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English Science and its
Literary Caricaturists
in the 17th and 18th Centuries

*An Address given at the 25th Anniversary of
the Haslemere Natural History Society,
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ENGLISH SCIENCE AND ITS LITERARY
CARICATURISTS IN THE SEVENTEENTH
AND EIGHTEENTH CENTURIES.

ON this occasion, when the Haslemere Natural History Society celebrates its twenty-fifth birthday, a retrospect of its brief but successful career would probably have been the most appropriate subject for an address. My connection with the Society, however, has been too short and discontinuous to warrant me in venturing upon the preparation of such a discourse. In casting about for another topic that would have a relation not too remote from what is fitting, I have thought that there might be some interest in looking back for a little while to the early days of scientific study in this country, in order to note the striking contrast which is presented between the attitude of the general community towards science then and now. In this twentieth century the out-of-doors pursuits of a Field-club or Natural-History Society are a source of the purest pleasure to its members, and the collections which they gather together of the objects of their quests furnish them with endless material for profitable study at home. These employments evoke neither amusement nor reprobation on the part of the onlookers outside. When we make a fungus-foray into the woods and return laden with

spoils, at which the cautious housekeeper may possibly look askance ; when we sally forth with bag-nets and killing-bottles, and may be seen careering in broad daylight after butterflies, or at eventide stealthily smearing the trees with unguents that will attract the night-flying moths ; when we scour the hedgerows and copsewoods for the nests into which we love to take a peep, but none of which will we ever despoil of more than a single egg ; or when we ramble, hammer in hand, to every natural or artificial exposure of naked rock whence a fossil may haply be extracted, our various doings excite no surprise, but on the contrary are regarded with more or less interest and sympathy by our neighbours, and our "finds" may even be thought of sufficient consequence to be worthy of chronicle in the local press.

We do not all realise that these employments, which are now matters of course and of every-day occurrence, could not have been indulged in a century or two ago without exposing those who took part in them to laughter and ridicule. There were then no field-clubs or natural-history societies, and the solitary naturalists and collectors who rambled by hedgerow, quarry, and moor were pointed at with the finger of scorn, or were treated as persons who seemed to have taken leave of their senses. It has appeared to me not altogether at variance with the spirit of our Celebration this evening, to bring before you some evidence of the kind of treatment to which your predecessors of bygone days were exposed. Accordingly, I propose to cite a series of passages out of English literature, from the middle of the seventeenth century onwards, which bring vividly

RISE OF NATURAL SCIENCE IN ENGLAND

before the mind the spirit of antagonism and contempt, against which not only the naturalists and collectors, but also the physicists, the chemists, and others who joined in the cultivation of what is now known as the domain of Natural Science, had to contend until almost within the memory of living men.

But first of all it will be of advantage if we take a rapid view of the conditions amidst which modern science arose in this country. A notable feature of the intellectual progress of Europe during the sixteenth and seventeenth centuries was the uprising of an awakening to the wonder and interest of the world in which we live. Spreading outward from Italy, and extending all over the Continent, the spirit of curiosity and enquiry at last reached England. Among the earliest and most memorable proofs that it had taken root here were the publication in the year 1600 of the immortal treatise of William Gilbert, *De Magnete*, which laid the foundations of the modern science of Magnetism, and, a few years thereafter, Harvey's discovery of the Circulation of the Blood, which paved the way for the triumphs of the science of Physiology. In the year 1620 Francis Bacon, who had been long brooding over the true method of investigating Nature, published his *Novum Organum*, and therein laid down what he conceived to be the scientific principles and the ultimate aims with which such investigation should be conducted. How potent was his influence in stirring the minds of his fellow-countrymen may be inferred from the avidity with which his writings were read. Thus, his tract on the *New Atlantis*, in which he sketched

his plan for the methodical exploration of all the phenomena of the world around us, and which appeared the year after his death, went through no fewer than ten editions in the next forty-three years. A general eagerness of enquiry was aroused, such as had never before been exhibited, to seek an explanation of even the most familiar phenomena of Nature, and to explore not only the inorganic realm, but the whole vast kingdoms of the Plant and Animal worlds.

In England, among the earliest and most noteworthy fruits of this remarkable awakening was the gathering together of a few of the most eminent and enthusiastic followers of what was then called the New or Experimental Philosophy, for the purpose of affording mutual encouragement and assistance in the active prosecution of research and experiment. The middle of the seventeenth century, however, was a period of sore trouble and commotion in the political history of this country, for it embraced the years which witnessed the tragic events that led up to the establishment of the Commonwealth, and thereafter to the Restoration of the Monarchy. The cultivation of science offered some relief to the philosophers from the anxieties of the time. But their meetings were not continued without interruption. Eventually, however, in 1660, when settled order had been restored in the State, the meetings were resumed in London, and soon led to the formation of an organised association for the prosecution of investigation and experiment, which two years later (1662) was formally incorporated as the Royal Society.

In those days comparatively little was known

GROWTH OF EXPERIMENTAL ENQUIRY

regarding what are called the laws of Nature. Of the vast world of plants and animals, many of the more obvious features had been more or less familiar from the days of Aristotle, but no great progress had been made in what is now known as the domain of Biology. In short, the whole of the outer world was little more than a vast *terra incognita*, which had still to be surveyed, and respecting which the most absurd assertions were made and accepted, for no definitely ascertained knowledge then existed whereby the absurdities could be recognised and corrected. The need for experimental exploration was felt in every direction, and doubtless many fruitless experiments were made; also many which, in the light of modern knowledge, raise our surprise that they should ever have been attempted. Some of them furnished excellent material for the exercise of the wit and raillery of the world outside of the philosophers.

Nevertheless the determination to test every statement of alleged fact was of the utmost importance in the search after an accurate knowledge of Nature. Of great value also was the growing spirit of curiosity, which led to the collection of natural objects of all kinds. Cabinets were formed by private collectors, wherein were arranged what were called "rarities," that is, specimens not only of stones, plants and animals, but in many cases also of miscellaneous objects of artificial origin that were rare, quaint, or odd. The naturalists who confined their collections to natural history, the philosophers who sought to interrogate Nature by means of methodised observations and carefully planned experiments, and the hunters after mere curiosities of

all kinds came to be known in the community at large as *Virtuosi*, an Italian word which, as then used, signified men who had a trained appreciation of any of the arts, of antiquities, of natural history, or of experimental philosophy. The Royal Society was thus a company of virtuosi, and this epithet as originally applied to them was not uncomplimentary. One of the most illustrious and orthodox of the Fellows, the eminent Robert Boyle, wrote a remarkable treatise, entitled, *The Christian Virtuoso*, in which he clearly stated his own position with regard to religion on the one side, and scientific enquiry on the other.

