our bay as before of the waters north and south of it.

Prof. GEORGE H. DIXON, of Hampton, Va., described some of the plants that had been collected, including the *Melilotus*, which the English cattle are very fond of, though the cattle here leave it intact. The *Crataegus* belonging to the same family as the English Hawthorn was exhibited, also several species of grasses. The Golden Rod was held up as an object of admiration, there being in England but one of the forty varieties that are known. He then read a piece of poetry which he had picked up that morning, giving an interesting description of the manner in which salmon go up the river to spawn. In England there is a very heavy fine for the taking of salmon during the spawning period; and he was glad to see an

effort for similar legislation in this country. He spoke of the evidence of glacial action to be seen all around here, and also of the history of our race, involving the origin of the human species. He had no doubt, that when the Mosaic chronology was better understood, it would be found that revelation and science agree, notwithstanding the evidence of man's existence goes back to so remote a period as to frighten the theologians, who fear damage to the Mosaic record.

REV. A. B. HERVEY, of Troy, N. Y., spoke of the marine flora of this vicinity. We have three kinds of rock-weed here, and Marblehead is set down as having the distinction of possessing one kind not found anywhere else, though he had never succeeded in finding it. Mr. Hervey had brought with him some pressed specimens, exhibiting the striking beauty of their formation and expressing surprise that so few people make collections in this department of our flora. Some of the most beautiful of these are parasitic varieties. He also exhibited the tools with which he made his collections, with the view of aiding the efforts of others in the same direction. He described the process of pressing, substantially as follows: Float out each specimen by itself in salt water, in a wide dish, like a washbowl. Put the paper under the plant in the water, arrange the plant on the paper and carefully draw it out. Lay the paper with the plant upon it on drying paper and spread over it a piece of white muslin. Then spread over this a layer of drying paper, then more plants, and then more cloth, drying paper, etc. Put all under a board, and weight it with forty or fifty pounds of stone or other heavy substances. The next day, change the cloths and drying paper, and in one day more the plants will be dry and ready to go into the herbarium or the album for permanent preservation.

Mr. JAMES J. H. GREGORY, of Marblehead, exhibited geological specimens collected on the beach, to illustrate the geology of Marblehead. There are here many varieties of porphyry rocks, the greenstone rocks, and the sienite. He described the chasms along the shore, or the trap dykes. We have here the old Indian quarry, from which the aborigines constructed their implements. In proof of this he described the appearance of the rock, which had obviously been chipped and not so left by any natural action. He spoke of the value of these rocks for building purposes, and of the former agricultural productiveness of this neck, rendered so by the use of sea manure, the soil being naturally as poor as any in Marblehead.

Rev. JOSEPH BANVARD, of Neponset, followed with congratulations of the day, the place, and the presence of ladies. Without professing to be a scientist, he gave expression to his love of nature and of the pleasure he had derived from gathering, thirty or forty years ago, when settled in the ministry in Salem, the little knowledge he possessed upon these subjects. Even a little knowledge of these things is good and pleasant.

After some pleasant and humorous remarks from Mr. WILLIAM D. NORTHEND, of Salem, Mr. D. B. HAGAR, of the State Normal School, introduced the following resolution, which was unanimously adopted :

Resolved, That the hearty thanks of the Institute are hereby presented to the proprietors of the hall, for the free use of the same on the present occasion. To Thomas Ryan, Esq., for the free use of the cottage, and to all persons who have in any way contributed to the pleasure and usefulness of this meeting ; and especially are thanks tendered to Mrs. Edward D. Kimball, Messrs. W. D. Northend, and J. J. H. Gregory, for their generous efforts in behalf of this gathering of the Institute.

Fig. 1



Fig. 1

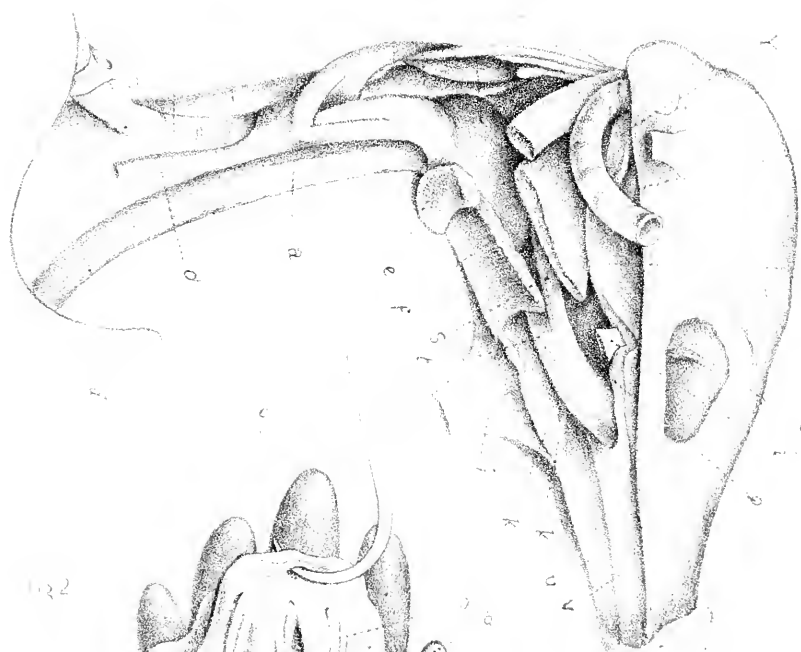
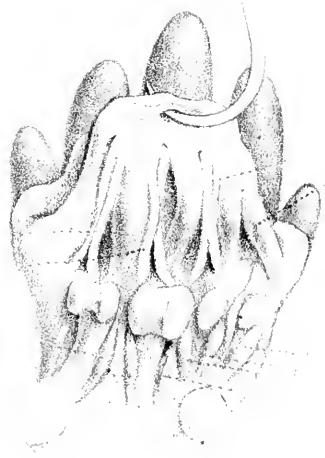


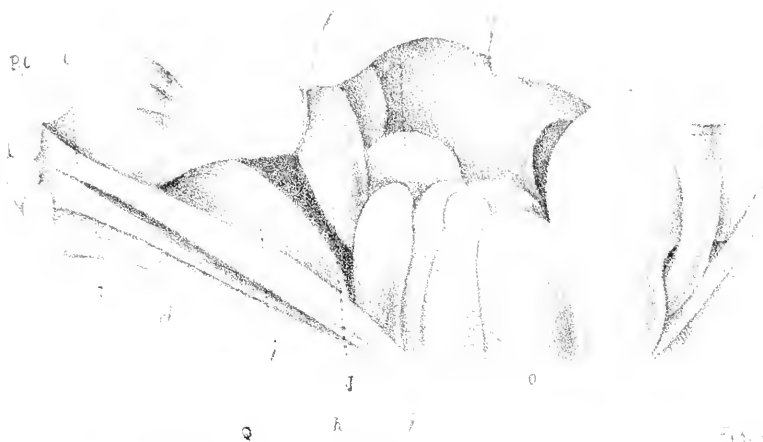
Fig. 2



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Fig. 1

Pl.



BULLETIN

OF THE

ESSEX INSTITUTE.

VOL. 9. SALEM, OCT., NOV., DEC., 1877. Nos. 10, 11, 12.

EXCURSION TO THE WHITE MOUNTAINS, MONDAY, SEPT. 10, 1877.

