

PROCEEDINGS
OF THE
Nova Scotian Institute of Science.

SESSION OF 1906-1907

ANNUAL BUSINESS MEETING.

Assembly Room, Province Building, Halifax, 12th Nov., 1906.

THE PRESIDENT, F. W. W. DOANE, in the chair.

PRESIDENTIAL ADDRESS: (1) WORK OF THE INSTITUTE; (2) RESEARCH WORK; (3) SANITARY SCIENTIFIC WORK.—By F. W. W. DOANE, C. E., City Engineer, Halifax.

Gentlemen,—A year ago, at the beginning of my twentieth year as a member of the Institute, you elected me to the highest office in your gift, an honor which I appreciate more because I am fully conscious that a better selection might well have been made in order to maintain the standard established by my predecessors.

In opening the forty-fifth session of the Institute by a short review of the events of the past year, it is a pleasure to be able to report that we have met with no losses either through death or resignation.

Papers.—The following papers have been communicated to the Institute during the year:

1. Presidential Address.—By DR. H. S. POOLE.
2. The Flora of MacNab's Island, Halifax.—By CAPTAIN J. H. BARBOUR, M. D., Royal Army Medical Corps.
3. Catalogue of the Birds of Prince Edward Island.—By JOHN MACSWAIN.

4. Mining—Is it a Science?—By W. E. LISHMAN, M. A.,
M. INST. M. E.
5. Additions to the List of Nova Scotia Fungi.—By DR. A. H.
MACKEY.
6. Halifax Water Works.—By H. W. JOHNSTON, C. E.
7. The Oil Fields of Eastern Canada.—By DR. R. W. ELLS.
8. The Frost and Drought of 1905.—By F. W. W. DOANE.
9. Eels in Water Pipes and Their Migration.—By WATSON L.
BISHOP.
10. Notes on Protective Coloring.—By FRANK H. REID.
11. The Grignard Synthesis: Action of Phenyl Magnesium
Bromide on Camphor.—By H. JERMAIN CREIGHTON.
12. Contribution to the Study of Hydroxylamine.—By G. M.
JOHNSTON MACKEY, B. A.
13. Water Powers on the Mersey River, N. S.—By W. G.
YORSTON, C. E.
14. The Damage done to Timber by *Teredo navalis* and *Limnoria
lignorum*.—By R. MCCOLL, C. E.
15. Phenological Observations, Canada, 1905.—By DR. A. H.
MACKEY.
16. Water-rolled Weed-balls.—By DR. A. H. MACKEY.

Of the thirteen authors who gave the Institute the benefit of their labors and observation, six presented papers for the first time, a fact which in itself is evidence of some progress. We cannot congratulate ourselves, however, that we are in the healthy condition that every member who has the best interest of the Institute at heart could wish. We have been depending too much on the work of the older members, and in consequence of the willingness with which they devote their time and energy to the arduous demands of each session, the enlistment of new workers has been somewhat neglected. While the interest of the older active members has not abated, their work could be lightened by the assistance of the younger members, who, by a little effort, might relieve the strain upon the knowledge and active intellect of those whose wonderful energy in the past has proved equal to the

demand upon them, and who have done so much to place the Nova Scotian Institute of Science among the chief scientific associations of British America.

Membership.—No addition has been made to the list of corresponding members, but four have been proposed and approved as ordinary members or associate members. A number of new members have not yet qualified for membership by paying the annual fee in consequence of defects in our financial system. This matter is receiving the attention of the council, and it is probable that changes will be made which will lead to the adoption of a more satisfactory system and place the finance department on a better business basis.

It should be our aim first to “set our house in order,” then to add to our membership as much as possible. We should have on our roll the name of every man in Nova Scotia who has the ability to add to our knowledge, and also all those who, though they may not have the opportunity or the requisite preparatory training to enable them to advance science themselves, are willing to encourage others in their efforts by their interest and their annual fees. There must be many of the latter class in the acquaintance circles of all our members, who might be induced to come in and help us if we make the effort. Indeed, there must be more persons in Nova Scotia devoting some portion of their time to scientific work than those whose names are inscribed on the membership roll of the Institute of Science. Let each member make a list of the names of those whom he considers eligible for membership and submit it to the new council. Let it be the duty of the council, assisted by individual members, to use every endeavor to obtain the allegiance of such persons, and I have no doubt that the result will be very beneficial to the Institute.

Meeting rooms.—The closing meeting of the last session was held in the room of the Mining Society, through the courtesy of its president. While one hesitates to record feelings of envy, it must be admitted that the cozy quarters placed at our service suggested speculations as to the benefits that would result to the Institute if we were able to maintain similar headquarters. If a campaign is

inaugurated for increasing the membership and consequently the revenue of the Institute, the next step should be to consider the advisability and possibility of providing a home for our society. From the first the provincial government gave the use of the only spare room at its disposal, and we are still indebted to the generosity of the government for a place in which to hold our meetings, and also a place wherein to keep our valuable library.

Publication.—We are handicapped by our limited purse and other conditions, so that it would be impossible to expend a larger sum at present on the publication of papers. A great effort should be made, however, to bring this work up to date. We should then consider the advisability of printing before they are read, all papers of general interest or special importance. If an advance-proof of such papers could be sent out some time before the meeting at which they are to be read, it would doubtless result in freer and much more valuable discussion and larger attendance at such meetings. Even under our present system the discussion is often second in value only to the paper itself.

Research work.—The practical value of research work is being impressed upon the public, and the business portion of the public is becoming interested more and more in the results of such work.

An address on a strictly scientific subject is not often of particular interest except to those who are engaged in the department of science discussed. The superficial observer who sees the oak but forgets the acorn, is likely to ascribe the great material advances of recent times wholly to scientific knowledge and rare ingenuity, and to consider the great inventors and the great captains of industry as the most important agents in bringing about the modern era. No other agent, however, has been of greater influence in making the mechanical evolution of the latter part of the last century possible than the great scientific investigators whose forceful intellect opened the way to secrets previously hidden from men.

Nature turns a forbidding face to those who pay her court with the hope of gain, and is responsive only to those suitors whose love is for herself alone. It is impossible to know what application

knowledge may have until after it is acquired, and the seeker after purely useful knowledge will fail to acquire any real knowledge whatever. In this fact lies the explanation of the extreme rarity with which the functions of an investigator of the laws of nature and those of the inventor who applies these laws to utilitarian purposes, are united in the same person.

This theme is one of special importance at the present time, because it is customary to ask about every new discovery in science, What is its value? It is only by going backward over the development of applied science that it is possible to realize the fundamental importance of research work. For instance, hardly any of the basic principles of engineering were discovered by men with any intent on practical work. The mathematical methods which are necessary for the engineer are the result of strictly scientific investigation, and the laws of physics and chemistry are being determined by the research work of men who care little whether their discoveries are to find immediate practical application or not. The development of industrial processes often suggests new subjects for investigation, and some of the best research work of to-day is being guided by business corporations, but the men who are so engaged are working in a purely scientific spirit, and leave the practical development of their results to the engineer.