True to the popular ideal of the virtuoso character, the Royal Society not only held meetings for discussion and experiment in natural science, but promptly began to form a Museum or collection of objects from the mineral, vegetable, and animal kingdoms. This "Repository of Rarities," as it was called, grew so rapidly from the contributions poured into it from all parts of the country, that in less than twenty years a description of its contents was published, which fills a large folio volume of nearly 400 pages. For about a hundred years the Royal Society's Museum continued to be the chief centre in this country to which specimens from the United Kingdom and from abroad were sent, until in 1779 it was handed over for incorporation into the British Museum, which had been founded about a quarter of a century earlier. It may easily be imagined that, amid the prevailing ignorance of natural history, many specimens were collected having no special interest of any kind, and that many tricks were played

TRICKS ON THE VIRTUOSI

upon credulous and unsuspecting virtuosi, by the fabrication of grotesque objects which the collectors often had not sufficient knowledge to detect at once as impostures. Jokes of this kind were so frequently launched even at the Royal Society's "Repository," that it became necessary to make a regulation that persons, not Fellows, who desired to present specimens to the Society should show them first to the President, "for fear of lodging unknownly ballads and buffooneries in these scoffing times."¹

So long as men would confine themselves to the collection of oddities, whether natural or artificial, they were looked upon by the general community as whimsical but harmless individuals, who would be more profitably employed if they spent their time and money in some worthier pursuit. When, however, they collected and studied snails, worms, insects, and such like objects, which, in general estimation, were of no use, had no interest for any well-balanced mind, and were positively loathsome to most people, their sanity began to be questioned. It is told that at Exeter Lady Granville was considered to be demented because she collected insects, and the great naturalist, John Ray, was called as a witness to her sanity.

It is not very difficult to trace how the spirit of

¹Quoted from a letter from Oldenburg, Secretary of the Royal Society, to Robert Boyle, 18th January, 1667-8. Writing a century later, Oliver Goldsmith refers to the practice as still continuing in his day: "He learned the art of pasting up mummies; was never at a loss for an artificial *lusus naturae*; nay, it has been reported that he has sold seven petrified lobsters of his own manufacture to a noted collector of rarities."—*Citizen of the World*, Letter xlv.

antagonism and of ridicule against the doings of the men of science arose not only among the general public, but even among educated men. The naturalists were at first comparatively few in number, and their proceedings could be watched. Contemporaneous with them were many collectors of miscellaneous and non-descript "rarities," who had no notions of science in their pursuit, and whose main ambition it was to outstrip their neighbours in the number, variety, oddity, or costliness of the objects in their cabinets. These men were sometimes apt to give themselves the airs of real seekers after natural knowledge, and to pose as the equals and compeers of the men who were engaged in earnest scientific studies. The outside world took no pains to discriminate between them. The men who made collections of natural-history objects which they studied did not seem to be very different from the hunters after mere oddities. They were all grouped together and held up to scorn and contempt.

Nevertheless, looking back to those times, we can see that something may now be said in favour even of the man who spent his time in gathering and preserving all kinds of miscellaneous curiosities. He and his "rarities" may have been as ridiculous as the wits made them out to be; yet he had, after all, his uses. His omnivorous appetite for whatever was out of the common, and his persistent prowling for objects to adorn his cabinet, could not but lead him now and then to pick up something, not only rare but, though he might not know it, of great scientific interest, which, had he not rescued it, might have disappeared. At the

POPULAR ESTIMATION OF THE VIRTUOSI

ultimate dispersal of his treasures such important "finds" could be acquired by naturalists who understood their real nature and value. In our larger and older museums there are doubtless many important specimens which, had they not been saved by these much ridiculed dilettanti, would have been for ever lost.

Again, the philosophers who were led to question and discard the popular explanations of some of the most familiar phenomena, who spent their time in experimenting with instruments and apparatus to find out what the man in the street thought that he already quite understood, seemed to the general public to be engaged in mere solemn trifling, wasting time and labour which might be more profitably devoted to something of practical utility. There does not therefore appear to be matter for surprise that not only the uneducated part of the community, but the cultivated classes, which had but little sympathy with the newer or experimental philosophy, should have grouped physicists, chemists, astronomers, naturalists, and collectors of all sorts under one common name. Thus the epithet of *Virtuosi*, which was at first used in its original Italian and respectful meaning, came in the end to acquire a somewhat contemptuous significance. Those to whom it was applied were often stigmatised as men who neglected the ordinary and urgent duties of life in order to spend their time and their resources on things of the most useless and even despicable kind, mere gullible cranks, or half-witted simpletons, for whom ridicule and laughter were the only fitting

treatment. Even the most sedate philosophers, who were actually engaged in laying some of the chief corner-stones of modern science, were held up to public derision. As one of them wrote, they were regarded as "men of another world, only fit companions for the shadow and their own melancholy whimsies."¹

A stream of such abuse by literary men continued to flow, at first with increasing volume, during the latter half of the seventeenth and the whole of the eighteenth century. Even in the earlier years of the nineteenth, though it was then shrinking rapidly, it still could be traced, until it finally died out amidst the glorious triumphs of science in every branch of enquiry, and the marvellous applications of scientific discovery to the promotion of the civilisation and the intercourse of mankind.

It is obvious that the theologians, who looked on scientific studies as tending to ungodliness and the subversion of the orthodox religion, would stoutly oppose them, even although many able and enlightened dignitaries of the Church had enrolled themselves in the ranks of the experimental philosophers, and had taken an active share in their experiments and discussions. It is less easy to comprehend what ailed the men of letters that they should at an early period display so marked a spirit of antagonism to scientific pursuits, and maintain it for so long. It is true that eventually they came to recognise the grandeur of the astronomical problems with which some of the Virtuosi grappled, and to appreciate the genius of such giants as Isaac Newton,

¹ Sprat's *History of the Royal Society*, 1667, Part I. p. 26.

OPPOSITION OF THE OLDER LEARNING

John Flamsteed, and Edmund Halley. But, while every allowance is made for the effect of the irresistible temptation to ridicule the doings of the collectors of miscellaneous trumpery, it is difficult to account for the persistent reiteration of the old taunts levelled at the naturalists, especially at those who sought out and studied the more lowly members of the organic world. One might almost imagine that some kind of jealous feeling spread among the supporters of the older learning, in view of the rise and progress of a newer learning which they did not understand, which somehow they could not arrest with laughter or sarcasm, and which, in spite of all their travesties and burlesques of it, quietly and steadily continued its advance. But speculation on this matter need not be pursued. Science, having emerged victorious from the conflict, can now look back with amusement at the continuous but futile attempts to bar her progress. We can fully appreciate the wit that was so plentifully brought to bear against her by her literary opponents. We can laugh with them at the grotesqueness of their travesties and the comicality of their caricatures. But the laugh is on our side now. Times have happily changed. The literary lion, formerly either growling or snarling, and the scientific lamb, that cropped the pastures of Natural Knowledge with little disturbance of composure, now repose peacefully together. The ancient animosity of the poets, dramatists, and essayists has been replaced by a genuine respect and esteem. Some of the men of literature have even strayed into the fold of science, while not a few men of science have entered the fields of literature, and have

there been welcomed by the successors of the wits of bygone times.

One of the earliest and most brilliant of the satirists who held up the Experimental Philosophers and Naturalists to scorn was Samuel Butler, author of the immortal *Hudibras*. That poem, of which the first portion appeared in 1662, the year of the birth of the Royal Society, contains a somewhat laboured caricature of the pretensions of science, learning, and astrology as displayed by Sidrophel, of whom it is said that

He had been long t'wards Mathematics,
Opticks, Philosophy, and Staticks,
Magick, Horoscopy, Astrology,
And was old dog at Physiology.¹

Some years later than the foundation of the Royal Society, when the astronomers were active, Butler wrote his "Elephant in the Moon," the wittiest of all the early metrical travesties of the Society's proceedings.

¹ Part II., Canto iii. 205, and the succeeding detailed sketch of this charlatan, who

Knew what's ever's to be known,
But much more than he knew would own.

