Alfred Neighbour Esq.
With William Carr's compliments.

INTRODUCTION

OR

EARLY HISTORY

OF

BEES AND HONEY,

BY

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INTRODUCTION OR EARLY HISTORY OF BEES AND HONEY.

By Mr. William Carr.

The natural history of the honey-bee has been the marvel of all ages from the time of Adam, the greatest naturalist the world ever produced, who well knew her history when he named the bee "Debôrah," which in the Hebrew means "she that speaks;" and the bees' speech is both as sweet and as wise as that of her namesake Deborah, whose wondrous song of victory is written in the book of Judges. Adam knew that the bee was able to speak, and teach proud man, with all his boasted intellect, many a wise saying, if he was only willing to learn at her school, and so he gave her that name. This was 4004 years before Christ.

The history of bees is found written in hieroglyphics on the Pyramids of Egypt, and on ancient tombs, long before writing was discovered, and this proves that the natural history and management of bees occupied the attention of man at the earliest period of which we have any record. Surrounded by a boundless variety of living creatures, he would naturally be led to notice their habits and economy; and no part of the world of insects would be more likely to engage his attention than the honey-bee.

Honey would, in all probability, constitute one of his earliest luxuries; and as he advanced in civilisation he would, as a matter of course, avail himself of the industry of its collectors by bringing them as much as possible within his reach; and by this means he would take an important step towards an acquaintance with entomology. But the progress made by our earliest progenitors, in this or any other science, is involved in the obscurity and uncertainty necessarily appertaining to the infancy of society and the difficulty of writing its history in hieroglyphics.

The first indication of attention to the bees' natural history is contained in the Old Testament, where it is mentioned in connection with honey and wax in no less than twenty of the books. In Genesis xliii. 11, the patriarch Jacob, in giving directions to his sons on going down into Egypt a second time, tells them to "take the best fruits of the land" with them, literally that which was praised the most, or "the song of the land," and among others he names "a little honey."

The things enumerated, as we are informed, grew well during a drought; and as a famine now prevailed, would be more highly appreciated in Egypt. Besides, we are led to the belief that honey was an article of commerce previous to this time. (Genesis xxxvii. 25, and inferences drawn from Homer and Herodotus, about 600 B.C., at a later date.) The whole of the twenty books conclusively prove the care that was taken of the bees, and how highly their produce was appreciated; and in Solomon's Song iv. 11, Christ's love for the Church is beautifully expressed, "Thy lips, O *my* spouse, drop as the honeycomb: honey and milk *are* under thy tongue; and the smell of thy garments is like the smell of Lebanon."

Honey was the first and last food that Christ partook of whilst on earth; and may not this account in some measure for his sweet disposition as a man? For

Isaiah prophecies the birth of Christ in the 7th chapter, 14th and 15th verses:—"Therefore the Lord himself shall give you a sign; Behold, a virgin shall conceive, and bear a son, and shall call his name Immanuel. Butter and honey shall he eat, that he may know to refuse the evil and choose the good."

The Jews in all countries where they are scattered to the present day do not believe that this prophecy has yet been fulfilled (and in the expectation that their first child may be the Messiah or Immanuel), import honey from Assyria to give their child when it is born.

I said the last food Christ eat on earth was honey, and that was just after his resurrection and before his ascension, and this is recorded in the 24th chapter of St. Luke and the 41st and 42nd verses. Christ said, "Have ye here any meat? And they gave him a piece of a broiled fish, and of an honeycomb. And he took it, and did eat before them."

I said the bee was able to speak, and teach proud man, with all his boasted intellect, many a wise saying, if he was only willing to learn at her school, and the wisest man the world ever saw, was willing to learn from the bee, what all his wisdom could not teach him, I allude of course to King Solomon, as the following story shows:—

When Solomon was reigning in his glory,
Unto his throne the Queen of Sheba came
(So in the *Talmud* you may read the story),
Drawn by the magic of the monarch's fame,
To see the splendours of his court; and bring
Some fitting tribute to the mighty king.