The beginner in research work may be discouraged when he reviews the work of more advanced scientific investigators, in the belief that the greater part of the work has been done. He will soon learn, however, that in the words of the late Cecil Rhodes, "there is so much to be done." For instance, how little we really know of meteorology except a few statistics. How intangible is the air, yet it uproots strong trees firmly anchored in mother earth, tears heavy structures from their foundations and drops them in fragments far from their original location.

There is much to learn and plenty of room for every new worker who has the inclination, the energy and the persistency to wrest from nature her jealously guarded secrets.

Sanitary scientific work.—In that branch of science with which my daily work brings me in intimate connection, prominence

has been given during the year to the extermination of the mosquito, the purification of water by copper sulphate, and the ventilation of sewers and plumbing, and the abolition of the main trap.

The extermination of the mosquito has been accomplished, where it has been undertaken by first a campaign of education, then the expenditure of considerable sums of money in destroying the breeding places by draining and filling up, etc.

The copper sulphate treatment of water has engaged the attention of the world, and it is apparently becoming more and more evident (1) that water infected with algæ can be purified by this means, and (2) that water which has been so purified is quite fit for human consumption, and that no one need fear harmful effects.

Abolition of the drain trap.—The ventilation of sewers and plumbing has been a burning question elsewhere, but the “abolition of the house trap” has become a live question in Halifax, and consequently may be worthy of more than passing notice.

The regulations of the city health board require the installation of a trap at or near the point where the drain leaves the house, and although there has been much diversity of opinion elsewhere regarding the necessity for its use, there had been no question here until the master plumbers asked that the sanitary regulations be amended so that the main trap could be omitted. This trap, known in England as the intercepting trap, is in that country intimately connected with the larger question of the ventilation of sewers and drains, which has been more or less the subject of controversy since the illness of King Edward, when Prince of Wales, in 1872. The intercepting trap was patented by W. P. Buchan, Glasgow, about 1875, and, without any special investigation, was adopted by the local government board and introduced into its model by-laws in 1877. Such official recognition caused its advantages to be taken for granted, and deterred many people from investigating the question for themselves. The controversy resulted in a general consensus of opinion that “sewer gas must be cut off from the house,” and the intercepting trap was adopted with that object in view.

Recently many engineers engaged in municipal work have favored the abolition of the trap, and their argument has been

greatly strengthened by experiments made in England and elsewhere to determine whether sewer air is actually dangerous or not. Medical officers of health are more conservative in their views, and are for the most part strongly in favor of the retention of the trap.

It is probably true that there is no local sanitary authority in this province, where sewers, drains and plumbing exist, which has not had to deal, at some period or other, with complaints as to the nuisance caused by the escape of sewer gas, and it may therefore be assumed that the subject is of importance to every section of the community.

It is not advisable or necessary in these remarks to introduce the technical pros and cons that are so often used. Such arguments may be reserved for a technical paper or for the benefit of municipal sanitary authorities. The question which is of special interest to us, and which, too, must be considered to a certain extent unsettled, since it is yet under investigation, is, does sewer air injuriously affect health?

About a year ago the borough council of Hampstead, England, employed two experts, F. W. Andrews, M. D., F. R. C. P., D. P. H., and W. H. Hurtley, D. Sc., to make analyses of sewer air and report on the bacteria suspended therein.

The particular points which the experts set themselves to investigate were: (1) Can it be determined whether the emanations from the sewers are likely to cause disease? (2) What is the substance which gives rise to the disagreeable odors? (3) What is the chemical composition of the sewer air at different levels?

As regards the first point, which is the most important, it is the general, but not altogether unanimous opinion, that sewage bacteria do not exist in sewer air. This opinion has been based upon the results of only a few investigations; and on the other hand it has been abundantly proved that sewer air, escaping direct into houses, has injuriously affected the health of the inmates. This fact has led to the assumption that there must be some subtle chemical action in such cases which has not yet been discovered, and which might possibly also exert its influence in the open air.

The bacteriological examination of sewer air has not received the attention which should have been given to it, and possibly we have in our own ranks members who, by research and investigation, can throw some light on this important question. Within the last few years improved methods for investigating air-borne bacteria, especially *Streptococci*, have been introduced, but they have not yet been applied to sewer air, and when it is borne in mind that *Streptococci* are the most abundant organisms in sewage, that they are amongst the most important of disease-producing bacteria, and that some at least of the diseases to which sewer air is credited with giving rise, are in all probability streptococcal infections, it is plain that the examination of sewer air for *Streptococci* should prove an important field of investigation.

Improved methods have also been recently introduced whereby the common intestinal bacteria belonging to the *B. coli* group (including the typhoid bacillus) may be much more easily identified and isolated.

The first step taken by Dr. Andrews was to endeavor to find sewage organisms in the sewer air, and he succeeded in finding an organism which was not the true *B. coli communis*, but was identical with a characteristic sewage member of the group, present in the sewage to the number of at least 30,000 per c. c.

The most important experiments, however, were those relating to *Streptococci*; and Dr. Andrews established the fact that the *Streptococci* of the sewer air are very different from those of the fresh air outside the sewers, and in the very point in which they differ from those of the fresh air they tend to approach those of the sewage. The importance of this discovery cannot be overestimated, and it is fairly obvious that the whole future disposition of sewer ventilation or sewer air treatment may depend upon the facts which further examination in this direction will produce.

The question arises, what effect does this variation in the constitution of *Streptococci* have upon the human constitution? Both Dr. Andrews and Dr. Hurtley remained in the sewers for long periods and it is not recorded that they suffered at all; in fact, Dr. Hurtley specifically states that he did not experience the slight-

est inconvenience. In this connection the case of sewer men, who are notoriously healthy subjects, may be instanced.

Although these investigations seem to establish pretty clearly that sewer air, as such, is not necessarily dangerous, and that the probability of sewer air organisms being carried into the outer air so as to become a danger is exceedingly remote, yet it must be admitted that there is still an off-chance, and it is that off-chance which produces a doubt.

There is still a belief that, for some as yet unknown reason, sewer air escaping direct into dwelling houses is a danger, and that sewer smells are objectionable and a nuisance no one will deny. The public therefore will probably await the result of further investigation.

W. MCKERRON presented the treasurer's accounts, which were referred to the auditors.

The librarian's report was presented by H. PIERS, showing that 1911 books and pamphlets had been received by the Institute through its exchange-list during the year 1905; and 1,457 had been received during ten months (January to October) of the present year, 1906. Particulars were also given of the total number of books and pamphlets received by the Provincial Science Library (with which the books of the Institute are incorporated) during the year 1905. This number was 2,590, of which 1,911 were the society's exchanges as above-mentioned. Increased use of the library was reported, as shown by the number of books borrowed, namely 536 in 1905. A card catalogue of the manuals and general works, arranged alphabetically by authors and subjects, has been completed during 1906, and these books have been arranged on the shelves according to the decimal system of classification. The report was received and adopted.

The SECRETARY reported that the KINGS COUNTY BRANCH of the Institute had done no work during the session of 1905-6, nor during the previous session. It was resolved that the subject of branch societies be referred to the incoming council.