At a later time Butler returned to him and wrote "An Heroical Epistle of Hudibras to Sidrophel." It has been supposed by some writers that he drew the character from Sir Paul Neile, one of the original Fellows of the Royal Society: others have thought he had in his mind William Lilly, the astrologer and almanack-maker. Butler must have gone over with some diligence the early numbers of the *Philosophical Transactions*, or Birch's *History of the Royal Society*, before he could obtain the material for the fragment of his intended "Satire upon the Royal Society." It must be admitted that the strange jumble of subjects and experiments in the early minutes of the meetings of that Society offered a tempting field for the critics who were disposed to be merry.

HUDIBRAS ON THE ASTRONOMERS

He seems to have been so satisfied with this production that, after having composed it in the verse of *Hudibras*, of which he was so consummate a master, he made another version of it, expanded into heroic metre. But he did not publish this poem. It lay among his papers for nearly a century until, in 1759, it appeared in a collection of his "Genuine Remains." In this production Butler describes a company of experimental philosophers who were engaged in exploring the moon by means of a large telescope. They made out to their satisfaction that this satellite of ours is inhabited by two warlike tribes, who, as the philosophers kept watching, were seen to be waging a fierce battle :

Where many fall on both sides slain,
As by the glass 'tis clear and plain ;
Look quickly then that every one
May see the fight before 'tis done.

When one of the party took his turn at the telescope he started, stared, and exclaimed :

An elephant from one of those
Two mighty armies is broke loose.

After each member of the company had verified this important observation, they determined to set down a full and accurate account of their wonderful discoveries :

Since now the world's incredulous
Of all our scrutinies, and us ;
And with a prejudice prevents
Our best and worst experiments,
Let us as cautiously contrive
To draw an exact narrative

ENGLISH SCIENCE AND LITERARY CARICATURISTS

Of what we every one can swear,
Our eyes themselves have seen appear ;
That when we publish the account,
We all may take our oaths upon't.

While the philosophers were busy "with wording the memorial," the footboys, having nothing else to do, took a peep through the telescope and found a mouse near the eye-piece. This ill-timed discovery sent the company into a ferment of disputation as to whether they had seen a true celestial elephant or merely a wretched terrestrial mouse. To resolve their doubts they determined to unmount the tube. Before it was half let down, swarms of flies and gnats flew out, which had been mistaken for armies of combatants in the moon, and when they unscrewed the glass they found the mouse which had personated the elephant. Whereupon,

Amazed, confounded and afflicted
To be so openly convicted,
Immediately they get them gone.

Fortunately for the peace of mind of the philosophers of the Royal Society, Butler's clever satire remained unpublished until they had all passed away, and a new generation had arisen to which such literary diatribes had grown familiar. Obviously, however, there were other literary critics to whom the miscellaneous occupations and vagaries of the Virtuosi would offer a tempting field for ridicule. The dramatists of the Restoration would not be likely to forego the pleasure of cultivating this field. Chief among those who availed themselves of the opportunity was Thomas Shadwell, now chiefly remembered as the object of Dryden's unsparing

invective, but well known as a playwright in his day. He devoted one of his dramas to ridicule the various opinions, occupations, and experiments of the Virtuosi. This play was published, under the title of *The Virtuoso*, in June 1676, by which time the doings of the Royal Society had become well known to the community at large. Shadwell certainly took great pains to prime himself with information about his subject.¹ Like Samuel Butler, he evidently perused with some care the earlier minutes of the doings of the Royal Society in order to pick out of them the topics that seemed most to lend themselves to caricature. He thus produced a clever and amusing travesty, wherein he gathered together and grossly burlesqued the foibles and pursuits of the Virtuosi, concentrating them in the person of a single individual—a certain absurd Sir Nicholas Gimcrack. The peculiarities of this personage are delineated with ruthless sarcasm by some of his relatives before he himself appears. Thus, he is described as

“A sot that has spent £2000 in Microscopes to find out the nature of eels in vinegar, mites in a cheese, and the blue of plums, which he has subtilly found out to be living creatures ;— One who has broken his brains about the nature of maggots, who has studied these twenty years to find out the several sorts of spiders, and never cares for understanding mankind.” “A

¹ Dryden, in his overwhelming satire, alludes to this well-known play of Shadwell's having been some time in preparation ;

Let “Virtuosos” in five years be writ.—MacFlecknoe, 149.

Dryden was a brilliant exception to the writers who decried the experimental philosophers. He was one of the original founders of the Royal Society, and in his “Annus Mirabilis” he penned a noble apostrophe to the Society and a prophecy of the benefits which it would confer on humanity.—Ver. 645-664.

coxcomb, he has study'd these twenty years about the nature of lice, spiders and insects, and has been as long compiling a book of geography for the world in the moon." "No man upon the face of the Earth is so well seen in the nature of ants, flies, humble-bees, earwigs, millepedes, hoglice, maggots, mites in cheese, todpoles, worms, neufts, spiders, and all the noble products of the sun by equivocal generation." "This foolish Virtuoso does not consider that one bricklayer is worth forty philosophers."

But his most telling caricature of the scientific men of the day is produced by the dramatist when he brings this ludicrous Virtuoso in bodily presence on the stage, makes him discourse there on what he claims as his discoveries, and actually exhibits him in the midst of one of his ridiculous experiments. Two strangers who have come to make his acquaintance are informed by his wife that he is indeed at home, but is engaged for the moment in some private business. The following scene is then presented :

Lady Gimcrack. The truth on't is, he's learning to swim.

Longvil. Is there any water hereabouts, Madam ?

Lady G. He does not learn to swim in the water, Sir.

Bruce. Not in the water, Madam ? How then ?

Lady G. In his Laboratory—a spacious room, where all his instruments and fine knick-knacks are. He has a frog in a bowl of water, ty'd with a packthread about his loins ; which packthread Sir Nicholas holds in his teeth, lying upon his belly on a table ; and as the frog strikes, he strikes ; and his swimming master stands by, to tell him when he does well or ill.

Bruce. This is the most curious invention I ever heard of.

Lady G. Alas ! he has many such. He is a rare mechanical philosopher. The College¹ indeed refus'd him ; they envied him.

¹ *i.e.* the Royal Society which met at Gresham College in the City.

HOW TO LEARN SWIMMING ON A TABLE

Long. Were it not possible to have the favour of seeing this experiment?

Lady G. I'll introduce you.

[SCENE opens and discovers Sir Nicholas learning to swim upon a Table, Sir Formal Trifle and the Swimming Master standing by.]¹

Swimming Master. Ah! well struck Sir Nicholas; that was admirable, that was as well swom as any man in England can. Observe the Frog. Draw up your arms a little nearer, and then thrust 'em out strongly—gather up your legs a little more—so, very well—Incomparable.

Bruce. Let's not interrupt them, Madam, yet, but observe a little this great Curiosity.

Sir Nich. Let me rest a little to respire. So; it is wonderful to observe the agility of this pretty animal, which notwithstanding I impede its motion, by the detention of this Filum or thread within my teeth, which makes a ligature about its loins, and though by many sudden stops I cause the animal sometimes to sink or immerge, yet with indefatigable activity it rises, and keeps almost its whole body upon the superficies, or surface, of this humid element. I doubt not in a very little time to become amphibious: a Man, by Art, may appropriate any element to himself. You know a great many Virtuoso's that can fly; but I am so much advanced in the art of flying, that I can already out-fly that ponderous animal call'd a Bustard; nor should any grey-hound in England catch me in the calmest day, before I got upon wing: Nay, I doubt not, but in a little time to improve the art so far, 'twill be as common to buy a pair of wings to fly to the world in the Moon, as to buy a pair of wax-boots to ride into Sussex with.

