
ANNUAL REPORT
OF THE
SOUTH AFRICAN INSTITUTION, 1830.

AWARE, as the Members are, of the recent establishment and limited resources of the Institution, they will not anticipate in our report a record of extensive researches, or eminent discovery. We can only congratulate ourselves on a prosperous commencement of an interesting experiment, and on having a cheering prospect of success in the objects we contemplated. The Members have great reason for satisfaction in the general interest wherewith the Institution and its operations have been welcomed; and in the cordiality and effect wherewith its proceedings have been carried on. We may anticipate that the aid and countenance we require, will flow from wider and more abundant sources as our object becomes more fully apprehended, and as increasing numbers in society come to feel the benefit and gratification of affording and imbibing knowledge; and that confidence in our proceedings will increase, according as our efficiency for useful purposes augments with our experience.

Though we have met with some slight difficulties, we trust it will be concluded, that what we have gained is more than commensurate with the trouble and expense entailed upon each one. The pledge which we have given will be very inadequately redeemed, if we allow small difficulties to deter us. And when we remember how many great and important things there are tending to the benefit of this our country, to the accomplishment of which we may advance effectually, though we advance slowly, we will feel that a very imposing claim for our perseverance arises not only from what we have promised or attempted, but from the ease and certainty with which we may reach their accomplishment. The Institution will still look for efforts from its Members, well directed and unwearied as hitherto, that we may repay, according to our ability, our debt of gratitude to other lands for the knowledge they afford us, and may be accelerating the period when more abundant sources of information shall be opened and resorted to in our own.

The Institution entered as early as possible into correspondence with such individuals in the country districts, as seemed likely, from their talents and situation, to have opportunities of promoting its designs. We have thus endeavoured to originate the interest in our procedure, and to spread widely the agency, through means of which success is most to be anticipated. We have the satisfaction to record our experience of the benefit of this measure, and have every reason to rest in the conviction that the demand which we have made on the attention of our fellow colonists, will be abundantly answered, by our securing,

if we continue to merit it, a rich supply of the information we covet, from the intelligent observers scattered over the extensive and varied domain submitted to our research. The Institution has already been gratified by receiving from its Members many interesting communications in regard to those branches of knowledge which it proposes to investigate; and to our correspondents in the country we are indebted for several valuable elucidations of those matters to which we endeavoured to direct their attention.

By the measure which the Institution has sanctioned, of extending its usefulness, by recording its transactions in the *South African Quarterly Journal*, the benefit of the information given and secured is readily diffused; and, though this subsidiary experiment has been of very limited extent and duration, the result is sufficiently encouraging.

Time has not yet been afforded us for effecting a reciprocal intercourse with the similar associations of loftier aspect and greater power in other countries: but we have no reason to imagine that our humble efforts will be overlooked, or that our willing aid will be disregarded in the extensive researches which they prosecute. They are awake to the advantage of possessing a local and permanent agent in a district so deservedly the object of their attention; and we may anticipate much gratifying and useful direction from the instructions they communicate, or from the example they set us in their proceedings regarding those matters on which we mutually speculate.

Of the nature and object of our domestic transactions during the elapsed twelve months, we shall now proceed to give a short detail:—

In regard to our internal economy, the regulations we adopted have been, it is conceived, as few and simple as the case would admit of; and we feel that we are correct in leaving, as the result of our future experience, the additional rules which a greater extent or complexity in our operations may require.

The Institution made an early endeavour to excite attention from the public, to those subjects involved in our researches which were most likely to be of general interest and benefit, by proposing honorary premiums for the most approved communications in regard to them. In consequence of a request to that effect, an extensive list of such subjects was furnished by Members of the Institution, from which the Council, in compliance with your instructions, selected *four*,—such as in our present circumstances seemed of most utility. It is to be regretted that this measure has been unsuccessful; and it will rest with the succeeding Council to determine, whether the mode of operation may be varied so as to have the intended effect; either, perhaps, by diminishing the number of such subjects, and striving to concentrate attention to a greater degree on the more important: or, by extending the time of competition, or augmenting the rewards or privileges conferred on the successful. Though, as

such a reward is entirely honorary, and to be expected only as such, it may scarcely be advisable to be prodigal in applying our pecuniary resources in this manner, except a case should occur in which extensive experiments may be required for the elucidation of the proposed subject. The Council, however, proceeded to fulfil the intention of this vote as well as circumstances admitted, by resolving to present two medals in cases where they judged that a mark of your esteem and approbation was called for; as shall presently be detailed.