It was resolved that the thanks of the Institute be conveyed to HIS HONOR THE SPEAKER OF THE HOUSE OF ASSEMBLY, for his courtesy in permitting the use of the assembly room as a place of meeting.

Reference was made to the desirability of having some exchange system in Canada which would take the place of that of the Smithsonian Bureau of International Exchanges at Washington, which latter bureau can not now undertake the work of forwarding book packages to foreign countries owing to the magnitude to which such work had grown of late years. The subject was referred to the council.

The following were elected officers for the ensuing year (1906-1907):

President—F. W. W. DOANE, C. E., *ex officio* F. R. M. S.

Vice-Presidents—PROFESSOR EBENEZER MACKAY, PH. D.; PROFESSOR J. E. WOODMAN, D. SC.

Treasurer—J. B. MCCARTHY, B. A., M. SC.

Corresponding Secretary—A. H. MACKAY, LL. D., F. R. S. C.

Recording Secretary—HARRY PIERS.

Librarian—HARRY PIERS.

Councillors without Office—MAYNARD BOWMAN, B. A.; WATSON L. BISHOP; EDWIN GILPIN, JR., LL. D., F. R. S. C., I. S. O.; ALEXANDER MCKAY; PROFESSOR FREDERIC H. SEXTON, B. SC.; HENRY S. POOLE, D. SC., F. R. S. C.; WILLIAM MCKERRON.

Auditors—PROFESSOR D. A. MURRAY, PH. D.; R. MCCOLL, C. E.

A vote of thanks was presented to the retiring treasurer, W. MCKERRON, for his services; to H. PIERS, for his work as secretary; and to the PRESIDENT, MR. DOANE.

FIRST ORDINARY MEETING.

Assembly Room, Province Building, Halifax, 14th Jan., 1907.

THE PRESIDENT, MR. DOANE, in the chair.

It was reported that PHILIP A. FREEMAN, engineer, Halifax Electric Tram Co., Halifax, had been elected an ordinary member.

A paper was read, entitled, "Notes on Mineral Fuels of Canada," by R. W. ELLS, LL. D., F. G. S. A., F. R. S. C., of the Geological Survey, Ottawa. (See Transactions, p. 61.)

SECOND ORDINARY MEETING.

City Council Chamber, Halifax, 11th March, 1907.

THE PRESIDENT, MR. DOANE, in the chair.

H. PIERS and J. B. MCCARTHY were appointed a committee to prepare a suitable design for a seal for the Institute, and to have the same engraved.

In the absence of the author, MR. PIERS read the following paper by GENERAL CAMPBELL HARDY :

REMINISCENCES OF A NOVA SCOTIAN NATURALIST: ANDREW DOWNS.—By MAJOR-GENERAL CAMPBELL HARDY, R. A., Dover, England.

In days gone by, when the writer of this paper was quartered at Halifax, N. S., then a great naval and military station of the imperial government, there were two interesting spots which a stranger generally visited first, namely the Old Point Woods and Downs's Zoological Gardens at the head of the North West Arm. The former are now enclosed and preserved in the area termed Point Pleasant Park: the latter have vanished from the scene. It is then the object of this paper to recall a picture of the past, to speak of the remarkable man who lived at the head of the North West Arm, and to describe his charming location, Walton Cottage.*

A little stream runs in at the head of the North West Arm, and following it up by the road which branches from the main road from Halifax in the direction of the Dutch Village, a few hundred yards brought us to Downs's gates.

The cottage nestled in its prettily wooded grounds, with the shores of the Arm in the background receding towards the blue Atlantic. Here nature and cultivation were charmingly blended together, and the wild birds from the hills behind loved to come in and nest in perfect confidence in the owner's good will towards all living creatures. For I will say this of Downs by way of introduc-

*The grounds on which Downs's zoological gardens were situated are now the property of the estate of the late John Doull, and Walton Cottage is at present the residence of Dr. Arthur Doull.

tion, that he was a man of sweet disposition, tender and merciful to all his feathered friends, and though perhaps he could not say yes to Emerson's pointed question, "Hast thou named all the birds without a gun?" he was incapable of any act of cruelty or neglect.

My acquaintance with Downs commenced very soon after arrival, for in him I found the very man who could tell me all about the wild creatures of this favoured little province, the ideal home of the naturalist and sportsman. To live and camp in the great backwoods of Canada had been my ambition in early youth, and in his company I served an apprenticeship as it were, and commenced habits of observation which have stored my memory with the songs and scents of the woods and the ways of their denizens during a prolonged residence of some sixteen years.

In re-reading lately a very entertaining little book by Samuel Smiles, entitled "The Life of a Scotch Naturalist," I was struck by some points of resemblance between its subject, Thomas Edward, A. L. S., and Andrew Downs of Nova Scotia. Both were men of humble origin, and both became in their early lives devotees of nature study as it is now popularly termed, leaving their respective callings to work in that fascinating field. Both were strenuous workers, taxidermists and collectors, practical men and not over much given to library lore. Both were recognized by the scientific world as having acquired their knowledge of natural history at first-hand, and though cultivating their own powers of observation. It seems, too, that they had much similarity of character, the same honest grasping of facts and hatred of shams, the same Spartan-like simplicity of life, with much originality and a sturdy independence which under all circumstances compels respect. Edward was credited with many discoveries and additions to British zoology. Downs gave more impetus to forwarding the knowledge of local natural history than any Canadian before his day. Every visitor desirous of acquaintance with wild life in the woods or by the waters of Acadie, went to Downs for advice or reference; and few returned to Europe, after a sojourn more or less prolonged in the maritime provinces, without taking back either some trophy of the larger game or specimens of the beautiful avi-fauna of eastern Canada which had passed through our naturalist's skilful hands.

An extended biographical sketch of Downs's life on the model of Smiles's little work would doubtless be very interesting, but as he was a man who sought retirement and seldom troubled himself with correspondence, and as, moreover, time is fast effacing his memory in Nova Scotia, it would be difficult to get together sufficient and reliable materials for such a compilation. I have, however, recently received from the recording secretary of the Nova Scotian Institute of Science,* of which I am a corresponding member, a paper on this subject written by himself and embodying extracts from an article by the editor of the *New York Forest and Stream*, a personal friend and admirer of Downs, whom he had visited. On reading it, I was induced to refer to a number of old diaries and notebooks of Nova Scotian days, and was glad to find Downs's name frequently occurring therein, as well as an article which I contributed in 1864 to a Halifax newspaper* and have fortunately preserved, undoubtedly the first notice of Downs and his establishment which had then been published. I quote the article here, as a contemporary account of the naturalist and his interesting collection of animals:

Sketches in Our Neighbourhood: An Afternoon with Downs.

Half an hour's walk from the city, over the Common, and down the telegraph-road leading to the west, brings the visitor to the cross-roads at the head of the North West Arm. If a stranger, your question—"Is this the way to Downs's?" is probably answered by a piscatorial urchin, seated by a little brook which here trickles into the salt-water under a bridge, by "Yaas, that's it, where yer hear them burds screaming'," pointing to the road turning off towards the Dutch Village. In confirmation whereof the shrill scream of a peacock or discordant cry of a cockatoo reaches your ear, and we presently arrive at the gates of Walton Cottage Gardens.