¹ Dryden in his "MacFlecknoe" refers to the character of Sir Formal Trifle and also to Bruce and Longvil, whom he actually introduces into his poem as playing a trick on Flecknoe—

He said: but his last words were scarcely heard;
For Bruce and Longvil had a trap prepared,
And down they sent the yet declaiming bard.

ENGLISH SCIENCE AND LITERARY CARICATURISTS

But having sufficiently refrigerated my lungs by way of respiration, I will return to my swimming.

[After a short while, during which the Swimming Master applauds the strokes given by the Virtuoso on the Table, the performance is interrupted to allow the two strangers to be introduced.]

Sir Nich. You are right welcome into my poor Laboratory ; and if in ought I can serve you in the way of Science my Nature is diffusive.

Sir Form. All the ingenious world are proud of Sir Nicholas for his Physico-mechanical excellencies.

Sir Nich. I confess I have some Felicity that way.

Bruce. We are both your admirers. But of all quaint inventions, none ever came near this of swimming.

Long. Have you ever try'd in the water, Sir ?

Sir Nich. No, Sir ; but I swim most exquisitely on land.

Bruce. Do you intend to practise in the water, Sir ?

Sir Nich. Never, Sir ; I hate the water ; I never come upon the water, Sir.

Long. Then there will be no use of swimming.

Sir Nich. I content myself with the speculative part of swimming, I care not for the practice. I seldom bring anything to use ; 'tis not my way. Knowledge is my ultimate end.

Bruce. You have reason, Sir ; knowledge is like virtue ;—its own reward.

Sir Form. To study for use is base and mercenary, below the serene and quiet temper of a sedate philosopher.

Sir Nich. You have hit it right, Sir. I never studied anything for use but physick, which I administer to the poor people : you shall see my method. . . . Now, if you please, gentlemen, we'll retire. I am sorry I cannot perform the dissection of the Lobster, which I promised. My fishmonger, that serves me for that operation, has failed me : but I'll assure you it is the most curious of all testaceous or crustaceous animals whatsoever. . . . After dinner we will have a lecture concerning the nature of insects, and will survey my microscopes, telescopes,

A VIRTUOSO'S EXPERIENCE OF SPIDERS

thermometers, barometers, pneumatick engines, stentorophonical tubes and the like.

In a later part of the play the following discourse on insects occurs :

Sir Nich. I think I have found out more phenomena's, or appearances of Nature in Spiders, than any man breathing ; would you think it ? there are in England six and thirty several sorts of spiders ; there's your Hound, greyhound, lurcher, Spaniel spider.

Long. But above all, your Spider Tumbler is most admirable.

Sir Nich. O Sir, I am no stranger to't : it catches flies as Tumblers do conies.

Bruce (aside). Good ! how these fools will meet a lie half-way !

Long. (aside). Great liars are always civil in that point : as there is no lie too great for their telling, so there's none too great for their believing.

Sir Nich. The fabrick or structure of this insect, with its texture, is most admirable. . . . It will teach its young ones to hunt, and discipline 'em severely, when they commit faults ; and when an old one misses its prey, it will retire, and keep its chamber for grief, shame and anguish, ten hours together. But Sir, there is not in the world a more docible creature ; I have kept several of 'em tame.

Bruce. That's curious, indeed. I never heard of a tame spider before.

Sir Nich. One above all the rest, I had call'd him Nick ; and he knew his name so well, he would follow me all over the house ; I fed him indeed with fair flesh-flies. He was the best-natur'd, best-condition'd spider that ever I met with. You knew Nick very well Sir Formal ; he was of the Spaniel-breed, Sir.

Sir Form. Knew him ! I knew Nick intimately well.

Long. (aside). These fools are beyond all that art or Nature e'er produced.

Bruce. These are the admirable secrets they find out.

Long. Have you observed that delicate Spider call'd Taran-tula ?

ENGLISH SCIENCE AND LITERARY CARICATURISTS

Sir Nich. Now you have hit me, now you come home to me; why, I travelled all over Italy and had no other affair in the world, but to study the secrets of that harmonious insect.

Bruce. Did you not observe the wisdom, policies, and customs of that ingenious [Italian] people?

Sir Nich. Oh, by no means! 'Tis below a Virtuoso to trouble himself with men and manners. I study insects; and I have observed the Tarantula does infinitely delight in Musick, which is the reason of its poison being drawn by it. There's your Phenomenon of Sympathy!

Long. Does a Tarantula delight so in Musick?

Sir Nich. Oh, extravagantly. There are three sorts—black, grey and red, that delight in three several sorts and modes of musick.

Bruce. That was a curious inquisition: how did you make it?

Sir Nich. Why, I put them upon three several chips in water; then caused a musician to play; first, a grave Pavin, or Almain, at which the black Tarantula only moved; it danc'd to it with a kind of grave motion, much like the benchers at the Revels."

[Here the conversation breaks off when a Servant enters to obtain the letters and queries that were going off to "Lapland, Russia, and those parts."

In the middle of the seventeenth century much interest was excited among the experimental philosophers by the invention of the air-pump, and many were the experiments made with it in order to learn something of the physics of the atmosphere. The early founders of the Royal Society devoted much attention to this new and important philosophical instrument, with which they demonstrated that air is a material substance possessing weight. Their experiments in "weighing air" gave rise to much mirthful comment, in which even their patron, Charles the Second, joined. This aspect of the work of

THE WEIGHING AND COLLECTING OF AIR

the Virtuosi was not likely to escape the satire of Shadwell, and he devotes the following scene in his play to a travesty of the proceedings of the philosophers :

Sir Nich. By the way, gentlemen, what country air do you like best ?

Bruce. Why, we cannot travel far for't this evening.

Sir Nich. Travel ! I thought I should have you. Why, I never travel, I take it in a close chamber.

Long. Why, you can take but one kind of nasty smoaky air in a chamber.

Sir Nich. There's your mistake. Chuse your air, you shall have it in my chamber—*Newmarket, Banstead Down, Wiltshire, Bury* air, *Norwich* air ; what you will.

Long. Is it possible to take all these several country airs in your chamber ?

Sir Nich. I knew you were to seek. I employ men all over England, Factors for air, who bottle up air, and weigh it in all places, sealing the bottles hermetically ; they send me loads from all places. That vault is full of country air.

Bruce. To weigh air and send it to you !

Sir Nich. O yes ; I have sent one to weigh air at the Pique of Teneriff ; that's the lightest air : I shall have a considerable cargo of that air. Sheerness and the Isle of Dogs air is the heaviest. Now, if I have a mind to take country air, I send for, maybe, forty gallons of *Bury* air, shut all my windows and doors close, and let it fly in my chamber. . . .

Long. But to what end do you weigh this air, Sir ?

Sir Nich. To what end should I ? to know what it weighs. O knowledge is a fine thing ; why, I can tell to a grain what a gallon of any air in England weighs.

Bruce. Is that all the use you make of these Pneumatick Engines ?

Sir Nich. No ; I eclipse the light of rotten wood, stinking whittings, and putrid flesh, when it becomes lucid. . . . There was a lucid sirloin of beef in the Strand ; foolish people thought it burnt, when it only became lucid and chrystalline by the

coagulation of the aqueous juice of the beef by the corruption that invaded it. 'Tis frequent. I myself have read a Geneva Bible by a leg of Pork.