The only result of this proposal of the Institution, has been the transmission of a new model of a carriage intended to be used in conveying any kind of goods, with less waste of power than in common wagons, and in regard to it the Council have had a report in nearly the following terms:

“That there does not appear in this model that degree of originality in the invention, or of probable advantage in the adoption of the construction proposed by the contriver, which the Institution ought to seek in bestowing their premiums. The structure of the model offers confessedly a copy of the invention of another, with modifications so slight, as can scarcely have been overlooked; and, therefore, were probably contemplated by the original inventor. But to the principle of the contrivance itself, and to the exertions of the individual who here first brought it into notice, the Council may think it incumbent on them to direct their attention. The carriage of liquids in large casks, rolling on their sides, appears to have been first proposed here by Mr. Naude three or four years ago, and he has since, by numerous additions and improvements, brought it to the form exhibited in a model transmitted to you by Mr. Hertzog; and, though the idea be not a very recondite one, the principle being in some cases in common employment, and different carriages of the same nature having been at different times proposed, used, and forgotten, yet the circumstances in which the present attempt was made, and the energy and perseverance of the contriver in his different improvements of it, do abundantly entitle him to such marks of esteem as the Institution have proposed to confer on zeal and talent employed for the public advantage. A patent for the same contrivance has been taken out in North America, and is described in a late number of the *Franklin Institute*; but, as from the different proposals in regard to it, some of the advantages of the construction seem to be overlooked, it may be advisable here to explain, shortly, whence is derived the advantage of the construction:—The resistance opposing the progress of a common carriage is of two kinds; 1st, the friction of the axle; 2d, the resistance created at the rim of the wheel. The first of these arises from the vertical pressure of the load upon the axle, modified by the strain or effort exerted by the moving power; and the real resistance so produced appears to be very constant, or nearly independent of the velocity of pro-

gress. Now, in the case of the roller, neither the weight of the load, nor of its carriage, rests upon the axle; and, therefore, the only resistance produced there arises from the weight of the frame, modified as before, by the strain of the moving power; which will, together, produce generally a very small fraction of that resistance which has in this way been obviated.

It has happened that in the patent above alluded to, this circumstance has, apparently, been disregarded; since, for the purpose of preserving the load always in the same position, it has there been proposed to suspend a carriage on an axle inside of the roller, and thus return exactly to the principle of an ordinary wagon. It is obvious that the two effects of diminishing the resistance as already described, and at the same time preventing the load from revolving, are quite incompatible. It will be observed that, in the model of Mr. Naude's contrivance, now in the possession of the Institution, the advantage of the structure would also partly be resigned, if a suggestion shewn in it were adopted; or if, as there appears intended, the strain of the moving power were directed to the circumference of the wheel in place of its axis. No advantage could in this way be gained, unless in the hypothetical case, that the diameter of the friction-wheel interposed, could exceed the diameter of the roller itself. From these observations it will be seen, that in those circumstances where the friction at the axle is almost the only resistance which the moving power has to contend with, (which is the case on a good rail road), by substituting rollers for carriages, the resistance might be reduced to a small fraction of its general amount; so that a horse now able to drag on an average 8 or 9 tons, could with the same effort drag above 38*.

The second part of the resistance, viz: that at the rim of the wheel is, in the case of the roller, nearly all that remains to be overcome by the moving power, and is little affected by the change proposed, if the road or bearing surface be hard and smooth, but where the wheels can sink into a soft material, the advantage is very much in favor of the roller. There is, however, a disadvantage attending the employment of these machines in the great force required to turn them. This Mr. Naude has ingeniously attempted to remedy, by using double rims enclosing friction-wheels; so that when the roller turns aside from its direction, one end may retire while the other advances. This is an expensive arrangement, but certainly effectual for the intention."

* To explain this and a preceding allusion, we may remark that the resistance of a cylinder of 3 feet in diameter, rolling on iron, does not appear to exceed 1-900th part of its weight, and that the whole resistance, when the same load is disposed in a carriage with wheels of the same diameter, amounts to 1-200th. As the resistance arising from the friction at the axis of the roller is only about 1-200th of the pressure upon it we attain a ratio nearly $4\frac{1}{2}:1$, when the axles are of the same size, which would be increased by the comparative smallness of the axle of the roller.