And here let me say ere proceeding, that these gardens were the first "Zoo" established on the American continent—a fact often recounted to me by the founder with some pride.

Prettily surrounded and hid from the road by fir woods, Downs's house, approached by a circular drive, stands on a slight eminence overlooking the whole length of the North West Arm. It is a neat, rustic little residence with tall, sharp-pointed gables ornamented with trellis,

*Harry Piers, Esq. See "Sketch of the Life of Andrew Downs, founder of the first zoological garden in America."—*Proc. N. S. Inst. Sci.*, vol. x. p. cii, with portrait.

† *The Acadian Recorder*, edited by Mr. Peter Hamilton and Hunter Duvar.

and a porch groaning under the weight of the honeysuckles and Virginia creepers which have seized upon it. Several pairs of antlers of moose and deer adorn the sides under the roof; and tall poles, bearing painted miniature cottages, are planted around for the express benefit of such birds as will take advantage of the gratuitous lodging thus afforded, and the offer of free board with the well-fed poultry in the yard—a spacious enclosure with a large, clear pond fed by a stream from the hill-side in the rear, and shaded by shrubberies, through which are cut prettily-winding walks in every direction.

Here we probably find the owner himself spreading Indian corn broadcast amongst a rude, greedy assembly of every kind of fowl—land-fowl and water-fowl, great thick-thighed cochins and diminutive bantams, hearty swans which come up to the banquet, with a hasty, waddling gait ill befitting their dignity, and fat, glossy ducks of every hue that at once suggest the idea of comestibles in the shape of green pease. In fact, I was about to pass them over as being, in the language of the advertisers, “too numerous to mention,” but as Downs himself is engaged in feeding them, it is worth our while to stay and hear him expatiate on their beauties and peculiarities; for he is a quick, sharp-sighted, and enthusiastic naturalist, and will point out things which we should otherwise have never thought of noticing. “There are days,” he says, “when the light seems to bring out the colours on birds’ feathers which you would never see in dull weather, days when all nature seems brightened up by the peculiar state of the atmosphere; when the trees seem greener, when the sky has a greater softness and depth than commonly, and your own feelings are in tune with all around. Look at that wild turkey as he comes swelling along, and the sun’s rays light up the wonderful metallic hues on the neck, back and sides, hues of bronze, and green, and orange-copper, which now and then flash with the brilliancy of the humming bird’s plumage.” A pair of pigeons alight at your feet, bowing and scraping around. Perhaps a delicate plum-bloom appears to colour their necks and breasts; but in a moment they burn with emerald green, and in another with the sparkling tints of hyacinth or topaz. These brilliant greens placed on a subdued ground-colour, and changing into the gleaming tints of precious minerals, are favourite touches of nature’s pencil from amongst the wide range of colours with which she has so lavishly painted the plumage of birds. The beautiful pencil marking on the silver Hamburgs are pointed out to us, and the bright golden spangles on another variety of domestic fowls. The uncomfortable appearance of the little fowls from China with all their feathers curled back, and the curious blue ear-lobes of the Japanese, which have a blue skin underneath their white feathers and blue bones likewise; the beautiful green velvet jacket which sits so trim and close on the East Indian duck, are all brought under notice by the zealous exhibitor, and the uncouth—stay, I have used a wrong word, and shall be presently corrected by Downs himself, with whom

I heartily agree that there is nothing really ugly or frightful in nature, and though these terms are often employed conventionally, it is really very snobbish to do so, unless in the case of accident or design, by which nature has been made to fall short of her work. It appears to me the height of arrogance to criticize or disparage any of nature's handiwork. Wherein lies our ability to judge? "Ask a toad," says Voltaire, "what is beauty, the supremely beautiful, the *τό καλόν*! He will tell you, it is my wife, with two large eyes projecting out of her little head, a broad and flat neck, yellow belly, and dark brown back." So, friend visitor, be warned not to revile even the toad in the presence of our naturalist, or perchance he may cause thee to be ashamed of thy speech.

Within a little paled enclosure adjacent to the yard are the wood-ducks, the gems of the collection. To see these beautiful birds looking their best, we must choose a bright day, such as has been described. No stuffed specimens can show the vivid colouring of the living and healthy bird in its prime. Many of the glossy hues fade in death, as well as the rich colouring on the upper mandible, of the iris and legs, and which cannot be artificially rendered with justice to the bright tints of life. The wood-duck, so called from its habit of roosting and building in trees, is a rather rare summer visitor in this province. It loves to make its nest in hollows in tall trees, by the banks of forest streams far from the haunts of man. Its Latin name (*Anas sponsa*) signifies the bride-duck, "a pretty name for a pretty creature," as Frank Forester says of it. As Downs chases them over the brook which trickles through this enclosure, and up the sunny bank, that we may the better observe the play of the light on their gorgeous plumage, we notice how strictly they keep in pairs, each drake accompanying his soft, modest-looking duck, and continually uttering a little, subdued cry—*peet, peet*. I have seen these birds in their wild state on the Shubenacadie; once on Gold River, and, more frequently, in the wild river solitudes of northern New Brunswick, when, as our invading canoe scared them from their haunts, they would fly down stream, their brightly-painted forms standing out against the dark background of fir-forest in the soft light of a summer's afternoon. A flock of almost equally beautiful little ducks, natives of South America, with less gorgeous, but exquisitely marked plumage and showy crimson spots on the bill, occupies the same cage as the wood-ducks, where also stalks a very conceited and rather obtrusive crane from the Mississippi, who marches around you, apparently earnestly regarding the ground, but really meditating as to the prudence of indulging in an old failing—that of casually driving his long, sharp beak through your boot.

We cannot fail to notice the tameness of the swallows (the white-bellied wood-swallow), which breed in the little boxes set up for them round the house, and sometimes but a few feet above the ground. Quite regardless of your presence, they continue their nest-building or feeding

their young almost within reach of your hand. I like to see these swallow boxes set up round country houses; they seldom fail to attract a pair of tenants, and nothing is more pleasing than to hear their twittering song, as they busily flit past the window, when awakening on a bright summer's morning.

Many other wild birds also chose these grounds for their family residence. A pair of golden-winged woodpeckers have built in an old stump close to the house for several seasons; robins' nests are met with everywhere; last year a pair hatched two broods in a low fir bush by the side of the glass-house; and in the shrubberies, close to the paths, many varieties of warblers may constantly be seen throughout the summer flitting to and from their closely-hidden nests. Nor is their confidence misplaced. Downs may apply the words of our gentle-minded Cowper in the "Winter Walk at Noon":

"These shades are all my own. The timorous hare,
Grown so familiar with her frequent guest,
Scarce shuns me; and the stock-dove unalarm'd
Sits cooing in the pine tree, nor suspends
His long love-ditty for my near approach."