Bruce. How! A Geneva Bible by a leg of Pork?

Sir Nich. O, ay, 'tis the finest light in the world: But for all that, I could eclipse the leg of pork in my receiver, by pumping out the air; but immediately upon the appulse of the air let in again, it becomes lucid as before. . . . I am now studying of glow-worms; a fine study! It is a curious animal: I think I shall preserve 'em light all the year, and then I'll never use any other light in my study but glow-worms and concave glasses." . . .

But I wonder Sir Formal is not returned. I sent him to fix my telescopes for surveying the Moon.

Long. Do you believe that the Moon is an Earth, as you told us?

Sir Nich. Believe it! I know it; I shall shortly publish a Book of Geography for it. Why, 'tis as big as our Earth; I can see all the mountainous parts, and vallies, and seas, and lakes in it; nay, the larger sort of animals, as Elephants and Camels; but publick buildings and ships very easily. I have seen several battles fought there. They have great guns, and have the use of gun-powder. At land they fight with Elephants and Castles. I have seen 'em. There's now a great monarch, who has armies in several countries in the moon; which we find out, because the colours which we see are all alike. There are a great many states, which we take to be confederates against him. He is a very ambitious Prince, and aims at universal monarchy; but the rest of the moon will be too hard for him.

Enter *Sir Formal.* I have fixed the tubes in the garden; and if we be not deceived, the great monarch is making an attack upon a Town, and they are in a very hard service.

Sir Nich. 'Tis probable; we'll haste to see it.

The ridicule and scorn so plentifully bestowed on the students of natural history in the second half of the seventeenth century went on increasing in volume in

the earlier decades of the century that followed. The essayists of the reign of Queen Anne found it an attractive topic for their short papers, into which they contrived to find room for as much misapprehension, exaggeration, and sarcasm as their predecessors, the poets and dramatists of the Restoration, had done. One of the most restrained of their number, the mild and genially humorous Addison, could not resist the familiar temptation to put the naturalists and collectors into the pillory and pelt them with ridicule. He undoubtedly felt and candidly acknowledged that the study of the Creation is an eminently worthy pursuit for the mind of man. Yet when it was confined to the minuter and less outwardly attractive portions of the animal and vegetable kingdoms, he seems to have regarded it as descending beneath the dignity of serious men. Ignorant of what the study of these lowly parts of Nature really involves, he proceeded to hold it up to scorn in the wittiest and most exaggerated burlesque of which the Virtuoso was ever made the subject. Even the grotesque Nicholas Gimcrack is revived and brought forward once more as the type of the tribe to which he belonged, and he is made even more outrageously absurd than Shadwell had drawn him. Addison's essay, which formed No. 216 of the *Tatler* and appeared on 26th August, 1710, deserves to be quoted entire as a memorial of the attitude of a cultivated man of letters at that time towards the pursuits of the naturalist.

“Nature is full of wonders; every atom is a standing miracle, and endowed with such qualities as could not be impressed on it by a power and wisdom less than infinite. For this reason

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I would not discourage any searches that are made into the most minute and trivial parts of the creation. However, since the world abounds in the noblest fields of speculation, it is, methinks, the mark of a little genius to be wholly conversant among insects, reptiles, animalcules, and those trifling rarities that furnish out the apartment of a Virtuoso.

“There are some men whose heads are so oddly turned this way, that though they are utter strangers to the common occurrences of life, they are able to discover the sex of a cockle, or describe the generation of a mite, in all its circumstances. They are so little versed in the world, that they scarce know a horse from an ox ; but at the same time will tell you, with great deal of gravity, that a flea is a rhinoceros, and a snail a hermaphrodite. I have known one of these whimsical philosophers who has set a greater value upon a collection of spiders than he would upon a flock of sheep, and has sold his coat off his back to purchase a tarantula.

“I would not have a scholar wholly unacquainted with these secrets and curiosities of Nature ; but certainly the mind of man, that is capable of so much higher contemplations, should not be altogether fixed upon such mean and disproportioned objects. Observations of this kind are apt to alienate us too much from the knowledge of the world, and to make us serious upon trifles, by which means they expose philosophy to the ridicule of the witty, and the contempt of the ignorant. In short, studies of this nature should be the diversions, relaxations, and amusements, not the care, business, and concern of life.

“It is indeed wonderful that there should be a sort of learned men who are wholly employed in gathering together the refuse of Nature, if I may call it so, and hoarding up in their chests and cabinets such creatures as others industriously avoid the sight of. One does not know how to mention some of the most precious parts of their treasure, without a kind of apology for it. I have been shown a beetle valued at twenty crowns, and a toad at an hundred : but we must take this for a general rule, that whatever appears trivial or obscene in the common

ADDISON'S CARICATURE OF THE VIRTUOSI

notions of the world, looks grave and philosophical in the eye of a Virtuoso.

“To show this humour in its perfection, I shall present my reader with the legacy of a certain Virtuoso, who laid out a considerable estate in natural rarities and curiosities, which upon his death-bed he bequeathed to his relations and friends in the following words:

THE WILL OF A VIRTUOSO.

“I Nicholas Gimcrack being in sound health of mind, but in great weakness of body, do by this my last will and testament bestow my worldly goods and chattels in manner following:

Imprimis, To my dear Wife,

One box of butterflies,

One drawer of shells,

A female skeleton,

A dried cockatrice.

Item, To my daughter Elizabeth,

My receipt for preserving dead caterpillars,

As also my preparations of winter May-dew and embryo pickle.

Item, To my little daughter Fanny,

Three crocodile's eggs,

And upon the birth of her first child, if she marries with her mother's consent,

The nest of a humming-bird.

Item, To my eldest brother, as an acknowledgment for the lands he has vested in my son Charles, I bequeath

My last year's collection of grasshoppers.

Item, To his daughter Susanna, being his only child, I bequeath my

English weeds pasted on royal paper,

With my large folio of Indian cabbage.

“Having fully provided for my nephew Isaac by making over to him some years since,

A horned scarabæus,

The skin of a rattle-snake, and
The mummy of an Egyptian king,

I make no further provision for him in this my will.

"My eldest son John, having spoke disrespectfully of his little sister, whom I keep by me in spirits of wine, and in many other instances behaved himself undutifully towards me, I do disinherit, and wholly cut off from any part of this my personal estate, by giving him a single cockle-shell.

"To my second son Charles I give and bequeath all my flowers, plants, minerals, mosses, shells, pebbles, fossils, beetles, butterflies, caterpillars, grasshoppers, and vermin not above specified; as also all my monsters both wet and dry; making the said Charles whole and sole executor of this my last will and testament; he paying, or causing to be paid, the aforesaid legacies within the space of six months after my decease. And I do hereby revoke all other wills whatsoever by me formerly made."