The report concludes by suggesting to the Council, that Mr. Naude deserves the encouragement of the Institution, and it appeared advisable to the Council that one-half of the sum voted should be appropriated to this purpose, by presenting Mr. Naude with a medal of that value.

In regard to those objects relating to the scientific and economical statistics of this country, which it is the professed intention of the Institution to investigate, it is clear that we are entitled to require a longer respite 'ere there be claimed from us any very important result. We can at present do little more than consider and point out the methods by which useful discoveries may be made. But we shall certainly by perseverance collect, in no long time, an interesting mass of information on these subjects, from the gradual incidental progress which the attention of our Members and Correspondents allows us to make. It may be contemplated as an effective mean to gain such knowledge on these matters, if we were enabled to provide suitable sets of the more common instruments used in meteorology and surveying, to be put into the hands of correspondents competent to avail themselves of their several uses. And as illustrative of the condition of the earth's surface, it will be of use to request from our correspondents, according to some form or outline to be furnished to them, the most minute information in their different districts, according as they have leisure to acquire it, in regard to the slope, direction, velocity, abundance, and temperature of streams; the acclivity or altitudes of elevations or plains; the direction of chains of mountains; and the course, inclination, number, and composition of their beds of mineral deposits. It should be well understood that minute and detailed information as to these matters, even in the smallest district, will be most acceptable.

The interest of our geological domain increases every day, as it becomes more known. We have various notices of formations, as they are generally termed, occurring to a great extent in the colony, different from the primitive slates and granites of the southwestern Peninsula, and the sheets of quartzite sandstone which here overlay them, hitherto generally considered as characteristic of Southern Africa. That series, known in the Wernerian nomenclature by the name of *Transition rocks*, "the lower fossiliferous series," seems to occur extensively distributed. A few of those fossils, characteristic of transition limestone, or other beds of the same series, have reached us. A commencement has in some degree been made, by one of our Members, in determining the magnitude and boundary of the deposits. As it is a class of rocks which generally has proved of great importance, it will be exceedingly valuable to ascertain the precise outline and extent of the space it occupies, and its relations to the older rocks around us here, which seem to dive under it, and the exact nature of its component beds. Its limestones generally

afford beautiful architectural marbles: its slaty conglomerates are, in some countries, among the richest in metals of the strata composing the earth's crust.

Though some members of the general series of rock formations, are almost always absent in particular districts, yet we may here look confidently for something analogous to the carboniferous limestone and coal deposits of other countries. Among the fossils transmitted from the interior, there are some which seem to indicate rocks of a newer formation, as is also pointed out apparently by the reported change of aspect which the colony presents towards its centre, and eastern extremity. Every thing relating to these formations is of deep and permanent interest, and deserving of our active research. Besides the general attention they claim from the utility of the pursuit, we have this advantage in the research, that scarcely any form of the earth's surface could render the examination easier.

This end of the colony abounds with precipices on which the plane-edges of the strata emerge distinctly into light, and in the mountain-passes we have the means of examining the structure of the elevations, of numbering their beds, and studying the effect of their proximity to the surface, or vegetable life; and the nature of its supply of water has every where over the colony furrowed the country with gullies, having sides bared by annual floods. It were well the Institution suggested to country correspondents a regular and minute examination of the course of mountain torrents, and such chasms as unfold the positions of the strata intersected by them.

In the botanical department our exertions have had peculiarly a reference to practical results, and herein are we likely to derive benefit immediately and directly from the communications made by one of our Members, in regard of the culture of exotics. We have also, under his direction, to a certain extent rendered local botany a subject of useful and practical attention, by furnishing an outline of a local flora, which may afterwards be filled up in its details. In the circumstances already mentioned as affecting the vote for medals, it has appeared to the Council that they would best fulfil your design by expressing their approbation, in this way, of the useful course of notices commenced by Mr. Bowie, and they have with this view voted to him a medal, of the same value as mentioned above. But it is an important question, whether the Association ought not to contemplate wider efforts in regard to this branch of its pursuits. If we should not be able to advance our establishments beyond their present amount, still much which we wish to know may be confidently expected from the zeal of such Members as have the means of assisting us. There are many experiments in the culture of different vegetable productions, which those who have opportunity are constantly making, and it cannot be doubted that any which the Institution suggest or desire to engage in, will be