Sure of protection and ample fare, many migratory birds spend the long, cheerless winter in these grounds. One of these late, cold, dull days, by which the advance of the spring is this year so retarded, I heard the first song-bird here, the joyous note of the song-sparrow emanating from a thicket in the pheasant's enclosure. The little bird had been a guest all winter. Blue-birds (*Junco hiemalis*) and robins also remain. The latter are often seen during this season in many places in the neighbourhood.

It is very satisfactory to see robins and all other small birds now protected by law from being shot within the precincts of the city; whereas formerly they were continually stalked and fired at, particularly in the spring before mating, when the former birds hop over open grass-plots from which the snow has disappeared, in search of worms, in large flocks. Hard times do these appear for the early visitors, and many a buffeting snow-storm and hard-binding frost drives them to the verge of starvation before the new land flows for them with milk and honey, as the numbers of dead robins found on the snow-covered fields in the very cold weather of March, 1863, testified. Instead of cruel persecution, our small birds are deserving of encouragement and protection. In England the long-sustained suspicions of the farmer and the peasant as to the destructiveness of many species have been allayed, and every hedge-row is jubilant with songsters; whereas in France scarce a bird is to be seen in many districts, not only from their supposed noxious qualities, but from the comprehensive spirit of the term "*la chasse*" as pursued by French gunners.

“You call them thieves and pillagers; but know
 They are the winged wardens of your farms.
 * * * * *
 And think of your woods and orchards without birds!
 Of empty nests that cling to boughs and leaves,
 As in an idiot's brain remembered words
 Hang empty 'mid the cobwebs of his dreams!”

But to return from this digression to Downs's feathered captives who are apparently not a whit less happy than the wild birds who flit around them.

Leaving the motley assemblage of poultry and water-fowl in the yard, we enter the shrubberies by soft tanned walks along which are scattered the clean-looking, roomy cages allotted to a variety of feathered creatures. Here is an airy little tenement devoted to silver pheasants. The neatness of their plumage and the graceful sweep of their tails render them exceedingly ornamental; but they are, withal, so pugnacious that two separated males apparently devote their whole lives to pacing up and down the dividing wire netting, challenging each other to mortal combat. The silvery plumage of their necks and backs is beautifully pencilled with minute lines, and strongly relieved by their glossy black breasts and bodies. We so generally see birds with the lightest colours beneath, that, when this rule is excepted, a strange appearance is produced and the bird would almost seem inverted. Another instance is that of our common bob o'Lincoln in its summer dress. Further on, whole groves of young spruces are enclosed and netted over; and against their dark foliage the resplendent plumage of the golden pheasants shines in bright contrast as they run to and from the cover and their little house in the corner. Then there are aviaries with flocks of plump snow-buntings; another where the merle and throstle, so often mentioned in the poetry of the fields of merry England, nestle in the fir tree, happily forgetful of the hawthorn bush or oak coppice; the plumed and Californian quails from the far west pick lazily at ant-hills or squat in groups on the warm, sunny banks, under fern and low bushes tastefully introduced in their enclosures; whilst, in another, the spruce partridge of our own forests may be seen pruning the foliage of his favourite larch or silver-fir.

These grounds offer great natural advantages for the tasteful arrangement of a zoological garden: the sloping hillside topped by thick woods is continually broken by mossy hollows with numerous little brooks to which the woodcock and bittern often resort; and the dry, grassy knolls between are adorned by clumps of young firs and white birches, and the olive green tufts of the ground-juniper, amongst the roots of which the retiring may-flower trails towards the light.

By the side of one of these little valleys, dammed so as to form a miniature lake over which a picturesque rustic bridge is thrown, stands a

building known as the "glass house," a light and ornamental structure of painted wood-work and glass used as a green-house and aviary for rare tropical birds, an aquarium room, and a museum; and from the summit of the tower can be obtained a beautiful view of the grounds and the surrounding scenery.*

The aquarium is very attractive; a constant stream of water, derived from a more elevated pond, flows through all its compartments. Here may be seen many inhabitants of our lakes and streams—the silver dace and the yellow perch, in all respects similar to the English species save in his bright golden hue; the cat-fish of hideous mien, whose wide, gaping jaws and voracity render him the tyrant of the lake; the little terrapin or mud turtle of our alluvial rivers basking on semi-submerged rock-work with gorgeously coloured species from other climes; and several other amphibious reptiles, including the yellow-throated and leopard frogs, and the large yellow-spotted salamander common to our little rocky pools by the road-side, though seldom seen, as it is strictly nocturnal in its habits.

But now let us glance at the birds of prey engaged close by. A splendid pair of bald-headed eagles at once arrest our attention, though they have not arrived at the mature age necessary to produce the condition of plumage from which their misnomer, "bald-headed," has been derived. In the adult bird the head, neck and tail become pure white; the pointed hackles of the neck laying in sharp regularity on the close bronze plumage of the bird's body. The iris, beak, nostrils and legs assume a bright golden orange hue. This is the chosen emblem of the United States—the bird of America. The description given of its habit of depriving the osprey of its finny prey, by the great ornithologist of this continent. Wilson, is a beautiful piece of composition; as likewise is that of Audubon, the subject of which is the eagle's attack upon the wild swan in mid-air. There is about this bird an unmistakable air of fierceness and intractability; and it continually indulges in a habit of throwing back its head and giving vent to screams of defiance which must strike terror into the breasts of the captives around.

In adjacent cages sit several specimens of our native birds of wisdom—the owls. These are the great horned owls whose deep-toned hooting emanating from the dark spruce swamps is so familiar to the sojourner in the woods. Heard on a calm, still night in the forest, this sound is most impressive, and, though so connected with melancholy associations, it brings with it nevertheless a strange feeling of pleasure, probably owing to the mournful notes harmonizing with the mystery with which our imagination delights to invest the woods at night, especially when fitfully illumined by the moon. There is a dapper little owl of this species—quite a beau, trim in plumage and wide-awake—confined in one of these cages, who will treat us to some of his music whenever we approach him; and we see, if we look closely, that in emitting the sound, the bill is not opened

* The glass-house is now (1908) almost in ruins.

in the least; the sound is very guttural and the throat swells to a large hemispherical bag and at the same time the tail is raised. The older birds of his species sit far back in the shade under the sloping roof, apparently absorbed in moody reflection; for we cannot look at their great eyes, over which the covering membrane, which acts as an eyelid, slowly falls and is withdrawn, and the apparent abstraction evinced by their form and attitude, without fancying them to be cogitating deeply.

“Upon a beam aloft he sits,
And nods, and seems to think, by fits.”

A much brighter-looking bird, however, appears in the form of the snowy owl, confined close by, a stray wanderer from Arctic climes to our woodlands on an extended hunt for rabbits. His quick eyes, which he uses to seek his prey by daylight, unlike most of his family, follow our every movement. Dr. Gilpin states that this bird may be seen sitting in the full glare of the sun, watching the rabbit burrows on the sands of Sable Island, of which he has of late years become a visitor.