The satire which in Gulliver's voyage to Laputa was launched by Swift against the men of science who were engaged in astronomical, mathematical, and mechanical pursuits lacks the lightness of touch with which Addison, Steele, and his other literary contemporaries could trick out their diatribes. His account of the Flying Island and its machinery, inhabited by a race with heads all reclined to one side or the other, one eye turned inward, the other looking up to the zenith, all of them constantly wrapped in contemplation and the solving of problems, from which state of abstraction they had to be recalled to the business of life by attendants who flapped their mouths and ears with bladders containing a few pebbles that rattled inside—all this is somewhat ponderous pleasantry. It shows the writer's profound ignorance of the real object of the experimental philosophy and the spirit in which it was pursued. He pokes fun at the use

of mathematical instruments by portraying a Laputan tailor who, when called in to make a suit of clothes for Gulliver, proceeded to take the traveller's height with a quadrant, and his dimensions and outlines with rule and compasses; the result being a suit that was very ill made and quite out of shape, through a mistaken figure in the calculations. Swift's "Grand Academy of Lagado" is a somewhat coarse and Rabelaisian travesty of the kind of college that Francis Bacon had sketched in his *New Atlantis*, and which was in the minds of Boyle, Evelyn, Cowley, and other thoughtful founders of the Royal Society.

When Pope lashed the whole assemblage of contemporary writers who were not his friends, he could not omit a thrust at the naturalists and collectors of his day. He puts them among the dunces of the world who flock in crowds to the court of the Queen of Dulness :

Then thick as locusts blackening all the ground,
A tribe, with weeds and shells fantastic crown'd,
Each with some wondrous gift approached the Power,
A Nest, a Toad, a Fungus, or a Flower.¹

In the Address which the Queen gives to these votaries, the poet finds a vent for the usual sneer of the literary men at the pursuits of the Virtuosi and the contemptible objects with which they occupied their time and thought. She is made to remark :

Yet by some object ev'ry brain is stirr'd,
The dull may waken to a humming-bird,
The most recluse, discreetly open'd, find
Congenial matter in the Cockle-kind;

¹ *Dunciad*, iv. 397-400. Published in 1742.

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The mind, in Metaphysics at a loss,
May wander in a wilderness of Moss ;
The head that turns at super-lunar things,
Pois'd with a tail, may steer on Wilkins' wings.¹

In the final scene of this inimitable poem, the Virtuosi are given the place of honour, when the Queen of Dulness confers her rewards on her followers :

Next bidding all draw near on bended knees,
The Queen confers her titles and degrees ;
Her children first of more distinguished sort
Who study Shakespeare at the Inns of Court,
Impale a Glow-worm or Vertù profess,
Shine in the dignity of F.R.S.²

The minor poets of the time were not less sarcastic. Thus, before Pope's fourth book of the *Dunciad* appeared in 1742, James Bramston had already written :

Bears, Lyons, wolves, and elephants I breed,
And *Philosophical Transactions* read ;
Next lodge I'll be Freemason, nothing less,
Unless I happen to be F.R.S.

Shenstone (1737) composed an ode "To the Virtuosos," which is a feeble echo of the witty ridicule of previous generations. He keeps up what had now become the traditional view that the naturalists were so enamoured of repulsive and contemptible living things as to have no eye for human beauty. A few verses may be quoted here :

¹ 445-452. The allusion in the last line is to John Wilkins, Bishop of Chester, one of the principal founders of the Royal Society, who thought that the moon is a habitable globe, and that eventually means may possibly be devised whereby we might voyage to it.

² 565-570.

SHENSTONE AND AKENSIDE

TO THE VIRTUOSOS.

Hail curious wights! to whom so fair
The form of mortal flies is!
Who deem those grubs beyond compare,
Which common sense despises.

Whether o'er hill, morass, or mound,
You make your sportsman sallies;
Or that your prey in gardens found
Is urged thro' walks and allies;

Yet in the fury of the chase,
No slope cou'd e'er retard you;
Blest if one fly repay the race,
Or painted wing reward you.

.
'Tis you dispense the fav'rite meat
To Nature's filmy people;
Know what conserves they chuse to eat,
And what liqueurs to tipple.

.
Let Flavia's eyes more deeply warm,
Nor thus your hearts determine,
To slight dame Nature's finest form
And sigh for Nature's vermin.

And speak with some respect of beaux,
Nor more as triflers treat 'em;
'Tis better learn to save one's cloaths,
Than cherish moths that eat 'em.¹

Much more notable than Shenstone's effusion was that of his contemporary, the poet Mark Akenside, who at the age of only sixteen published a poem, after the manner of Spenser, entitled, "The Virtuoso."²

¹ Shenstone's *Works in Verse and Prose*, 5th Edit., 1777, vol. i. p. 204.

² *Gentleman's Magazine*, 23rd April, 1737.

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Though conceived on the old, familiar lines of sarcastic and exaggerated description, it is undoubtedly a brilliant, if somewhat strongly coloured, sketch of the popular conception of the usual habits, pursuits, and surroundings of a student of science. Its details, however, are so precise and so clearly delineated as to suggest that they were not derived altogether from the lad's reading, but possibly from actual visits to the home of some example of the collector fraternity who lived in the north of England.

Whilom by silver Thames's gentle stream
In London town there dwelt a subtile wight ;
A wight of mickle wealth and mickle fame,
Book-learn'd and quaint ; a Virtuoso hight.
Uncommon things and rare were his delight ;
From musings deep his brain ne'er gotten ease,
Nor ceasen he from study day or night ;
Until (advancing onward by degrees)
He knew whatever breeds on earth, or air, or seas.

He many a creature did anatomize,
Almost unpeopling water, air, and land ;
Beasts, fishes, birds, snails, caterpillars, flies,
Were laid full low by his relentless hand,
That oft with gory crimson was distain'd :
He many a dog destroyed, and many a cat ;
Of fleas his bed, of frogs the marshes, drain'd ;
Could tellen if a mite were lean or fat,
And read a lecture o'er the entrails of a gnat.

His rich museum, of dimensions fair,
With goods that spoke the owner's mind was fraught,
Things ancient, curious, value worth, and rare,
From sea and land, from Greece and Rome were brought,

AKENSIDE'S PICTURE OF A VIRTUOSO

Which he with mighty sums of gold had bought :
On these all tydes with joyous eyes he pored ;
And, sooth to say, himself he greater thought,
When he beheld his cabinets thus stored,
Than if he'd been of Albion's wealthy cities lord.

Here in a corner stood a rich scrutoire,
With many a curiosity replete ;
In seemly order furnish'd every drawer,
Products of Art or Nature, as was meet ;
Air-pumps and prisms were placed beneath his feet,
A Memphian mummy-king hung o'er his head ;
Here phials with live insects, small and great,
There stood a tripod of the Pythian maid ;
Above, a crocodile diffused a grateful shade.

Fast by the window did a table stand,
Where hodiern and antique rarities
From Egypt, Greece, and Rome, from sea and land
Were thick besprent, of every sort and size :
Here a Bahaman spider's carcass lies,
There a dire serpent's golden skin doth shine ;
Here Indian feathers, fruits, and glittering flies ;
There gums and amber found beneath the line,
The beak of Ibis here, and there an Antonine.

All things with vitiated sight he spies ;
Neglects his family, forgets his friend,
Seeks painted trifles and fantastic toys,
And eagerly pursues imaginary joys.