aided and attended to by proprietors of farms or gardens; and thus may the cultivations of native plants, and the introduction of useful exotics, be encouraged and extended. But the Association may aim at the higher and more useful object of having an experimental and systematic garden of its own. The Council have the pleasure of announcing that the co-operation of its Patron may be relied on for the attainment of this most desired object, and that the requisite accommodation as to ground and water may be obtained on the most favorable circumstances. Considering the interest generally felt in this matter, and the extensive gratuitous aid which would undoubtedly be received from Members and others, the Council do not see any great obstacle in making a beneficial commencement. The funds of the Institution would even now admit of the dedication of a small sum to the purpose, and we have the prospect of being able to afford, annually, as much as with the zealous co-operation of our Members, would preserve it in order. It is conceived, therefore, that by adopting a scale proportioned to our means, and trusting to the perseverance and liberality of our Members, a very useful, though it may not be a very imposing, establishment, may be attained. We have evidence that such an institution was commenced here before, and that at all times different Governors were in the habit of planting in the Government Gardens any curious plants which they had procured; and as they had greater opportunities of making such acquisitions than others, the grounds generally included, as they do now, a considerable variety of interesting objects. Several, however, which formerly existed there seem to have disappeared, from their having been no systematic agency for attending to them. In earlier periods, as was to be expected, the Government took an active share in the measures necessary for introducing and establishing many of the important species now cultivated, and it is evident that this object, necessary to the improvement of the colony, must have been much facilitated by the opportune receptacle prepared for them in the gardens. The Institution may be assured that little else is required but such a receptacle, which for its preparation, security, and maintenance, might require a considerable original and continued effort; but eventually, as is detailed in a communication read at the commencement of our sittings, every other requisite would pour in from the donations of many who are anxious to have such means of rendering their acquisitions useful, and from the exchanges which we should have ample opportunities of effecting. The Council would, therefore, eagerly anticipate such exertions from the Institution, and such aid from those who are inclined to favor the scheme, as may lead to the early formation of an efficient fund for it, and to the ultimate establishment of a repository, so much beyond all other collections of nature's grand and lovely efforts; as there every object stands where it loves most to display its

peculiar beauty, and each is to be contemplated, not as in other repositories in unnatural dislocation and repose, but glowing in the beautiful animation of life's progress and developement.

In zoology, we have to remark the advance made towards the acquisition of a local Fauna, by the researches of Dr. Smith, of which a portion has been read here, and given in the *Quarterly Journal*; but from any further detail in regard to this matter, we are precluded by his unavoidable, but much regretted absence. It is in this department of natural science that our collections have made most progress, as will shortly be illustrated in an outline of the contents of the Museum.

We have to lament that a plan adopted by the Council for increasing the ornithological collection, failed from an occurrence hitherto unexplained; and as the result was the loss to the Association of a sum voted for preparations, which is considerable, compared with our resources, the Council have not thought it advisable at present to prosecute this enterprize; but they are confident that the end may be, in a great measure, attained, without risk of such loss in future. The Institution has to acknowledge the acquisition of many valuable zoologic specimens presented to it, or procured by its Members; and the Council would fail in their duty, if they did not impress on the Institution their value for the favor conferred on it by Dr. Smith, Mr. von Ludwig, and Mr. Verreaux, in allowing their private collections to be in the mean time attached to the Museum.

The Institution has had conferred upon, a signal mark of favor and confidence from its Patron, by his having transferred to it the Museum formerly under the superintendence of Government; and if, along with this, we reckon the zoologic collections of private Members, at present under its care, and the donations received from many of them, it will be seen that we have commenced with peculiar advantages in this respect: and from having now proper accommodation for the reception of such objects, we have reason to anticipate a rapid increase to the amount and value of the treasure, from the daily occurrences which throw such objects into our hands, and the opportunity we have of profiting by the aid of a zealous and highly approved collector and preserver of animals.

Of the contents of the Museum we have to present the following outline, regretting that the unavoidable absence of the Curator, renders it impossible to afford a satisfactory detail of the acquisitions we have made.

Of minerals there is a small collection belonging to the Institution, which is not yet arranged. It consists partly of European, and partly of South African specimens; and to them has been added some interesting examples of the fossils of the north-western district, presented by Mr. Watermeyer.