Nor this alone; much had her Highness heard
What flowers of learning graced the royal speech;
What gems of wisdom dropped with every word;
What wholesome lessons he was wont to teach,
In pleasing proverbs; and she wished, in sooth,
To know if Rumour spoke the simple truth.

Besides, the queen had heard (which piqued her most),
How through the deepest riddles he could spy;
How all the curious arts that women boast
Were quite transparent to his piercing eye,
And so the queen had come—a royal guest—
To put the sage's cunning to the test.

And straight she held before the monarch's view,
In either hand, a radiant wreath of flowers;
The one bedecked with every charming hue,
Was newly culled from Nature's choicest bowers:
The other, no less fair in every part,
Was the product of divinest art.

"Which is the true, and which the false?" she said,
Great Solomon was silent. All-amazed,
Each wondering courtier shook his puzzled head,
While at the garlands long the monarch gazed,
As one who sees a miracle, and fain,
For very rapture, ne'er would speak again.

"Which is the true?" once more the woman asked,
Pleased at the fond amazement of the king,
"So wise a head should not be hardly tasked,
Most learned liege, with such a trivial thing!"
But still the sage was silent; it was plain
A deepening doubt perplexed the royal brain.

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While thus he ponders, presently he sees,
  Hard by the casement—so the story goes—
A little band of busy, bustling bees
  Hunting for honey in a Sharon rose.
The monarch smiled, and raised his royal head:
"Open the window!" that was all he said.

The window opened at the king's command,
  Within the room the eager insects flew,
And sought the flowers in Sheba's dexterous hand.
  And so the king and all the courtiers knew
That wreath was nature's; and the baffled queen
Returned to tell the wonders she had seen.

My story teaches (every tale should bear
  A fitting moral) that the wise may find
In trifles, light as atoms in the air,
  Some useful lesson to enrich the mind;
Some truth designed, to profit or to please,
As Israel's king learned wisdom from the bees!

The records of its first progression are, however, entirely lost, and no regular history of this science exists prior to the days of Aristotle (300 years before Christ), who, under the auspices and through the munificence of his pupil, Alexander the Great, was enabled to prosecute with the greatest advantage, for the time in which he lived, his experiments and inquiries into every department of natural history. Alexander felt so strong a desire to promote this object that he placed at the disposal of Aristotle a very large sum of money, and in his Asiatic expedition employed above a thousand persons in collecting and transmitting to him specimens from every part of the animal kingdom.

Aristotle is therefore to be regarded as having laid the first foundation of our knowledge of that kingdom. He must likewise have derived great advantages from the discoveries and observations of preceding writers, to whose works he would probably have easy access. No individual naturalist could, without such assistance, have produced so valuable and extensive a work on natural science as that which Aristotle has bequeathed to posterity. And though the opinions of himself and his contemporaries have been transmitted to us in an imperfect manner, and abound in errors, still he and his illustrious pupil, Theophrastus, who succeeded him in the Lyceum, may be regarded as the only philosophical naturalists of antiquity, whose labours and discoveries present us with any portion of satisfactory knowledge.

Prior to the time of Aristotle and Theophrastus, we read of the philosopher, Aristomachus, of Sali in Cilicia, and of Philiscus, the Thasian, having devoted many years of their lives to an investigation of the manners and habits of bees. The contemplations of the former are said to have been almost solely occupied by these insects for fifty-eight years, and the latter spent so great a portion of his time in the fields in pursuit of the same object as to have acquired the name of Agrius. Both of these great bee-masters left behind them, in writing, the results of their experiments and observations; but the original works have been long buried in oblivion. However small the contribution of knowledge which we have derived from these ancient worthies, they must have greatly aided the progress of their favourite science, and are at all events evidences of the zeal with which apiculture was prosecuted in their day.