AFTER the numerous preliminary announcements of this excursion, the Institute party, numbering more than one hundred members and friends, left Salem this morning at ten minutes past seven by the Salem & Lowell Railroad, and arrived at the Fabyan House at a quarter before five on the afternoon of the same day, under the auspices of the Boston, Concord, Montreal & White Mountains Railroad, a continuous and unbroken line, without change of cars, though made up of four or five distinct roads, the seat of management being at Plymouth. On this occasion the party was accompanied by Mr. I. A. Whitcomb, the travelling agent of the line, who was unremitting in his attentions, cheerfully responding to all enquiries, and volunteering a good deal of information as to localities and scenery.

Though this is not the shortest and quickest route to the mountains, it is no disparagement to any to say that

there is no other which combines so many natural attractions. From Lowell up through Nashua, Hooksett, into and beyond Concord, the ride is along the banks of the beautiful Merrimac, which Whittier has immortalized in verse, and which finds its outlet into the ocean at Newburyport, through the northern part of the county of Essex. Very soon after, the region grows a few shades more hilly, and attractive scenery is developed between Northfield and Tilton; thence to the western border of Lake Winnipiseogee, passing and stopping at Laconia, Lake Village, Weirs, and Meredith, a region whence came a considerable number of thrifty and energetic New Hampshire people who have settled in Salem within a score of years past. The party dined at the Pemigewasett House at Plymouth. Advancing northward, the hills grow bolder, but the soil appears indifferent till the valley of the Connecticut is reached at Haverhill, where the ride along the banks as far as Woodside presents a more luxurious aspect of soil and vegetation. Thence ten miles to Littleton, where the stages connect with the Franconia Mountains. Wing Road is a few miles farther on, and at this point the course sharply diverges from the north to an eastwardly direction over the Mount Washington Branch Road, which runs along the valley of the Ammonoosuc through scraggly woods relieved by frequent clearings. The clear tracts are extremely picturesque, and from the hotels dotted among them very fine views of the mountains may be obtained.

In the immediate vicinity of Fabian's, where the night was passed, are a grave stone and monument to the memory of Ethan Allen Crawford, who built and maintained the first house at the White Mountains. He died June 22, 1846, at the age of fifty-two. He was born, therefore, eighty-three years ago, and within that time

great changes have been witnessed in the travel of this region.

TUESDAY, SEPT. 11.—The main portion of the party left this morning for the Crawford House, four or five miles distant, and spent the day among its many attractions. This is one of the loveliest and most homelike spots in the mountains. A large number rode to the Willey House,¹ and other places of interest were visited.

Some of the party ascended Mount Washington in the forenoon, going to the Crawford House in the afternoon. There was formerly a stage ride of a few miles from the Fabyan House to the mountain railway station at the base. Within a year or two, however, the inevitable railway train, with its puffing locomotive, has penetrated the woods, and it now follows the Amonoosuck along its winding way and in the direction of its source, the grade at the last part of the distance being so very steep as to render friction propulsion something to marvel at. Among the curiosities at the summit is a daily paper, well printed and full of mountain gossip. An edition of from 400 to 1000 copies has been regularly issued and sold. Every one visiting this region buys a copy to send home. The temperature was very mild and comfortable

¹ Among the present Institute party, was Mr. S. P. Richardson, of Salem, accompanied by his brother-in-law, Mr. Bowker. It was a matter of more than ordinary interest to Mr. Richardson, as he visited the Willey House, that his father, Rev. Phineas Richardson, in the year 1826, while settled at Lower Gilmanton, N. H., went through this section on horseback, with saddle-bags, in the interest of the Baptist denomination, and under the auspices of the New Hampshire Baptist Convention, as a preacher in destitute places. He stopped with the Willey family just two weeks before they were destroyed by the avalanche, and read with them out of the same Bible that is still preserved in the house. Every reader, we presume, knows that the Willey family, and two persons in Capt. Willey's employ, were destroyed by a slide while trying to escape from their house, which proved to be the only place of safety. There were other slides in the mountains at the same time. They occurred during one of the most terrible storms that ever swept through this region — one, probably, that has never since been equalled.

and the view good, though there was the common haze lurking in the distance.

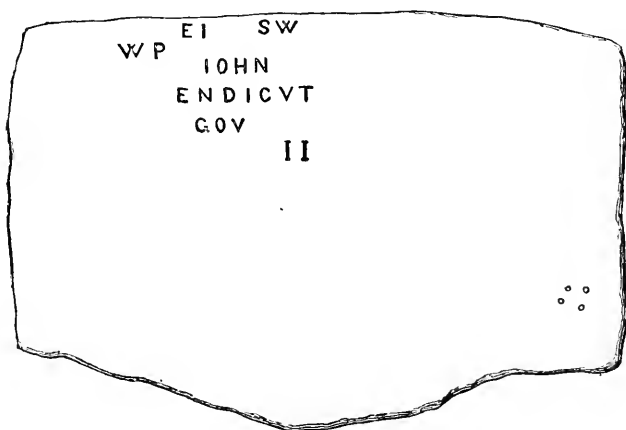
In the evening the Institute held a meeting in the drawing-room of the Crawford's, commencing at eight o'clock. The usual preliminary business of the Institute meetings having been suspended, the **PRESIDENT** said :

The Essex Institute seldom holds a meeting beyond the limits of Essex County. It is a local institution, and its objects are the collecting and preserving materials that will elucidate the natural and civil history of the county of Essex, and also the promotion of the arts, literature and science, by its meetings, lectures, publications, exhibitions, etc.

On several different occasions, it has deviated from the usual course and held meetings elsewhere. In August, 1867, at Kittery, Me., to visit, among other places of interest, the mansion once owned and occupied by Sir William Pepperell—a wealthy and enterprising merchant of the middle of the last century, who aided by his means and individual services in the raising of an expedition for the taking of Louisburg. This enterprise was crowned with success, and he was rewarded with a Baronetcy from George II. He was the first person born in New England who received this honorable distinction. Portsmouth and its surroundings, Kittery and Newcastle, are rich in associations connected with the Colonial and Provincial periods of our history. In 1870, a visit was made to Plymouth, Mass., where was noticed the rock on which the forefathers landed, and the interesting historical relics in Pilgrim Hall. In 1875 a pilgrimage was made to Concord, Mass., where life was first sacrificed in an open resistance to British arms,—the opening drama in the Revolution; and also where we could stand beside the

grave of Hawthorne, that brilliant star in the field of letters, born and for many years resident in Salem, and died near by, at Plymouth, N. H., in May, 1864.

The northern boundary of the colony of the Massachusetts Bay, as defined in the charter of 1628, is three miles north of the northernmost part of the Merrimack river. The General Court, on the 31st of May, 1652, appointed Capt. Symon Willard and Capt. Edward Johnson a committee to ascertain this point. On the 1st of August, 1652, Messrs. John Sherman and Jonathan Ince were selected as the surveyors, who, with two Indian guides, explored the river as far as the Great Fork. By the advice of the Indians, they took the eastern branch, and soon reached the Great Lake; and here, near the Weirs, they placed upon a large flat rock the following inscription, which was discovered some time since, and may now be seen:—



This is not the most northern point. The western branch, which is the Pemigewasset river, takes its rise from the southern slope of the White Hills, and the most

northern of the sources of the numerous rivulets that form so many of the beautiful cascades and waterfalls is the true limit; and three miles due north would not be far from our place of meeting.

The several grants made by the General Court of Massachusetts, north of Haverhill, were considered as belonging to Essex County.