Finally our agreeable guide and entertainer conducts us to the top of the hill, where, standing on a huge, erratic boulder of granite which has been left by glacial action in its present site on a bare plateau of slate rock, we may enjoy the beautiful and comprehensive view which opens to us as we turn. Beneath us and at our right are the gardens, with their walks and shrubberies, and the white tops of the bird houses. Beyond, the North West Arm stretches away to the outer harbour; Thrumcap, projecting from the eastern shore, just coming into the picture; and the wooded top of McNab's Island appearing above the south end of the peninsula. The snugly ensconced little sheet of water called Chocolate Lake is partly seen. On the high lands of the peninsula which ridges in front of us, the citadel and its signal station, the common, the fields and farms dotted with white houses, and the wooded spur of Rockhead successively meet our view as we sweep the horizon. Then the blue expanse of Bedford Basin and its distant hills, with the little, white tower of the three-mile church nestling in a fir grove by its shores in the foot of the valley; the picture being bounded on our extreme left by the slopes of Geizer's hill, thickly wooded and skirted at its foot by the road which winds round the valley through the pretty settlement known as the Dutch Village.

And now we retrace our steps, and take leave of our worthy guide with many a good wish for his long enjoyment of the beauties of nature in the pleasant retreat which he has chosen. His conceptions of her teachings, and the mode in which he imparts them to the visitor, are alike original and sound; and few can leave the zoological gardens at the North West Arm without realizing that they have spent a happy afternoon with Downs.

“Happy who walks with him! whom what he finds
 Of flavor or of scent in fruit or flower,
 Or what he views of beautiful or grand
 In nature, from the broad majestic oak
 To the green blade that twinkles in the sun,
 Prompts with remembrance of a present God.”

It was a year or so (it may have been two) after the foregoing article was published that I find in my diary some notes on an incident in which I was much interested at the time, the packing and shipment of some live specimens of moose-deer at Walton Cottage gardens, consigned to Victor Emmanuel, then King of Italy, who was an enthusiastic acclimatizer of large game in his grounds at Pisa. The following is an extract from an account of this incident which I forwarded to the *London Field*. I may here mention that at this time much interest was taken in acclimatization, to forward which there were societies in London, Paris, and elsewhere. In Great Britain the leading men in this direction were Buckland, Grantley, Berkeley, Tegetmeir and others. I have not heard much of this subject of late, but curiously enough saw in a paragraph in my *Morning Post* quite recently a request from the government of New Zealand for as many as fifty moose deer, if procurable, to be forwarded from Canada to the antipodes. Of course the deer would go to the south island where both pine trees and snow are to be found, but what would their food consist of? That would prove, I think, the crux of the experiment.

It appears that Victor Emmanuel, imbued with the spirit of acclimatization, had been procuring a number of the deer of the New World through an agent who made known to our provincial naturalist his majesty's wants with respect to the monarch of the North American forest—the moose. The right man and the right place were selected; but although in no part of North America is the moose-deer more plentiful than in Nova Scotia, living in our small forest areas nearer the borders of civilization than anywhere else, so few of these noble animals are taken young, and successfully reared, that but three could be procured on that occasion throughout the province.

The trio consisted of two cow-moose of the ages of two and a half years and eighteen months, and a sprightly young bull-calf of

seven months, the latter as nearly resembling an overgrown juvenile donkey as could well be imagined on the part of a member of the deer family. The youngest of the cows had been for the past year a much-admired resident in Downs's gardens, where, perfectly domesticated, and roaming in a railed-off patch of its native thickets, it had thriven and afforded much pleasure in contemplation of its strange action and configuration, so often described as uncouth, but so beautifully adapted to its natural state of existence. The larger animal was three-quarters grown, the finest tame specimen I had ever seen; she had been brought in from a distant settlement, the property of a farmer whose clearings verge on woods where moose are plentiful, and had been long a pet of the settlement, feeding with the domestic cattle and from the children's hands, and occasionally roaming at large in the woods. "I can't tell when I can bring her down," said the settler to Downs, when he offered to part with her; "I guess she's away off in the woods just now." But the next time her ladyship took a notion of returning to a state of civilization, the stable door was shut on her, and, driven into a roughly constructed cage of planks, she was shipped and brought down to Halifax in a schooner. A few days after her arrival I went to Downs's gardens to witness the packing of the moose for their voyage to Boston. A little previous fasting, and their excessive fondness for turnips, readily induced them to step boldly into the narrow crates prepared for them, so narrow that when we stuffed in the wadded bolsters to prevent their being injured by struggling or motion on board the packet, it was as tight a fit as could be imagined. "Pack them as tight as they can stand," were the express orders. I never saw animals take such sudden and close confinement so philosophically. Their long heads and prehensile muzzles were stretched out of the apertures in front, eagerly expecting the chopped turnips, without manifesting the least alarm at the novelty of their position; and they were most quietly and satisfactorily drawn into town on a long truck, and swung in their cages on to the deck of the packet. Mr. Downs himself accompanied them, taking plenty of their natural food, i. e. the tops of young birch and maple, and a few evergreen branches, such as the Canadian hemlock and silver fir, to which they are like-

wise partial, especially in winter. The cases were securely lashed across-ship, and the vessel started with favourable auspices. Alas, I have now to chronicle disaster; they made a capital run, almost within sight of Boston light, when one of our terrible mid-winter gales sprang up from the south-west, and drove them nearly the whole distance back. For nearly a week was the vessel most mercilessly buffeted, whilst the seas dashed over her; and under the influence of intense frost everything on board was coated with huge masses of ice. Suffice it to say, that the two smaller moose died from the roughness of the passage and their cramped position. The survivor would doubtless have perished likewise, had not two cages been knocked into one so as to allow her to lie down and stretch her limbs. This she always did when the weather was heaviest, invariably lying with her head towards the seas; and she was landed in Boston, and thence by train at New York in excellent health, and without a gall or scratch. This fine cow—whose value, I almost omitted to mention, was greatly enhanced by her being heavy with calf—was joyfully received by the agent for the King of Italy, and shared with a herd of thirty wapiti (also the property of his majesty, and alike awaiting a passage to Europe), the attentions of many visitors in the Empire City.

Although the passage which has proved so disastrous to the poor moose was unusually rough and protracted, even for a sailing vessel, we have a wrinkle here in connection with shipment of large animals of the deer tribe. Close packing, even with lots of padding, will not answer. Applied, perhaps, to short voyages, and where the animal is restive, it may do; but the exhaustion from a cramped and long-continued position, where it has to bear every shock as part and parcel of the ship, has proved fatal in the cases noted. On the opposite side, witness the largest moose quietly lying down in bad weather as soon as chance to do so was allowed her, and her always adapting her position to the motion of the vessel and the run of the sea. I, therefore, agree with Mr. Downs in the idea that a crate shaped like a hen-coop, well padded on the sides, and especially above, is the best form of cage for transporting large animals of the ruminant order on long sea-voyages.