About three hundred years after the time at which Aristotle wrote, his observations on the honey-bee were embellished and invested with a species of divinity by the

matchless pen of Virgil, in his fourth Georgic (35 years before Christ), and it excites feelings of regret that poetry, which for its beauty and elegance, is so universally admired, should be the vehicle of opinions that are founded in error. The following is Virgil's description of an Italian queen bee in his fourth Georgic (35 B.C.):—

"Glowing with yellow scales and dazzling hue,
His body marked with golden bands we view;
If safe this king, one mind abides in all—
If lost, in discord dire and feuds they fall;
Destroy their work, waste all their gathered store,
Dissolve all bonds, nor are a nation more.

If he but live, ruling the glowing hive,
All are content, the fertile race survive.
Him they admire, with joyful hum surround,
While labour thrives and honeyed sweets abound."

You here see the grave mistake Virgil makes in calling the queen a king.

Virgil says "That the bee is a ray of the Divinity;" Plutarch, "That it is a magazine of the virtues;" Quintilian, "That it is the chief of geometricians;" and De Montfort, "That the bee surpasses, in architecture, the skill of Archimedes."

The extensive notice we find of "mead" and "metheglin," in the days of the Druids, would lead us to believe that bees were domesticated by the Britons; but we have no authentic information on this point, and the honey used in their drinks may have been collected by wild bees. The Romans, when they came (A.D. 43) no doubt taught the Britons how to hive and domesticate the honey-bee.

Mead was the ideal nectar of the Scandinavian nations, which they expected to quaff in heaven out of the skulls of their enemies; and, as may reasonably be supposed, the liquor which they exalted thus highly in their *imaginary celestial banquets* was not forgotten at those which they *really* indulged in *upon earth*. Hence may be inferred the great attention which must have have been paid to the culture of the bee in those days, or there could not have been an adequate supply of honey for the production of mead, to satisfy the demand of such thirsty tribes.

The mythology of Scandinavia (the religion of our Gothic ancestors) was imparted by Sigge or Odin, a chieftain who migrated from Scythia with the whole of his tribe, and subdued, either by arms or arts, the northern parts of Europe. In the singular paradise which Odin sketched for his followers, the principal pleasure was to be derived from war and carnage; after the daily enjoyment of which, they were to sit down to a feast of boar's flesh and mead. The mead was to be handed to them in the skulls of their enemies, by virgins somewhat resembling the houri of the Mahometan paradise, and plentiful draughts were to be taken, until intoxication should crown their felicity.

Hence the poet Penrose thus commences his "Carousal of Odin":—

"Fill the honey'd bev'rage high,
Fill the skulls, 'tis Odin's cry!
Heard ye not the powerful call,
Thundering through the vaulted hall?
Fill the meath and spread the board,
Vassals of the grisly lord!
The feast begins, the skull goes round,
Laughter shouts—the shouts resound!"

The mead made in South Wales in the present day is not so potent as that drunk when King Ethelwald restricted the monks of his monastery to a certain quantum

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to be drunk between twelve of the brethren at supper. Howel Dhu, who was King of Wales about A.D. 490, made a code of laws relating to bees, fixing the various prices of a hive at different seasons; and so highly was mead thought of some thousand years ago that the mead-maker ranked in the Prince of Wales' household next to the royal physician.

The Anglo-Saxons, of the earliest period, were probably more anxious to domesticate bees than horses. Their produce was an article of food, necessary to brewing mead and extensively used in medicine. In the sixth and seventh centuries, bees were altogether wild. They swarmed in the woods, and formed their honeycombs in hollow trees, and were at first classed by law with foxes and otters, as incapable of private ownership, because they were always on the move.

Anyone who found them had a right to the honey and wax, though, from several ecclesiastical regulations in the seventh and eighth century, we may infer that their capture was a dangerous amusement, and that their half-naked captors were often severely stung. A favourite mode of taking them was to cut down the tree in which they were, saw off the part containing them, and carry it home. But as the country progressed in wealth, bee-keeping became more profitable. By the laws of one of the Saxon kings it was ruled that every "ten hides of land shall furnish ten vessels of honey."