The claims of New Hampshire, on a patent by Capt. John Mason, in 1629, under the common seal of the Council of Plymouth, which conveyed the land from the middle of the Merrimack River and thence northward along the coast to the Piscataqua River, and up the same to the farthest head thereof, and through the Merrimack to the farthest head thereof,—were in conflict with the grant of Massachusetts, and caused a long controversy as to jurisdiction, not affecting, however, individual rights.

Owing to the unsettled state of affairs, the two Provinces were united from 1641 to 1680, and even afterwards the same person would be frequently Governor of both Provinces; so that for many years no serious difficulties arose. But afterwards it was deemed best to have the northern line defined. In 1737 commissioners were appointed, and it was decided that the northern boundary of the Massachusetts line should be a line three miles from the mouth of the river at Newburyport, thence parallel with the river as far as the Pawtucket Falls, thence west to the New York line. In 1740 His Majesty, by the concurrence of the Council, adjudged and ordered this boundary.

On this occasion it is meet that we should pay a tribute of respect to the memory of WILLIAM OAKES, the most distinguished botanist in New England in his time, and one of the founders of the Natural History Society, and for many years a Vice President. A native of Danvers, a

graduate of Harvard in the class of 1820, admitted to the Essex bar in January, 1824; then removed to Ipswich to practise the profession, from which, after some two years, he retired, not finding the duties congenial to his feelings, and devoted his time entirely to the study of natural history, more especially to botany, which had been fostered and developed during his collegiate life by Professor Peck, the Massachusetts Professor of Natural History in Harvard. Not long afterwards he confined his attention almost solely to the New England flora, seldom, if ever, herborizing beyond the limits. There is scarcely a New England plant which he has not collected with his own hands, and prepared an abundance of surpassingly excellent specimens.

As early as the year 1830, he, in company with his friend Dr. C. Pickering, had already explored these mountains, and had projected a flora of New England. The appearance of Dr. Beck's book, in 1833, caused him to abandon this scheme, which he afterwards resumed with increasing ardor, and upon a more elaborate scale. To this end he had collected much.

In the autumn of 1842 he was solicited to prepare a catalogue of alpine plants, to be appended to the final Report of Geology of New Hampshire. Although he had frequently visited and examined this flora, he again went to the mountains. The subject grew upon his hands, —the geology, mineralogy, and zoology alike claimed his attention. He employed artists to make drawings not only of the plants, etc., but of the views and scenery, of rare faithfulness and accuracy. He published, in 1848, a volume which may be considered as the introductory part of the work, entitled, "Scenery of the White Mountains, with sixteen plates, from the drawings of Isaac Sprague; by William Oakes." Boston: Little & Brown,

1848. Small folio, 16 1-2 by 12 inches. Soon after the last proof sheet of this work had been sent to the printer, he suddenly died, on the 31st of July, 1848. He was a man of great generosity, and never hoarded his immense collections, distributing freely to those who would appreciate them. Professor Edward Tuckerman has given the name of Oakes to a highly interesting evergreen, detected some thirty years since in several localities along our eastern coast (*Oakesia Conradi*), which is figured in the memoirs of the American Academy.

Although he had collected much, he had done little towards a final elaboration of the results of his observations, which is attributed to a fastidious taste, and an over anxious desire to satisfy the ever increasing demands of science, and to realize his own high standard of perfection. He published a catalogue of plants of Vermont appended to Thompson's History of Vermont, and some articles in magazines.

OLD RECORDS OF PENNYCOOK AND RUMFORD.

Since the adjournment of the meeting, the following extracts from the first volume of the records of Concord, N. H., have been copied and are here inserted as confirming that portion of the above remarks which relates to the old New Hampshire towns. The General Court of Massachusetts passed March 4, 1733-4, an act for erecting a new town within the county of Essex, called Pennycook, by the name of Rumford. In 1765 this name was changed to Concord, and is now the flourishing capital of New Hampshire.

Pennycook, January ye 9, 1732.—The Inhabitants of the Plantation of Pennycook are hereby notified to assemble and convene at the meeting-house in Pennycook on the eleventh day of this instant January at nine of the

clock in the Forenoon, then and there to choose a town clerk, selectmen and constables and all other ordinary town officers, which officers when chosen are to stand to the anniversary meeting in March next.—BENJA. ROLFE² by orders of the General Court.—A True Copy examined by Benja. Rolfe, Town Clerk.

ESSEX, ss. *Pennycook*, January 11, 1732.—By virtue of the Order from the General Court have notified the Inhabitants of the Plantation of Pennycook of the within mentioned meeting by setting up the within notification at the meeting house in Pennycook. BENJA. ROLFE. A True copy examined by Benja. Rolfe, Town Clerk.

January 11, 1732-3.—*Voted*, That one hundred and ten pounds be raised for the support of Rev. Mr. Timothy Walker.³

Pennycook, March 6, 1732-3.—*Voted*, That there should be twenty shillings paid for the encouragement of killing of wolves, for the year ensuing, within the Township.

Voted, That there should be six pence paid for the encouragement of killing of Rattlesnakes within this Township, for the year ensuing, provided that the destroyers of such snakes shall bring in a black joynt of the tail or with the tail to the selectmen or any of them. A penny

² Benjamin Rolfe, who is referred to in the old New Hampshire records, was a son of Henry Rolfe, Esq., of Newbury, who was one of the original proprietors of Pennycook. He was born in 1710, graduate of Harvard in 1727, chosen one of the proprietors and grantees of Pennycook in 1731, and continued in the office during the several changes of Rumford and Concord, till 1770. He held every important office in the gift of his fellow citizens, and had acquired a large property. At the age of sixty he married Sarah, daughter of Rev. Timothy Walker, some thirty years his junior. He died Dec. 21, 1771. His widow, Sarah, married in 1773, Benjamin Thompson, afterwards distinguished as Count Rumford.

³ Rev. Timothy Walker, the son of Deacon Samuel Walker of Woburn, Mass., was born July 27, 1705, graduated at Harvard College in 1725, invited to settle at Pennycook, Oct. 14, 1730. He married, Nov. 12, 1730, Sarah Burbeen, daughter of James Burbeen, of Woburn. She was born June 17, 1701, and died Feb. 19, 1778. He was a revered, faithful and devoted minister to his people, served the town as a wise counsellor on many important occasions, and was justly entitled to the appellation of "the father of the town." He died Sept. 1, 1782, aged 77.

voted for the encouragement of the killing of Black Birds within this Township, for the year ensuing, the head being brought to the selectmen or any of them and burnt.

March 9, 1735.—*Voted*, That Henry Rolfe, Esq., be chosen and desired to assist and joyn with others, that are or may be chosen for to use proper means for to get the county of Essex divided into two counties.

November 7, 1739.—*Agreed and voted*, That Benja. Rolfe, Esq., be chosen to petition the General Court in the name and behalf of the Inhabitants of the town of Rumford, in order to get a country road laid out and made from the town of Rumford to the town of Chester in New Hampshire.

At a legal meeting of the Freeholders and other Inhabitants of the town of Rumford on the eleventh day of June, 1740. The Selectmen regulating said meeting, Benjamin Rolfe, Esq., was elected and deputed to serve for and represent them in the Great and General Court or assembly now convened and held and kept his majesties service at the Court House in Boston.

After the choice of Representative, Capt. Ebenezer Eastman⁴ was chosen Moderator of this present meeting.

Voted, That Benjamin Rolfe, Esq., be hereby desired and impowered in the name and behalf of the Inhabitants of the town of Rumford to prefer a petition to his Majesty, that they may be quieted in their possessions and remain under the jurisdiction of the Massachusetts Bay, or for any other thing that may be thought proper and convenient.