As a suitable animal for acclimatization in England, I cannot recommend the moose. The great objection is the nature of his food; he is exclusively a wood-eater, living upon the tender branches of deciduous trees, with a proportion, more particularly in winter, of those of evergreens. No plantation or copse in England could thrive with a couple of moose in it; and, though fond of roots, such feeding would prove fatal, as I know from experience; whilst, with one exception, I have never seen a tame moose accept hay or grass. If it were not for this, we would have in the moose an animal most appropriate for acclimatization—with the speed of a trotting horse, the strength and endurance of an ox, a docile and useful beast of burden, and good for food. Its flesh, being very open in its fibre, is very digestible, possessing a good flavour between that of beef and that of venison. It always commands a good price in the market when in season.

Speaking of this animal, the moose was once exceedingly plentiful in the forests of Nova Scotia, and is still holding its own despite increasingly restricted areas, and the large annual tribute it is called on to pay to the sportsman—to say nothing of the poachers, back-wood settlers or greedy Indians. And so the constant employment of Downs as the one taxidermist in the province who could set up a head and horns, can be well imagined. All through the autumn and that part of the winter during which moose-hunting was legal, a stream of trophies from the woods came up to his work-sheds. The skins of the heads were there pickled in preservative liquor in vats, and the horns, with a portion of the frontal bone of the skull, cut out and labelled with the shooter's name. He employed a trusted workman to carve out the pine block (it was always of yellow pine) on which the skins were stretched and united round the horns, which were with the connecting piece of the skull firmly screwed down. It was quite a sight to see these magnificent sporting trophies ranged in his shed. Downs stuffed many hundreds of these moose heads as well as cariboo (I see Mr. Piers states eight hundred in his paper) and they are scattered all through Europe and America. Some I know of are still in good preservation after fifty years of resistance to time and the attacks of moth. One of his finest specimens is (or was) I

believe in Buckingham Palace, having been presented to Her late Majesty Queen Victoria; whilst a whole family stuffed by him appeared in the Nova Scotia Court at the Paris exhibition of 1867. His charge was moderate; I think I used to pay him twenty or twenty-five dollars for setting up my own heads. The true-to-nature modelling of the curious nose of the moose was his forte. The eyes he put in, so he told me, were the upper part of the inturned glass at the bottom of a black bottle. I never heard anyone express aught but delight on receiving his trophy back from the hands of Downs.

To get the heads out of the woods to his establishment what work we sometimes had! To back the huge thing out of the woods, and such woods too, with swarms of blow-flies trying to lay their eggs on it (I am speaking of the warm days of the autumn hunting, in the winter the snow makes it much easier) was often a difficult undertaking even for an Indian, who carries it over his shoulders by the "carrying-strap," and he is liable to have one of the great moose-ticks fasten on his neck—"all same as pieces of fire, he bite." I remember once coming out of Beaverbank woods, twenty miles from Halifax, with a splendid head we had shot while "calling" the night before. My friend was my guest, who had come out from England to see the woods, and being most anxious to get the head into Downs's pickling tub the same day, I started off with about sixty pounds weight on my back, hoping to do it alone, the Indian being obliged to go back to the hunting ground to get the meat with the settlers' help. I did not get far. It was too much, and we had to obtain a cart or rather a waggon.

But to return from this digression to the occupant of Walton Cottage gardens. He called it Walton Cottage after visiting Charles Waterton, of Walton Hall, the author of *Wanderings in South America*, of which more anon. There were many additions to the zoo after my descriptive paper of 1864 was written, to wit bears, polar and black; moose, seal, beaver, etc. White bears are often procurable in Halifax, brought in by vessels trading with Labrador. The specimen I saw at Downs's was always consistently ferocious. Those of the black species, on the other hand, are pleasant to have as pets. The Indians often bring them in. I bought

a young one for a dollar which did a deal of damage in my barrack room the first hour I possessed him, and, finally, by attacking my legs, compelled me to get on a chair. But he was an exception. I gave him to an officer going home—poor Welsford who fell at the Redan, and I believe the animal came to a bad end, having injured a child. I gave him porridge and milk, and I well remember his comical snarling face as he greedily plunged his head into it up to his eyes, growling the whole time. My wife and I, visiting Downs's establishment one afternoon, found two young bears engaged there making a great fuss, the owner having gone into town and left them without food—not a usual trait with Downs. I went up the hill to saunter awhile in the woods, and on returning, found her pacifying the youngsters by feeding them out of a child's bottle obtained from the house, one at a time, on her lap, to the astonishment of the boy who was left in charge. Perhaps I had better state here that a young bear, even at mid-summer, is not a very big animal. At birth, generally in February, it is surprisingly diminutive, not more than six inches in length, almost hairless, blind for the first month, and weighs less than a pound; four to six hundred pounds being the weight of the adult bears, *i. e.* the black species, the only one found in Nova Scotia.

Downs had some trouble with his seals. They were the ordinary harbour species (*Phoca vitulina*), frequently seen in Halifax harbour and in the North West Arm. Though wired in an enclosure with a pond and running water, the smell of the sea so near was too much for them, and several times have they been met on the road, bumping themselves along down the hill to the head of the Arm near which, the alarm having been given, they were recaptured.

To Downs the province owes the introduction of both the English pheasant and the Canadian red-deer (*Cervus virginianus*), and I find the following paragraphs in a paper entitled, "Provincial Acclimatization," which I contributed, in December, 1864, to the N. S. Institute of Natural Science, of which I was at that time a vice-president:

"With the fact of the introduction and breeding of the English and gold and silver pheasants at Mr. Downs's establishment we

are well acquainted; and the most interesting fact is the well-ascertained capability of the English pheasant to live and find its own subsistence in our woods through a rigorous winter. Why should not this experiment be continued?"

I have known golden pheasants on the property of Mr. Faulkner, the brewery, Dartmouth, to roost out away from their weather-proof house in the branches of fir trees, uninjured in any way, on a cold night when 23 degrees of frost were registered.

And as to the Virginian deer, the following appears in the same paper:—"The red deer then of Maine and the Canadas, and more recently of New Brunswick, appears to be perfectly adapted for an existence in the Nova Scotian woods—a graceful species, but little inferior to the red deer of Europe, affording the excellent venison with which the New York and Boston markets are so well supplied. Indeed it is already with us, for a small herd of healthy animals may now be seen at Mr. Downs's gardens, to whom the country is already indebted for many an unassisted attempt at real, practical acclimatization."

Between the above and the present date, 1906, this beautiful deer has been turned out and so thriven that it is be found now in every county of the province. Its greatest enemy, the wolf, is not found in Nova Scotia, though frequent in the adjacent intervals a troop of these marauders comes in over the connecting isthmus and is heard of here and there from various counties which it visits, but the species has never been known to stay. There is something about this province which does not suit its fancy. In frequent wanderings I have only once seen the track of a wolf in Nova Scotian woods. It was chasing a young moose in deep snow.

Thanks to the ceaseless efforts of the Game Protection Society which was inaugurated at Halifax in 1852 when I was present, the province has definitely added *Cervus virginianus* to its larger game. It is everywhere increasing. One of the society's agents speaks of it in last year's report as "coming out in the fields among the cattle on several occasions."