It is interesting to note that two and a half years later this precocious youth published in the same journal a poem in a totally different vein. It was a "Hymn to Science," in which he hails science as the "charm of age and guide of youth ; sweet refuge of distress" ; and prays that, as she unveils her beams, he

may escape from the vain tumult of life and sit in peace with her.¹ Yet, when the occasion offered, he seems to have been nothing loath to have another fling at the much abused Virtuoso, for in his chief poem, *The Pleasures of the Imagination*, published in 1744, by which he quickly leapt into poetic renown, he has these lines :

Behold yon mystic form
 Bedecked with feathers, insects, weeds, and shells !
 Not with intenser view the Samian sage
 Bent his fixed eye on heaven's eternal fires,
 When first the order of that radiant scene
 Swelled his exulting thought, than this surveys
 A muckworm's entrails or a spider's fang.²

Akenside, born in Newcastle, took to medicine, studied in Edinburgh and Leyden, settled eventually in London, where he rose to eminence as a physician, and also as one of the popular poets of his day. He was elected into the Royal Society (1753) while still a comparatively young man, and contributed to the *Philosophical Transactions*.

The spirit of caricature wherewith the literary world viewed the pursuits of men of science continued with but little diminution in its acerbity until far on in the eighteenth century. Of this persistence a curious example may be cited from the writings of Oliver Goldsmith. In the charming series of chapters forming his *Citizen of the World*, published in 1762, there is one that contains a pasquinade against the scientific students of his day, which is worthy to rank with those of Butler,

¹ *Gentleman's Magazine*, October, 1739.

² *Pleasures of the Imagination*, Book III. 163.

GOLDSMITH ON THE PURSUITS OF NATURALISTS

Shadwell, or Addison. A portion of the chapter may be cited :

“I am amused with the labours of some of the learned here. One shall write you a whole folio on the dissection of a caterpillar. Another shall swell his works with a description of the plumage on the wing of a butterfly : a third shall see a little world on a peach-leaf, and publish a book to describe what his readers might see more clearly, in two minutes only, by being furnished with eyes and a microscope.

“I have frequently compared the understandings of such men to their own glasses. Their field of vision is too contracted to take in the whole of any but minute objects ; they view all Nature bit by bit ; now the proboscis, now the antennae, now the pinnae of—a flea. Now the polypus comes to breakfast upon a worm ; now it is kept up to see how long it will live without eating ; now it is turned inside outward ; and now it sickens and dies. Thus they proceed, laborious in trifles, constant in experiment, without one single abstraction, by which alone knowledge may be properly said to increase ; till at last their ideas, ever employed upon minute things, contract to the size of the diminutive object, and a single mite shall fill their whole mind’s capacity.

“Yet believe me, ridiculous as these men are to the world, they are set up as objects of esteem for each other. They have particular places appointed for their meetings, in which one shows his cockle-shell and is praised by all the society ; another produces his powder, makes some experiments that result in nothing, and comes off with admiration and applause ; a third comes out with the important discovery of some new process in the skeleton of the mole, and is set down as the accurate and the sensible ; while one still more fortunate than the rest, by pickling, potting, and preserving monsters, rises into unbounded reputation.

“The labours of such men, instead of being calculated to amuse the public, are laid out only into diverting each other. The world becomes very little the better or the wiser for knowing what is the peculiar food of an insect, that is itself the

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food of another, which in its turn is eaten by a third ; but there are men who have studied themselves into a habit of investigating and admiring such minutiae.”¹

It is impossible to read without a smile this passage, full as it is of exaggeration and mis-statement, when we remember that the writer, who shows here so little sympathy with the detailed studies of the professed naturalist, became himself in later years the author of a voluminous work on Natural History. Towards the end of his life, pressed by debt and the narrowness of his means, he engaged himself to write for the booksellers a series of eight octavo volumes on the *History of the Earth and Animated Nature*. He had just completed it in 1774 when he was struck down by an early death, and it was published later in the same year. When he started on this laborious task, some of his friends expressed their surprise that he should involve himself in an enterprise so different from the nature of his previous writings. Samuel Johnson, in particular, is said to have remarked, in his caustic vein, “Goldsmith, Sir, will give us a very fine book upon the subject ; but if he can distinguish a cow from a horse, that, I believe, may be the extent of his knowledge of Natural History.”²

The poet, however, made no pretensions to be a naturalist, and he had no intention of attempting to produce a scientific treatise. He had an instinctive repugnance to the detailed studies of the naturalists, which seemed to him to concentrate the mental faculties on minute points, and to hinder the attainment of the

¹ *Citizen of the World*, chap. lxxxix.

² Boswell's *Life of Johnson*, Murray, 1835, vol. vi. p 209, note.

broad general views (or "abstractions," to use his own term) which gave him pleasure. What he aimed at was the preparation of a compilation of the more generally interesting parts of natural history which could be gathered from what was to be found in the works of previous writers, and which he could present in a simple and attractive guise, easily comprehensible by readers of every age and class. Though he claimed no special or practical acquaintance with his subject, he had a keen feeling for the beauties and wonders of Nature, as every lover of English literature knows well, in whose heart the poetry and prose of Goldsmith are enshrined. And he had the power, which comparatively so few men of science possess, of vividly portraying what he had seen and felt in language of exquisite simplicity and charm. "My chief ambition," so he wrote in his Preface, "is to drag up the obscure and gloomy learning of the cell; to strip it from its garb of austerity, and to show the beauties of that form, which only the industrious and the inquisitive have been hitherto permitted to approach."

To carry out this task it was needful to procure a good supply of books. These in part he borrowed, but, as he narrates, he also "taxed his scanty circumstances in procuring the books which are on this subject of all others the most expensive." The voluminous *Histoire Naturelle* of Buffon, as far as then published, was his chief source of information. To secure quiet, away from the noises and distractions of London, he took lodgings at a farmer's house, near to the sixth milestone on the Edgware Road. Thither he "carried

down his books in two returned post-chaises,"¹ and there, amid the sights and sounds and scents of the country, he set to work on his long labour.

It was impossible that Goldsmith should write even a compilation without making it eminently readable, and sprinkling it with passages of admirable descriptive power, sympathetic fervour, and poetic beauty. Such passages, often suggested by his own rural observation, have long taken their place among the treasures of English literature. He points out some of the advantages of a knowledge of natural history. Thus, in travelling, "the mere uninformed spectator passes on in gloomy solitude; but the naturalist, in every plant, in every insect and every pebble, finds something to entertain his curiosity, and excite his speculation."² On the other hand, he feels the force of the prevalent condemnation of the inutility of these pursuits. "Let us," he says, "dignify Natural History with the grave appellation of a useful science, yet still we must confess that it is the occupation of the idle and the speculative, more than of the busy and ambitious part of mankind." "It will be," he modestly confesses, "his chief pride, if this work may be found an innocent amusement for those who have nothing else to employ them, or who require a relaxation from labour. Professed naturalists will, no doubt, find it superficial."³ Yet, as he wishes for the approbation of these men, he hopes that they may discover in his chapters something, neither trite nor elementary, which he has gleaned from his various

¹ Boswell, *op. cit.* vol. iii. p. 220.

² Preface, p. vi.