Voted, That Benjamin Rolfe, Esq., be hereby desired and impowered in the name and behalf of the Inhabitants

⁴ Capt. Ebenezer Eastman, son of Philip of Haverhill, and grandson of Rogers, the first of the name, who settled in Salisbury, Mass., in 1640. was born Jan. 10, 1689, married Sarah Peaslee, of Haverhill, March 4, 1710, a daughter of Col. Nath'l Peaslee. He became an early settler in Concord, where he died July 28, 1748, aged 59. The part he took in the first settlement of the town, the services rendered and the offices of trust and honor which he held will cause his name to be held in grateful remembrance. He went to Cape Breton, March, 1745, in command of a company and was present at the reduction and surrender of Louisburg, June 16 of that year.

of the town of Rumford, to prefer a petition to the General Court, that they would use their interest with his majesty, that said Inhabitants may be quieted in their possessions and remain under the jurisdiction of the Massachusetts Bay or for any other thing that they may thought proper or convenient.

At a meeting of the Inhabitants and Freeholders of the town of Rumford, being legally warned and assembled the twenty-sixth day of September, 1740.

Capt. Ebenezer Eastman was chosen Moderator of this present meeting.

This Town being informed that by the determination of his Majesty in council, respecting the controverted bounds between the province of Massachusetts Bay and New Hampshire, they are excluded from the Province of the Massachusetts Bay to which they always supposed themselves to belong, therefore unanimously *voted*, That a Petition be preferred, to the King's most excellent Majesty, setting forth our distressed estate and praying we may be annexed to the said Massachusetts Province.

Voted, That Thomas Hutchinson, Esq., be impowered to present the said Petition to his Majesty and to appear and fully to act for and in behalf of this town respecting the subject matter of said Petition, according to his best discretion.

Voted, That Benjamin Rolfe, Esq., Town Clerk, be desired and impowered in the name and behalf of this Town to sign the said Petition.

Voted, That Benjamin Rolfe, Esq., be desired and impowered to nominate or make choice of a suitable person to present the said petition to his Majesty and to appear and fully to act for and in behalf of this Town, respecting the subject matter of said Petition according to his best discretion. In case Thomas Hutchinson, Esq., shall refuse the said service or otherwise be prevented doing the same.—[Page 78 and 79 of Records.

Notice is here given to the Freeholders and other Inhabitants of the Town of Rumford that have an estate or freehold in land within this Province or Territory, of

forty shillings per annum at the least, or other estate to the value of fifty pounds sterling to assemble at the meeting house in said Rumford, on Monday, the twenty-ninth day of June current at five of the clock in the afternoon then and there to elect and depute a person (being a Freeholder and resident in said town) to serve for and represent them in a Great and General Court or assembly appointe to be convened held and kept for his majesty's service at the court house in Boston, upon Wednesday the eighth day of July next ensuing the date hereof. Also to grant such sum or sums of money as shall be thought best to enable Thomas Hutchinson, Esq., further to prosecute the affair of our being annexed to Massachusetts Bay, also to choose a surveyor of highways instead of Joseph Hall who refuses to serve in said office. Dated at Rumford aforesaid the 23d day of June 1741.

Joseph Hall,

Constable of Rumford.

By virtue of a warrant from the selectmen of Rumford.
—Page 85.

At a legal meeting of Rumford, 11 Dec. 1744. *Voted*—That Benjamin Rolfe, Esq., be hereby desired and impowered in the name and behalf of said Inhabitants to prefer a petition to his excellency our Captain General, or to the General assembly of this Province for such a number of soldiers which may be sufficient with a Divine Blessing to defend us against all attempts which may be made against us by our enemies.

Voted—That Benjamin Rolfe, Esq., be hereby desired and impowered in the name and behalf of said inhabitants to prefer a petition to his excellency our Governor or to the General assembly of this Province that may be impowered to make choice of some suitable person to serve for and represent them in every session of the General assembly from time to time within this Province.

Voted—That Benjamin Rolfe, Esq., be hereby desired and impowered in the name and behalf of said Inhabitants to represent to his excellency the Governor and General Court of the Province of the Massachusetts Bay

the deplorable circumstances we are in upon the account of our being exposed to imminent danger both from French and Indian Enemies and to request of them of such aids as to their great wisdom may seem fit meet and which may be sufficient to enable us with a Divine Blessing vigorously to repell all attempts of our said enemies. —Pages 98 and 99.

Dr. Wheatland concluded his remarks by introducing Prof. CHARLES H. HITCHCOCK, saying,—“Having thus briefly alluded to the observations of a diligent explorer of these mountains some forty or fifty years since, we now introduce one who is engaged in a somewhat similar occupation as the present accomplished head of the State Geological Survey of New Hampshire.”

Alluding to Dr. Wheatland’s reference to the Essex County naturalist, Prof. Hitchcock said that William Oakes was one of the early explorers of these mountains, and did his work in a very thorough and satisfactory way, his preserved specimens of pressed plants being the best prepared of any he had seen.

Prof. Hitchcock then spoke of the mountains in their relation to other parts of the country, comparing the White Mountains of New Hampshire with the Alps and Jura Mountains of Europe. The Alps are a chain of mountains running east and west through the south of France, a part of Switzerland, and across to the Black Sea—terminating with the Balkans (where the Russians and Turks are now fighting), which are really a continuation of the same range. He described the formation of the summits of these mountains and their varied heights, they being also of the same material as our White Mountains—gneiss and granite, chiefly. He also in a very plain way described and illustrated the commonly accepted theory of the formation of mountains, which is by

lateral pressure caused by contraction of the crust of the earth—this side pressure upon the original flat surface pressing the surface upwards as a sheet of paper laid flat upon a table would bulge upward from the centre on being closed in from the opposite edges.

According to the manner and degree of pressure, the appearance of the mountains and their summits is varied; and in reference to the Alps he spoke of their obtusely pointed summits arranged *en echelon*. The same lateral force that led to this form, also led to fracture in the rocks; and so, by inversions, what seem to be the newer rocks are really the oldest. The Jura range of mountains is not more than 3000 or 4000 feet in height, and often as uniform and straight as a railway embankment. They are composed of sedimentary substances, as sand and gravel, and are full of graceful curves—the folds being steepest on the side next to the Alps. From this it will be seen that the Alpine mountains are different from the Jura Mountains; and these represent two systems, with the Switzerland valley formed between.

Now we have these two systems of mountains in eastern America. One extends from Newfoundland to Alabama, and the other from the Catskills in New York to Alabama. Between them is a great valley beginning with the Champlain, then the Hudson, Kittatinny, Shenandoah, Great Valley of Virginia and East Tennessee. In referring to the general shape of the continent, he said the elevated portions are next to the oceans, while the interior parts are depressed. He then described the Alpine features of the eastern mountains,—first, the Newfoundland district with mountains rising 2000 feet; next, the middle division like that in the midst of what we now are, rising to 6291 feet; and, third, the mountains of North Carolina, exceeding 7000 feet in height. In the

course of his explanations, he said if the land should sink 200 feet, the middle section would become an island.

Coming to examine the structure of the mountains, we find the characteristics of the Alpine and Jura mountains well represented, and the material very much the same. From the Catskills, away to Alabama, on the western side of the great valley he had spoken of, were the graceful curves and that appearance as of steep embankments. The highest of our Jurassic mountains is over 4000 feet. The eastern range is composed of crystalline schists, with inverted strata.