In the department of conchology the Museum is totally deficient, with the exception of a collection of foreign shells, belong-

ing to Mr. J. Verreaux, which he has committed to the temporary care of the Institution.

There is one case of insects, chiefly Coleopterous, which is the property of the Institution; the specimens are South African, and amount to about 300 species.

In regard to those two last departments, as the collection of specimens of the South African species is very easy, the Institution may hope that it will receive many additions from the exertions of its Members.

Of fishes, the specimens amount to about ninety, including several of great rarity and interest, particularly in the family of the sharks, of which the species are above twenty. Of turtles there are three fine specimens of different species, and of lizards six species stuffed, and several of the smaller description belonging to this family are preserved in spirits. In the department of herpetology we have lately received a splendid specimen of a Boa skin and skeleton; and there is, besides, an extensive collection of South African snakes in bottles.

The Museum is peculiarly rich in ornithology, of which two private collections, belonging to Dr. Smith and Mr. von Ludwig, have been temporarily attached to it. The former is of great interest and value, particularly in regard to the families of the Raptores and Passeres, among the birds of this country. In Mr. Ludwig's collection, the splendid and conspicuous birds of the colony predominate. The property of the Institution in this department is of far less value, but will form a respectable foundation for a collection.

Of quadrupeds there are thirty specimens, all colonial, and in a tolerably good state of preservation. There are also at present in the Museum two lion cubs, belonging to Mr. Verreaux. In this respect, therefore, the present state of the Institution is cheering, and we may confidently anticipate much addition to several of these departments, since we have now so advisable a receptacle for the study and exhibition of them.

Of works of art, we have some examples of arms, &c. manufactured in the Pacific Islands, which have been chiefly presented by Captain Finch, of the *Vincennes*, United States ship of war, and also many of a similar description of objects, made by the colonial tribes.

From the outline now given it will be seen that, as is becoming our powers, our resources, and our aim, our attention has been devoted rather to unfold the practical use of science, than to extend its boundaries; and therein have we followed, though at humble distance, the general direction at present given to the inquiries of those who investigate; and have been striving to take a place among the many cultivators in the domain of science, who are employed in rendering fruitful the tract they superintend, rather than in extending the territory by new acquisitions. And we trust that in looking back on our past endeavours, we

have done as much, as in our circumstances, there was reason to expect; particularly when we consider our employments, as only having been preparatory for such measures, as may attain a wider practical effect hereafter, in fulfilling the Institution's object, viz.: "investigating the Geography, Natural History, and General Resources of South Africa." We need not say that the practical result we hope from the past preparation and experience, must depend entirely upon your efforts, and that the success which you wish or hope can arise only from the augmentation of them.

We can safely assert that a great deal will be gained even by doing as we *have* done, should the means of quicker progress be denied. We trust that we may appeal to the experience of our supporters, that a thirst and search for knowledge may be a blessing, independent of the practical results of science in turning nature's powers to our use and comfort. We will feel that the mind's gratification with the things we search into, increases with our knowledge of their mysteries. For all science may participate in the lofty aim of extending the mind's power by multiplying the subjects of its contemplation, and making things known, the augmenting instruments for further acquisition. We may remark, how few of them who have been eminently successful have been allured on by other motives than the uneasiness of ignorance, and the elevating desire to escape from it; the profit they have looked for, if they aimed at such at all, has been that which the mind claims as its right, and recognizes as the completion of its purpose and its destiny, in giving a purer direction and more commanding range to its faculties; the deepest ardor of inquiry may be directed on those things, into which the senses are the instruments of our search, with the simple and elevating aim, that the mind may be enriched with the knowledge of them. To it, with this aim, all discovery or increase of knowledge is as substantial nourishment, and thus ministered to by its material organs, in developing the principles of things material as themselves, it grows as the glowing flowers of our climate, which only cling to the rock as their resting place, but seek their food in the breathings of the air which bathes them. Such reward (and it is the highest we can seek) must attend upon our efforts; and were all science a fruitless dream, and all discoveries to perish untold in the mind which is their birth-place, still were the immortal mind itself the wiser and the richer, through the expansion of its exercised faculties, by its encounter with them. And we thus have before us as an unquestionable result of our exertion, that reward which attends the effort for discovery, and may precede the attainment of it.