³ *Ibid.* pp. xiii-xv.

reading. Having no critical knowledge of the subject, he could not avoid falling into error, repeating the blunders of his predecessors, and continuing in the credulous beliefs of older times. We cannot wonder, for instance, that when he came to treat of insects the inveterate prejudice against that subject, as an unworthy study for sensible men, should somewhat colour his language. In his introduction to the Section he dwells on what he regards as proofs of the low place which insects hold in the scale of being, and what he considers to be their imperfection. He thinks them to be often "more allied to the vegetables on which they feed than to the nobler classes above them"; and that of some of them, it may be said that "a few days fill up the measure of their contemptible lives."¹

Buffon's *Histoire Naturelle* had a remarkable influence in evoking among all classes of his fellow-countrymen an eager interest in the subject of which it treated. Goldsmith, perhaps, hoped that his *History of the Earth and Animated Nature* might have a similar influence in his own country, but he could have had no premonition of the success of his endeavour;—how, for more than a hundred years, edition after edition of the book, in many different sizes and forms, would continue to be printed and sold in England, Scotland, Ireland, and the United States, and that it would remain for so long a period the most popular English compendium of Natural History, read everywhere from the palace to the cotter's hut. No other work had so potent an influence during the later decades of the eighteenth and the early years

¹ Vol. vii. p. 238.

of the nineteenth century in diffusing an appreciation of the interest of animated Nature among the English-speaking countries of the world. The literary charm of the book kept it alive in spite of all its defects, until the spread of more accurate information by the naturalists who followed Linnaeus led to its supersession. It is thus interesting to find that, after all the satire and ridicule poured forth by four generations of literary men upon the study of natural science, one of the most illustrious of their number should have closed his brief career with the production of a work so helpful as that of Goldsmith to the spread of the pursuit which they had so persistently derided.

With the growth of more knowledge of the true meaning and interest of natural science, the general estimation of the Virtuoso had now become less unfavourable. The literary critics and the public at large began at last to see that the natural philosopher, and even the naturalist who collected and studied insects, were engaged in pursuits that deserved respect, and were to be completely dissociated from the mere collector, whose only aim was to gather a miscellaneous assortment of "rarities," or who cared more to possess an ample and varied store of natural-history specimens than to study their characters. But even the collector was now regarded with good-natured amusement rather than sarcastic scorn. Thus the poet Burns, who could be fiercely vituperative when he saw fit, has a genial tolerance for the collector, though he pokes fun at his pursuit. Of the antiquary, Captain Francis Grose, he wrote :

EARLY STRICTURES ON GEOLOGISTS

He has a fouth of auld nick-nackets :
Rusty airn caps and jinglin jackets,
Wad haud the Lothians three in tackets
 A toumont guid ;
And parritch-pats and auld saut-backets
 Before the Flood.

Of Eve's first fire he has a cinder ;
Auld Tubalcain's fire-shool and fender,
A broomstick o' the witch of Endor,
 Weel shod wi' brass.

Forbye, he'll shape you aff fu' gleg
The cut of Adam's philibeg ;
The knife that nicket Abel's craig
 He'll prove you fully,
It was a faulding jocteleg
 Or lang-kail gullie.

It is worthy of remark that, amidst the whole confraternity of scientific men, the geologists were about the last to incur the reprobation of the theological and literary critics. Their science was young, for it did not take its place as a recognised department of natural history until late in the eighteenth century. We may be sure that if the poets and dramatists of the Restoration, or the wits of the reign of Queen Anne, had beheld a set of men, armed with hammers, chipping off bits of rock, and from such specimens building up theories as to the age and history of the globe, a fitting place would have been found for this new type of Virtuoso in the ridicule and caricature of those times. As it was, however, the geologists did not wholly escape. Theological denunciation descended with all its old vigour upon their heads. Enough of the old Adam, too, was left in the literary mind to resent the appearance of this upstart

group of bold and pertinacious theorists, who were upsetting some of the most ancient beliefs. The poet Cowper, mild and gentle as he was, loved at times, as he said, to "crack the satiric thong," and he made his whip resound about the ears of the geologists in five trenchant lines :

Some drill and bore
The solid earth, and from the strata there
Extract a register, by which we learn
That He who made it, and revealed its date
To Moses, was mistaken in its age.¹

In a later generation, Wordsworth poured his contemptuous pity on the man who could invade the quiet Cumbrian hills, hammer in hand, defacing the moss-grown rocks by the side of the pathways along which the poet loved to wander and meditate :

You may trace him oft
By scars which his activity has left
Beside our roads and pathways, though, thank Heaven !
This covert nook reports not of his hand—
He who with pocket-hammer smites the edge
Of luckless rock or prominent stone, disguised
In weather-stains or crusted o'er by Nature
With her first growths, detaching by the stroke
A chip or splinter—to resolve his doubts ;
And, with that ready answer satisfied,
The substance classes by some barbarous name,
And hurries on ; or from the fragments picks
His specimen, if but haply interveined
With sparkling mineral, or should crystal cube
Lurk in its cells—and thinks himself enriched,
Wealthier, and doubtless wiser, than before.²

More genial was the banter which Scott put into the

¹ *Task*, iii. 150.

² *Excursion*, Bk. iii.

THE VIRTUOSI OF TO-DAY

mouth of that worthy landlady, Meg Dods of St. Ronan's Well. When recounting the various types of wise and odd folk brought from Edinburgh by Lady Penelope Pennfeather, he takes care that she shall not omit the group who "rin uphill and doun dale, knapping the chucky-stanes to pieces wi' hammers like sae mony road-makers run daft, to see how the world was made."

The Virtuosi of to-day may still be open to the gibes of the literary censor, but for failings far different from those of their predecessors in bygone generations. Yet they now pursue their avocations not only unmolested by ridicule, but with the tolerance, if not always the explicit approbation of the most cynical critic. This happier relation has been brought about by an enlargement of outlook on both sides.

On the one hand, the mere collector of miscellaneous curiosities has practically disappeared, or, where a stray surviving example may be found, he is looked upon with something of the amusement wherewith the oddity of a man would be regarded who should insist on wearing the costume of his great-grandfather. The art of collecting has specialised in many different directions beyond the so-called "articles of vertu" of the earliest collectors. The gathering together of specimens of natural history, even including the insects, worms, and other despised creatures that were so repulsive to our inexperienced forefathers, calls forth no remark nor any shrug of the shoulders. On the contrary, even the literary critic finds some interest in contemplating, safely pinned down in a glass case, the gigantic beetle, or

blood-sucking fly, from which he would shrink with horror if it were alive. It is recognised on every side that the world owes a deep debt to the Virtuosi. These men include the physicists and chemists who, by the study of Nature's processes, have brought to light so many natural laws, and by the application of the results of their investigations to the practical affairs of life have enormously advanced the civilisation of our race. The astronomers are likewise to be included, who have so greatly increased our knowledge not only of our own solar system, but of the stars and nebulae that crowd the firmament as far as telescope can pierce. And lastly comes the great band of observers and collectors in every department of the domain of Biology to whom we are indebted for the vast accessions to our knowledge of the wide field of plant and animal life, past and present, whereby the whole world of living and extinct organisms has been made so deeply interesting, and for the practical applications of their studies to the furtherance of our material welfare and to the amelioration of disease.

On the other hand, the literary man has himself been educated, often perhaps indirectly and unconsciously, by the onward march of science. He has learnt to admit that, although a man of science may have his personal vagaries no less than a man of literature, it is mainly by the discoveries of scientific men and their practical application to the affairs of modern life that during the last two centuries the face of the world has been so changed, and our mental attitude to the universe has been so profoundly affected. He has come to see that students of Nature are not less serious in their calling

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than he is in his. He recognises that they are one and all striving to contribute, each what little he can, towards the erection of that great Temple of Truth wherein all genuine knowledge shall be enshrined. So that now the voice of ridicule and laughter is stilled, and there has come in its place a generously expressed acknowledgment of the services of the men by whose patient and strenuous labour the Sphinx of Nature has been made to reveal those secrets the knowledge of which has proved so beneficent to the mental, moral, and material well-being of man.