Prof. Hitchcock spoke of the relations of this mountain mass to the water of the ocean. Probably ages ago these Atlantic mountains approached the Alps in altitude more nearly than now—the sea having, within these ages, encroached upon the land.

Our Jura mountains are properly called Appalachian; and our Alpine portion we can call the Atlantic system—a name suggested forty years ago for that region, by Featherstonehaugh, the geologist.

Dr. WHEATLAND alluded to his first visit to these mountains forty-five years since. At that time a stage coach in one direction every other day,—returning on the intermediate days,—with a few small wayside inns at intervals of some three or four miles, proved a sufficient accommodation for the summer travel. He stopped at Tom Crawford's, a few rods on the other side of the road near the entrance of the Notch. The foundation of that house is now visible. The winter travel was very large—the farmers from northern New Hampshire and Vermont coming in large numbers together in their sleighs with produce to barter in cities on the seaboard.

Eighteen years after he again visited these mountains.

The tide of travel hitherward had so increased that the stages ran quite full from point to point at least once or twice each day, and the Glen House in the Pinkham Notch; the Crawford House through the gateway of the Crawford or White Mountain Notch; and the Profile House in that sequestered nook in the Franconia Notch,—were all in full blast, having acquired a wide reputation. These lovely spots in the mountains maintain the same appearance that they did then, though the hotels have all been greatly enlarged and the railway has badly mutilated the gateway at the Crawford. The nearest railroad connections at that time, however, were at Gorham, Me., on the Grand Trunk road, and Plymouth and Littleton on the present Boston, Concord and Montreal. Connections with the Crawford House and North Conway were only by stage, as is now the case at the Glen and Profile. The nearest approach to easy connection with the summit of Mount Washington, was a projected carriage road on the Glen side—at that time completed for about a mile and a half.

The PRESIDENT then introduced REV. CHARLES T. BROOKS, of Newport, R. I., as one of a party of three Salem people, two of whom are now living and present at the meeting, who visited these mountains in 1834, on a pedestrian expedition. Mr. Brooks then read the following poem:—

A Mountain Amble on Pegasus, with considerable Pre-amble. Done for, and dedicated to, the Essex Institute, of Salem, Mass. Read at Crawford's White Mountain House, September 11, 1877.

THE learned body gathered here to-day
Will not be greatly startled if I say
Frequent experiment has proved the rule,
That when a stone is dropped into a pool,

The agitation of the surface takes
 The form of circular, concentric wakes,
 Say, *rhythmic wrinkles*, rippling on and on,
 Till, by and by, the expansive force is gone,
 Fainter and fainter grow the rings, and then
 The last gives up the ghost—and stillness reigns again.

So was it, when, one day, your summons fell
 On the still bosom of my mental well,
 To perch in your commodious travelling cage,
 The song-bird of a mountain pilgrimage;
 The watery rhymes forthwith began to run—
 But courage!—What in time has once begun
 (To us may Heaven a good deliverance send!),
 In time (so science shows) will surely have an end.—

The rifle ball revolves awhile, they say,
 Ere from the gun it speeds its fatal way.
 And I remember well—one frosty morning—
 The tinkling engine bell had given its warning;—
 The locomotive wheels slid round and round
 Some moments, yet had gained no inch of ground.

Does not the sun himself take time to rise,
 While a precursive glow lights up the skies?
 And Ocean's gradual deepening floods begin
 With shoals in which a child may wade and swim.
 This means that *Nature makes no sudden leaps*,
 And Art, in this, faithful to Nature keeps.

The wary general, when he sits him down,
 Prepared with patience to besiege a town,
 With slow approach his parallels draws in,
 Till Prudence says: now let the assault begin!

Shakspeare exclaims, Shall then this wooden O
 (Meaning the play-house called the Globe, you know)
 Contain within its small circumference
 The crowded camps of England and of France,
 And fields with terrible helmets bristling o'er
 That did affright the air at Agincourt?
 But did he not a greater wonder know—
 The mighty mystery of that *hony* O—
 That more contracted space that can contain
 Within the walls that fence the human brain
 The very globe of earth itself and all
 That doth inhabit this terraqueous ball?

Friends, I have mountains on the brain—and you
With patient sympathy must help me through.

A famed Dutch tumbler of antiquity
(Old Diedrich says) once made a bet that he
Would jump over a mountain—so, one day,
He started on the run three miles away,
To *get a purchase* by this mighty race;
But when at length he reached the mountain's base,
He sat, to gain his breath, upon a rock,
And o'er the mountain then, at leisure, he could walk.
Scarce less presumptuous to myself I seem
Than that rash wight, before my mountainous theme.
Like him, I pause an instant here, and then
Gird up my loins and journey on again.—

(Friends, these remarks are nothing but the Proem;
Mistake them not, I pray you, for the Poem.
In Eastern lands the temple, as you know,
Is, sometimes, shorter than the portico.
The patient hearer hence some hope may win:
Pre-ambling then no more, we now begin:)

In good old times, ere yet Romance's land
Was gridironed by rails on every hand;
Or black, fuliginous clouds obscured the blue
And half the landscape's beauties hid from view;
Or pipe of lark or eagle's pibroch scream
Were scared or drowned by shrieks of prisoned steam;
When Nature's quiet voice could yet be heard
In peaceful song of bee and brook and bird,
Inviting man to the unvexed recesses
Of her majestic sylvan wildernesses;—
Then (as old Chaucer says) by easy stages
Did "longen folk to gon on pilgrimages,"
In coach or carryall or "one horse shay"
They jogged along the quiet country way;
Or, better still, on horseback rode at ease
With forehead bared to woo the morning breeze.
So rode that pleasant troop whose forms repass
Forevermore in Fancy's magic glass,
Drawn by the spell of *his* exhilarant lay
(The morning-glory of Old England's day),
Who dipped his brush in the enchanting hues

That play and sparkle on the morning-dews;—
 True sons of merry England, hieing forth
 Along those pleasant lanes o'er Kentish earth,—
Knight, Miller, Franklin, Sumner, Palmer, Clark,
 Good fellows all and each as gay as lark,—
 Each mounted on his palfrey, mare or nag,
 Good cheer behind in bottle and in bag,
 And better cheer in story and in song,—
 As thus in festal mood they jogged along,
 Was it not meet these wights, so blithe and merry,
 Should *canter* leisurely to Canterbury?
 Loitering along the road, perchance, at times
 (As strenuously slow as these, my rhymes).
 For these blithe pilgrim-folk, I apprehend,
 Were not in haste to reach their journey's end.
 Though to a stately shrine their steps were bound,
 Yet all the way was over pleasant ground;
 The holy martyr's tomb they went to seek,
 That oft had holpen them when sore and weak;
 Yet was there not a healing in the trees
 That lined the road, and in the balmy breeze?
 Had Nature's living breath and human tones
 Less power to work a charm than dead men's bones?