Though spoken of in the yearly reports as being found wild here and there, the pheasant is not doing so well, as the fox, the

wild-cat, the eagle, owl, and the rabbit-snares are against it, with the great host of the weazel tribe—ermine, mink and marten. Raccoons, too, which are numerous in some parts of the province, are most destructive to game birds nesting on the ground.

In one of his papers on Nova Scotian birds, contributed by Downs to the N. S. Institute of Natural Science in 1865, Downs writes thus of the English sparrow:—"What a treat it would be to see these saucy fellows preening their feathers on our roofs and collecting in dozens round our doors to pick up the scraps, and I would even go so far as to say, gobbling up the cherries in our gardens; for who would not make a sacrifice of some kind to colonize his domain with such a family of merry friends?" Anent which Mr. Harry Piers, the secretary of the Institute, writes me the following answer to a question about the sparrow, dated Halifax, 1904: "Yes, the European sparrow is met with everywhere in Nova Scotia, I am sorry to say. I once was his friend, but with all the evidence there is against him, I have had to turn over to his enemies."

Thoughtlessly brought over the Atlantic to eat up the canker-worm in the trees of American cities, the sparrows did well for a while, but with change of climate soon developed other tastes. They became almost wholly seed and vegetable eaters, devouring young buds on vines and trees, and injuring all cereal crops, so that they are now protested against as bad citizens and criminals and condemned by everyone. They increase very fast and spread everywhere, driving away the native birds, taking their homes and making themselves generally nuisances. The same story comes from Bermuda, where they are driving out the two wild birds of that colony—the beautiful blue and red birds. Another instance of the terrible mistakes which may be made by ill-advised acclimatization.

Although it has been stated that Downs was rather shy of letter-writing, there was one man whose correspondence he prized and whose praises he was never tired of recounting—the veteran naturalist, Charles Waterton, of Walton Hall, Yorks, the author of *Wanderings in South America*, and of many essays on

natural history subjects—"My worthy master in ornithology," he calls him, as he quotes from the well-known book which I own took my own fancy immensely when, as a boy, I first read in its pages the wonders of the South American forest. In those untravelling times there was no library without it. On Downs's return from Europe, which he visited in 1864, being given a free passage in H. M. S. *Mersey*, and taking over many cases of birds as well as a stuffed moose, I went to see him, to hear him recount his adventures. At that time I lived with my family on the shores of the Arm and was a near neighbour. He had received many attentions from savants and had been a guest of Waterton. He spoke of Waterton's tenderness of feeling towards all created things, especially the feathered tribes; how he would allow no guns to be fired by sportsmen or others on his estate, how the wild birds all seemed to understand him, and what a motley gathering there was in the groves and shrubberies of the park at Walton Hall; how he would inveigh against the superficial and absurd natural history as often published in his days both in England and the United States, even Wilson and Audubon coming under the lash of his criticism. "You should hear him," said Downs, "talk of the Hanoverian rat, the only dumb creature I really believe which he really hated." Waterton being of an old English Roman Catholic family which had held Walton Hall for centuries, had no good word for the Hanoverian dynasty, and averred that he had evidence to prove that the grey rat was part of the freight of the vessel that brought over Dutch William. Anyhow, Walton Hall, besides having some of Cromwell's musket balls lodged in the old wood of the house porch, was more than ordinarily troubled by the grey rats, the deadly foes and exterminators of the old English black rat, both in Europe and America, which latter country it very soon reached. I remember a specimen of the black rat being shown at one of our Institute's meetings at Halifax, which had just been killed in Water Street. It was then stated that up to about a century ago it was the common vermin of both countries. In New Zealand, too, the European grey has destroyed the native black rat, once the sole animal food of the Maori, being the only indigenous quadruped of the islands.

Frank Buckland, an old friend of my own, was delighted to meet Downs. Every one of note visited his grounds, including our sovereign, King Edward, the late Duke of Edinburgh, Prince Jerome Bonaparte, and many others. Pleasure excursions to the head of the Arm by steamers often bore numbers of Halifaxians bent on an afternoon's ramble in his charming domain.

Offered the post of superintendent of the New York Central Park Menagerie in 1867, he declined the post through some misunderstanding, and, giving up his grounds at the North West Arm, died in Halifax on 26th August, 1892, aged eighty-one years all but one month.*

In concluding this paper, I think I cannot do better than close with the words of our friend in ending one of his contributions to the proceedings of our Institute, the subject of which was the land birds of Nova Scotia, read in 1865:

“Having now arrived, gentlemen, at the end of my present list, I must state that all the facts I have given may be safely relied on as they are the result of forty years' experience in bird life. And I would, here, as it is the very first time I have ever appeared as a reader in public, take the opportunity of counselling the young men of Halifax to take more interest than they do in the natural history of their country. Many an hour passed in walking up and down Granville Street in tight boots might be devoted far more profitably to studying the quiet scenes of nature. If I had listened to the advice given me by the young men of my time, I do not think I should have had the pleasure of appearing here this evening; and instead of being happy, as I now am, in the presence of my brother naturalists, and possessed of a cheerful home to which I can retire, surrounded by my feathered favourites, I should most probably either have descended to an early grave, or been the habitual frequenter of the tobacco and dram shops. No; the country for me, before all the pleasure and grandeur of the town. Old Waterton once said to me he would sooner be in the woods than in the finest palace in Europe.”

* Other particulars regarding his life, and a list of his published papers, will be found in Mr. Piers's article before referred to.

General Hardy's paper was discussed by the PRESIDENT, DR. A. P. REID, DR. A. H. MACKAY, W. L. BISHOP, H. PIERS, and T. C. JAMES.

The SECRETARY was directed to convey to GENERAL HARDY the thanks of the Institute for his interesting communication.

THIRD ORDINARY MEETING.

Assembly Room, Province Building, Halifax, 13th May, 1907.

THE PRESIDENT, MR. DOANE, in the chair.

It was reported that LOUIS L. MOWBRAY, of Hamilton, Bermuda, had been elected a corresponding member.

The SECRETARY read a letter from MR. STUPART, director of the meteorological service, Toronto, informing the society that the self-recording rain-gauge for Halifax, that had been asked for that station in accordance with a resolution of the Institute of 9th April, 1906, had been received by the department and would shortly be installed.

H. PIERS reported on behalf of the committee appointed on 11th March, that the committee had prepared a design for a seal for the Institute, and had had a die engraved, which had been approved by the council.

H. W. JOHNSTON, assistant city engineer, Halifax, read a paper entitled, "The Run-off from a Small Drainage Area near Halifax, N. S.," the drainage area in question being that of Bayer's Lake, a portion of the Chain Lakes water-shed. The subject was discussed by E. L. FENERTY, P. A. FREEMAN, H. PIERS, and the PRESIDENT.

W. L. BISHOP took the chair while the PRESIDENT, F. W. W. DOANE, city engineer, Halifax, read a paper on "Halifax County Water Powers: (1) Starr Manufacturing Company's Power." (See Transactions, p. 21). The subject was discussed by E. L. FENERTY, W. L. BISHOP, P. A. FREEMAN, and others.

HARRY PIERS,
Recording Secretary.