But wherefore then do these my wayward rhymes
 Wander to far off lands and distant times?
 One reason may have been—I am not sure—
 That whilom I, in a White Mountain tour,
 From Alton Bay passed down toward Londonderry
 And made a pilgrimage to Canterbury,
 With two good fellows scores of years ago—
 But that was not my only reason—no:
This was my thought—how, in these hasteful days,
 We miss the healing touch of Nature's ways,
 With what a gentle grace her guiding hand
 Would lead us up through Beauty's magic land,
 Up through the Majesty of solemn woods
 To the Sublime of mountain solitudes.
 By beautiful gradations she prepares
 Both soul and sense to climb her heavenward stairs.
 Alas! we reach, in these degenerate days,
 Her glorious shrines in too ignoble ways!
 With snort of iron steed we wheel along,
 The steam-pipe's fitful screech our only song;

Old forest-pines, alarmed such sight to see,
 Are startled from their staid propriety.
 And far behind us, as we speed away,
 Lo, how the "green-robed Senators" Chassez!
 Birch-groves in whirling waltz go spinning round,
 The grazing cattle in wild antics bound;
 And the deep thickets, as our train sweeps by,
 Send forth a scornful hiss or mournful sigh.
 Will not one day the good old times come back,
 And grass again o'ergrow the iron track?
 Oh would but for one day some power restore
 The aspect this enchanting region wore,
 When, forty years ago, companions three,—
 A small, select, congenial company,—
 From sultry Naumkeag came on foot to take
 Their fill of Nature's charms in wild Waumbeck.
 Again those sweet and winding ways I tread,
 Where Saco rippled o'er his pebbly bed,
 Or, lost from view awhile, anon was seen,
 Twinkling like silver down some dark ravine.
 Up through the valley's windings, day by day,
 In pleasant chat we sauntered on our way;
 (Haley, our spaniel, zig-zagging the while
 A lively chase of leagues to every mile).

The morn and evening walk—the noon-day rest—
 Day's parting salutation in the west—
 "The breezy call of incense breathing morn"—
 The locusts' hum—the rustle of the corn—
 The swinging sign-board of the wayside Inn,
 ('Tis pleasant to remember such *have been*!)—
 The weekly clothes' wash in the mountain brook,
 Beneath the bridge in some sequestered nook—
 The muttering thunder and the pattering rain—
 The hurried fording of the stream to gain
 Yon hospitable hut, and shelter there,
 Till the bright sun broke through the balmy air—
 Then, as we take our onward way once more,
 Earth's billows closing in behind, before,
 The spectacle from some commanding height
 Of such enchantment breaking on the sight,
 That we too felt as if the first were we
 "That ever burst into that silent sea"
 Of mountain pines—these memories throng again
 Upon the soul—a visionary train.

The mountains' great embrace enfolds me round,
 As when I entered first that holy ground.
 Have I not seen the genius of the place,
 Old Abel, patriarch of that giant-race?
 I see that grisly, grim old face once more,
 I hear his welcome at the old inn-door!
 That beetling brow—those stern and steady blinks—
 Had scared full many a catamount and lynx.
 I saw him and could well believe that he
 Had shaken down like apples from a tree
 The cubs, abandoned by the old she-bear,
 That in their fright had sought a refuge there.
 To one who gazed on that old wrinkled face,—
 Where many a mountain-storm had left its trace.
 And age his crow's-foot tracks—seemed it not fit
 That this old Jotun of the hills should sit
 There, like a warder, at the mountain-door
 That leads to yon weird valley, grim and hoar,
 Whose blasted sides and rock-strewn bed had been
 The scene of many a giant-battle din,
 When, frightened by the elemental wrath,
 Bewildered Saco fled his wonted path,
 E'en as from that lone house, the inmates fled,
 Which else had saved them in that night of dread,
 Spared as it was, sole witness of the vale
 To tell the passer by the tragic tale.—

Gone⁵ that memorial of a frightful fate—
 And gone that sentry at the mountain-gate.
 Gone all those giants of the elder days,
 Gone are the good old times and *slow old ways*,
 When step by step the musing pilgrim wound
 His quiet way up through the holy ground.
 Found tongues in trees, songs in the running brooks,
 And wisdom's whispers in the wayside nooks;
 Not, as to-day, by a steam-tempest hurled
 Into the bosom of the mountain-world;
 At morn he sees the breakers with their white
 And gnashing teeth leap up the rocks—at night,
 Far inland hears, hundreds of miles from shore,
 The giant mountain-pine-woods' sea-like roar.

⁵Not *literally*, but *virtually*, as it stands no longer in its sublime and affecting solitude.

How shall a man in these new-fangled days,
 Go back to the pedestrian's homely ways?
 Where is the five-mile Inn to greet his sight
 With promise of a home at noon and night?
 The *Inns* are out to-day—their day is o'er—
 That institution can return no more.
 Roll back the tide of time—and haply, *then*,
 You may get back the old Inn-life again.
 Where railroads come the inns must disappear;
 No man can stop to taste their homely cheer.
 The old time-colored house whose aged frame
 Leaned fondly to the earth from which it came,—
 That oldest settler that might seem to be
 Coeval with the soil and scenery—
 Is gone; the pilgrim will behold no more
 The old stone fire-place and the sanded floor—
 Will hear no more the well-sweep's cheerful creak—
 No more the faded sign-board's rusty squeak—
 Nor “cloy the hungry edge of appetite”
 With berries, milk and brown bread morn and night,—
 'Tis gone with the old times and the old men,
 And could it, in this rushing age, again
 In its old place and ancient form appear,
 Its wayside welcome who could stay to hear?

No, I do *not* forget what Solomon says
 To him who asks, Why were the former days
 Better than these—O grumbler! he replies,
 Wilt thou the ways of Providence despise?
Pur-blind laudator acti temporis!
 Rise to a better, broader view than this!
 All things are moving towards a blessed goal,
 Descried afar by them of generous soul.
 The rumble of the steam-car seems to say:
 Make in the desert for the Lord a way!⁶
 Bring down that which is high—exalt the low—
 He to all flesh His wondrous works will show.

Well, since accept we must both speed and steam,
 Enough to live old times an hour in dream.
 Be thankful for the Present *and* the Past,
 Nor vainly sigh for that which could not last;

⁶ This thought is borrowed from a striking and sublime sonnet of Jones Very's.

Each blissful yesterday still lives to-day,
 "A thing of beauty is a joy for aye."

And so, through all the rush and whirl of years,
 The tranquil picture ever reappears—
 Through Breton woods in August afternoons,
 The crags are hung with raspberry festoons—
 The Ammonoosuck, as we stroll along,
 A fourth companion, murmurs sweetest song—
 In evening's glow far over Bethlehem's plain
 Looks a farewell that glorious mountain train.

O what a chain of loveliest landscapes lie
 Visioned in memory's calm unfading sky!
 Forevermore through her mysterious glass
 Franconia's green and graceful arches pass;
 Far through, the mountain walls on either side,
 A soft, aerial apparition glide.
 That strange stone face, so weird and yet serene,
 Looks off into the sky with mystic mien;
 Deep in the woods, hid from intrusive eyes,
 The Silver Lake in virgin beauty lies,
 A liquid mirror, set in frame of green,
 O'er which the softly sighing birches lean.
 And there, in beauty, the Great Spirit smiles
 On the bright lake of the three hundred isles.
 But above all these charms I feel the thrill
 Of that mute mountain-salutation still;
 And standing at their feet once more would fain
 Lift to the ancient hills a grateful strain.

Alps of New England! I salute once more
 Your august foreheads, as in days of yore:
 Once more with youthful ecstacy I stand
 Beneath your spell, within this wonder-land:
 Once more with child-like awe I rest my eyes
 Where your bare brows salute the upper skies;
 Once more with child-like love and joy I greet
 The murmuring streams that cling around your feet.
 My heart bounds up to meet the cascade's leap
 From crag to crag adown the dizzy steep:
 Up to the mountain-top I lift my eye,
 Where, like a silver thread, it hangs on high,
 Anon, a shining snake, I see it glide,
 Sinuous and swift o'er the green mountain's side;

Down the rock-cavern roar—to plunge unseen
 With muffled thunder through the dark ravine.
 The murmuring music of a thousand rills
 That gush unseen among these winding hills,
 Fills all the region with a spirit's voice,
 That makes the reverent listener's heart rejoice.
 "Ye hills, near neighbors of the stars!" I, too,
 With these a filial homage pay to you!
 As these, in clouds, back from the ocean come,
 And fondly cling around their mountain home,
 So to your wooded heights and gushing springs
 My heart a child's warm benediction brings,
 And owns a blessing in the balmy breeze
 That still breathes on me from your ancient trees.

O, brother giants of an elder world,
 Whose mighty fragments round your feet are hurled,
 With foreheads scathed by lightning and by blast,
 With clouds for mantles round your shoulders cast;
 Mute witnesses of immemorial time,
 Ye look upon us from your heights sublime;
 Shoulder to shoulder, evermore ye stand,
 Kings, priests, and benefactors of the land!

Old friends! as I return at this late day,
 My filial tribute at your feet to lay,
 Though many a change has come and much is gone,
 To memory's world forever more withdrawn,
 Though the great world, with all its whirl and din,
 On these, your holy haunts, comes thronging in;
 Though this our driving, levelling age invades
 All sylvan solitudes and sacred shades,
 Though fire and axe have marred the virgin woods,
 Shattered the rocks, and cramped and choked the floods
 (And though the peddler's paint-pot dare affront
 The nymphs of wood and stream with "Sozodont!"),
 Though often Echo's self, affrighted grown,
 Has held her breath, or from man's presence flown.
 Yet oh, how much remains and will remain,
 Which hand of ruthless man can ne'er profane.
 Old battle scars on many a tall cliff's face
 Still show as lines of majesty and grace.
 Untamed, the winds through mountain hollows sweep—
 Untamed, the cataract makes its mountain leap;
 And though unawed by your dread heights sublime,

Above the clouds man's daring engines climb,
 Up to *those* hills his soul must lift its eyes,
 The eternal hills wherefrom life's rivers rise.
 Above him still sounds the loud voice of God,
 When peal on peal the thunder rolls abroad;
 And still the voice of God breathes soft below,
 Where silver-lipped, melodious brooklets flow.
 The glorious outline of yon mountain range
 Shall bless men's eyes till the great final change.

And oh, that beauteous vision seen last night!
 Snatched all too soon from our enchanted sight!
 That rosy mantle o'er the mountains flung,
 In evening's glow for one short moment hung,—
 Was that transparent veil of amethyst
 Woven of sunset hues and mountain mist,
 A fleeting show for man's illusion given?
 Was it a thing of earth, or air, or heaven?
 Upon the mountain's cheek a spirit flush,
 That held our spirits in a reverent hush?
 The farewell of the mountains to the sun,
 As in the West he sank—his day's-race run?
 I know not—but it was a spirit's power
 That touched our hearts in that transcendent hour!

O listen, man, and hear the psalmist sing,
 Still as of old: The mountain heights shall bring
 Peace to the people! Come then ye who bear
 With troubled hearts life's daily load of care,
 Here in the grandeur of the hills baptize
 Your jaded souls, and as ye lift your eyes,
 Your hearts shall be uplifted, ye shall lay
 Your burden down and bear a song away.

O mountains! is it your echoes that prolong
 My endlessly reverberating song?
 But now my harp must cease the strain to pour,
 Though in my heart the hymn can cease no more.
 Hail and farewell! though mine is not the wit
 To read the runes upon your rock leaves writ,—
 The runic rhymes ye whisper to the heart,
 These I may haply, dimly guess in part,
 Though the heart's joy the tongue in vain would tell—
 Thrice blest, I cry once more: Hail and Farewell!

Thus to the mountains having said adieu,
 I owe, good friends, one final word to you.

Mountains are more magnanimous than we,
 And suffer all inflictions patiently.
 But you are human, and I feel to you
 A few explanatory words are due.
 If then my song seems longer than was fit,
 Think, that I had not time to shorten it;
 And if the wagon of my rambling rhymes
 Have seemed a little rickety at times,
 My sole apology for this is found
 In the unevenness of mountain ground.
 But if my work infirm and clumsy seem,
 Then say, too poor a bard essayed too rich a theme.

Dr. GEORGE A. PERKINS was next introduced. He said it was his happy lot to be a companion, in this early mountain experience, of his friend who had spoken and given the poetry of this journey. On the occasion referred to, they started with their packs on their backs, went to Boston, and there took a steamer to Portland, sleeping, as he well remembered, on the dining table, he and his companion having their arms around each others' necks to keep from rolling off. Arriving at Portland, they came on foot through Gorham, Standish, Fryburg and Conway, and up through the Notch, passing over the range of mountains between the notch and the top of Mount Washington, up the mountains and back. Their guide told them he had met a bear the day before, in the road between the Notch and where the Fabyan house now stands—the animal, fortunately, having been in a peaceable frame of mind, and allowing him to pass unmolested. As an illustration of the changed condition of things between that day and the present, he said the bill at the tavern in Conway where the three had partaken of supper, lodging and breakfast, was only one dollar for the three. He remembered stopping one night at the house of a woman in the Franconia Notch, who, without keeping a tavern, often put up travellers over night. In

addition to the lodging, the meals consisted simply of bread, milk, and raspberries. On being asked the price, the woman, with an apologetic air, said she did not wish to be hard, but, considering that the berries were an extra, not included in her usual fare, she hoped it would not be considered unreasonable if she charged them eight cents each instead of her customary price of six and a quarter cents.

On leaving the Franconia Mountains, the party came down through the Pemigewasset valley, through Plymouth, sailing across Lake Winnipiseogee to Alton Bay, then through Gilmanton to the Shaker Village of Canterbury. At the Shaker Village they met with a warm reception at the "Office." An aged woman met them at the door, saying she had been looking for them all day, with the greeting, "Come in, the Lord has sent you; I knew you were coming, for the cock got upon the door-step this morning and crowed three times." This was on a Saturday evening; they remained over Sunday and Monday, and on Tuesday morning started for home by the most direct road through Concord, Londonderry, Methuen, etc., walking forty miles on one day. The whole journey, with the exception of the steam-boating, was performed on foot, and occupied nineteen days in July and August of 1834.

The meeting then adjourned to listen to some excellent music from several members of the party.

THURSDAY, SEPT. 13.—Yesterday morning at about nine, the party left the Crawford for the Profile House, retracing their former course by rail, some leaving the cars at Bethlehem and others going on to Littleton. From both places stage connections were made. Among the elevations of interest were the Agassiz Mountain,

with the house upon it, and the White and Franconia Mountain ranges.

No visitor to the mountains needs to be informed of the bewitching character of the location of the Profile House in the Franconia Notch. While similar in its general character to that of the Crawford, it is more closely hedged in under the shadow of perpendicular mountains and frowning cliffs. The cannon maintains its outlines on the summit of Cannon Mountain, and though generations of men come and go, the "Old Man of the Mountain" still keeps looking off down the valley as if to watch the march of applied science as it works its way into these regions in the form of railways, and the progress of speculative science in its efforts to unfold the mysteries which are hidden among the rocks and the mountains. The attractions about here were abundantly improved by the party, most of whom rode to the Flume; visited the lake at the base of the Old Man's mountain; and tested, with their own lungs and ears, the prime quality of the echo at Echo Lake.

This morning full two-thirds of the party started for home, a few remaining over till Friday. The larger part of those who came away went back to Littleton in the stage, and at that point took the Boston, Concord and Montreal road for home, by way of Lowell. A fortunate few, however, took the stage ride of thirty miles through the Pemigewasset valley to Plymouth. The ride abounded in scenes of magnificence and loveliness. The winding road through the Franconia Notch is shaded by the dense woods through which it passes, and at many points in its delightful curves, could be caught, by looking up and back, views of the steep rocky cliff where the Profile hangs, but the identity of the Old Man's face was lost in the surrounding crags. All through the valley are lovely

intervals, through which the river glides gracefully on its course towards the Merrimack, into which it flows. The mountains rise in stately grandeur upon either side, and, from time to time, on looking back, the traveller is greeted with views of surpassing magnificence. The finest of these views of the Franconia Mountains is to be seen at a high point in that section of the road which is in the town of Lincoln. This is the view which Starr King considered the finest, and, in this opinion, the ordinary observer would readily concur.



REGULAR MEETING, MONDAY, OCTOBER 1, 1877.

MEETING this evening. The PRESIDENT in the chair. Records read. Donations and correspondence announced.

Dr. A. J. Thompson, of Salem, was elected a resident member.

The PRESIDENT stated that an invitation had been received from Newport, R. I., to visit that city. After some remarks, it was voted to accept the invitation, and the Secretary was requested to make the necessary arrangements.

The PRESIDENT—in behalf of a committee appointed at the annual meeting in May to consider the propriety of commemorating the two hundred and fiftieth anniversary of the landing of Governor Endicott at Salem, which will occur in September of next year—reported favorably to a suitable notice of the event, and that the Hon. William C. Endicott, of Salem, be invited to deliver the address, and to request the coöperation of the City Government

and the citizens generally. After a discussion of the subject, on motion of Hon. WILLIAM D. NORTHEND, it was

Voted, That it is expedient for the Institute to take the initiative in the matter of the celebration, and that the Hon. William C. Endicott be invited to deliver an oration on the occasion. Also that the committee to whom was referred the subject of the said celebration, at the meeting of May 21, be authorized to make further arrangements.

Voted, That the cordial thanks of the Institute are hereby tendered to Prof. Charles H. Hitchcock, for his interesting remarks made at the Crawford House, Sept. 11, on the "Geology of the White Mountain Ranges," and to the Rev. Charles T. Brooks, of Newport, R. I., for the original poem read by him at the same place and time, and that copies of each be requested for publication.



REGULAR MEETING, MONDAY, OCTOBER 15, 1877.

MEETING this evening. The PRESIDENT in the chair. Records read. Correspondence and donations announced.

Messrs. Arthur L. Goodrich and W. S. Nevius, of Salem, and Mrs. S. Towne, of Beverly, were elected resident members.

On motion of Mr. W. P. UPHAM:

Voted, That the thanks of the Essex Institute be tendered to the Rev. C. T. Brooks, Col. T. W. Higginson and Mr. James E. Mauran, of Newport; to Capt. K. R. Breeze and other officers of the Naval Station at Goat Island; to Moses G. Farmer and his assistants; and to the officers and members of the Redwood Library, for their courtesies and civilities extended during the recent visit to Newport.

REGULAR MEETING, MONDAY, DECEMBER 3, 1877.

MEETING this evening. The PRESIDENT in the chair. Records read. Correspondence and donations announced.

Mr. E. B. George, of Groveland, was elected a resident member.

The PRESIDENT spoke of the death of Mr. John C. Lee, for many years a member and an officer of the Institute, remarking upon the assistance given in its early history, and of the zeal and interest he had always shown in its objects, especially in the department of horticulture.

Rev. E. B. WILLSON followed and spoke of Mr. Lee as a parishioner as well as a neighbor, and of his very pleasant acquaintance in both relations. Mr. Willson also alluded to his fondness for nature, particularly of his love of trees, and said that his reading in the latter years was very extensive.

On motion of Mr. C. COOKE :

Voted, That a committee of three be appointed to prepare suitable resolutions of respect to the memory of Mr. Lee, the same to be entered upon the records, and a copy sent to the family of the deceased by the secretary.

Rev. E. B. Willson and Messrs. H. M. Brooks and G. M. Whipple were appointed. This committee was authorized to prepare a memoir of Mr. Lee, for the publications of the Institute, if the same should be deemed desirable.

Resolutions on the death of Mr. Lee :

The undersigned, appointed a committee of the Essex Institute to prepare resolutions expressive of the sorrow with which the Institute has received the intelligence of

the death of John C. Lee, Esq., and of the respect in which his memory is held, offer the following resolutions to be entered upon the records of the Institute.

Resolved, That the Essex Institute has heard the announcement of the death of John C. Lee with unaffected sorrow :—

That by this event it loses one of its honored founders ; a faithful officer bearing important trusts ; a true and constant friend, who has rendered it valuable and continuous service through the whole period of its existence :—

That by his many liberal gifts, by repeatedly procuring liberal contributions from others, and by affording it the benefit of his experience and judgment in the care and management of its funds, he met its pressing need in more than one exigency with a timely and substantial support, placing it deeply in his debt :—

That by the interest he took in its proceedings, the time and gifts he contributed to its collections and horticultural exhibitions, especially in its earlier and forming years, he stimulated a public interest in its objects and its prosperity :—

That, holding in grateful remembrance his gratuitous labors in its behalf, and his large and varied benefactions as a generous and steadfast promoter of its peculiar aims, the Essex Institute at the same time, in common with the whole community, pays honor to his upright character, his strong understanding, his public spirit, his ever ready coöperation in whatever was to be done for the general good of society.

Resolved, That we offer our sincere sympathy to his family in their great bereavement.

E. B. WILLSON,
HENRY M. BROOKS,
GEORGE M. WHIPPLE.

MEETING, MONDAY, DECEMBER 31, 1877.

MEETING this evening. The PRESIDENT in the chair. Records read. Correspondence and donations announced.

Mr. E. W. Jacobs, of Peabody, was elected a resident member.

The PRESIDENT called upon Prof. E. S. MORSE, who gave, in a familiar manner, a brief account of his recent visit to Japan. He left for Japan on the 19th of last May, and returned on Friday, the 30th of November. The main object of this visit was to study the Brachio-pods, which are found plentifully in Japanese waters. In addition thereto he noticed many of the inside views of Japanese life, from that of the peasant, in the little fishing town, to the highest educated people in the empire. On arrival at Tokio, formerly Yeddo, he was urged to become a professor in the university, and a most liberal offer was accepted. The Government gave extended aid in establishing a zoological station at the mouth of the Bay of Yeddo, and excellent work was done in dredging. Six weeks were thus spent, two Japanese assistants engaging in the researches. He found ample materials and his studies in this direction had been most interesting. He also made careful observations of the Lingula and exhibited some living specimens which he had brought from Japan.

He spoke of the shell-heaps which he examined, and said that the discoveries there will attract attention. He found one or two parts of a human jaw, a few stone implements, and a large quantity of pottery. Some fine photographs of the specimens found were exhibited.

He presented to the cabinet some one hundred and thirty or more specimens of the paper of Japan, includ-

ing the common kinds used in every day life, also the fine grades of fancy paper, wall paper, writing and note paper, etc. He concluded his remarks with brief allusions to the character of the people, their dress and habits of life; also of the numerous beautiful temples and shrines that are scattered throughout the country, many of them in wild places remote from the cities and towns. Photographs of several of these buildings were exhibited.

A vote of thanks was then passed to Prof. Morse for his interesting and instructive remarks.



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