The clergy earnestly encouraged bee-keeping, teaching that the bees had been sent from heaven, because the Mass of God could not be celebrated without wax. The first step towards their domestication was the formation of imitations in bark (*rusca*) of the hollows of trees in which they were found. After a short time a wild swarm became the quasi property of the owner of the trees in which they had settled for three consecutive nights; but if he omitted to discover it within that time, the finder had a right to fourpence, and if it were not paid, to keep it himself. This shows the difference in value between the wild and domesticated swarms, as a rusca of bees was worth six times fourpence, viz., twenty-four pence.

About the middle of the tenth century slaves (whose duty it was exclusively to attend to bees, and were called bee-churls) were ordinarily attached to wealthy establishments, and from the position of slaves they soon became servile tenants, whom their lord provided with a stock of bees, for which they paid a fixed amount of produce for life, the swarms continuing the property of the lord.

We also find about this time the Anglo-Saxon word *bee-cist* (bee-chest) and the Latin *alvearia* (bee-hives) usually substituted for "rusca," from which it may be inferred that these rough constructions were superseded by regular hives. Not long afterwards, the clergy induced Edward the Confessor (A.D. 1050) to tithe bee-hives, an evidence that they had become numerous and valuable, which is confirmed by *Domesday Book*, where they are repeatedly mentioned.

But bees in those days were never more than semi-domesticated, nor even altogether private property, for if they flew away, and the owner did not recapture them within a short time, they belonged to anyone who could.

About the commencement of the Christian era (50 A.D.), Columella, who was a very accurate observer, and exhibited considerable genius as a naturalist, made some curious and useful remarks upon bees in his treatise, *De Re Rusticâ*, translated in 1745; but Columella, like Virgil, appears to have acquiesced in and copied the errors of his predecessors; and he states that the idea of deriving emolument from the labours of the bees was first entertained in Greece, after the introduction of the colony which accompanied Cecrops from Egypt to Attica, by whom bees were

established upon Mount Hymettus. And the Cecropian bees have survived all the revolutions which have changed the features and uprooted the population of Attica; though the defile of Therniopylæ has become a swampy plain, and the bed of the Cephisus is laid dry, this one feature of the country has remained unaltered, and there are now upwards of five thousand bee hives on Mount Hymettus; the honey is very celebrated, being principally collected from wild thyme (thymus scrpyllum).

> "And still his honey'd store Hymettus yields,
> There the blithe bee her fragrant fortress builds,
> The free-born wanderer of thy mountain air."

Columella must have handled queen bees, for he was the first to state the fact that a queen cannot sting a human being, and he gives a description of two kinds of bees.

After him, the elder Pliny gave a sanction to the opinions which he found prevalent, and added to them others of his own. But Pliny, though a laborious compiler, occupied himself with too great a variety of pursuits to attain excellence in any. As a naturalist, however, he is happy in some of his descriptions. To him we are indebted for the transmission to us of all that was actually known, or supposed to be known, of natural history in his day. I say—supposed to be known; for many of the opinions and conjectures which he has put forth have been shown by modern investigators to be ill-founded.

The notions of the ancients respecting natural philosophy rested on no rational foundation; ideas of charms and of planetary influence directed their most important pursuits, and led to the formation of very absurd theories. When Pliny recommended that the dust in which a mule has rolled should be sprinkled on persons who are violently in love, as a sovereign remedy for amatory ardour, and gravely tells us that snakes are sometimes produced from the human medullo,—with many frivolous conceits of the like kind, we may safely pronounce that he or his contemporaries, or both, were very credulous, and that the science of experimental philosophy was scarcely cultivated among them.

Melissus, King of Crete, was the first who invented and taught the use of bee-hives. I have a list of eighty ancient authors upon bees.

After the compilation of Pliny's vast compendium, nearly fourteen hundred years rolled away without anything being done for entomology or for natural history in general. The Arabians, who alone preserved a glimmer of science during those dark ages that succeeded the fall of the Roman empire, cultivated natural history only as a branch of medicine, and from their writings little can be gleaned in furtherance of our present object.

On the revival of learning in the fifteenth century, and after the discovery of the art of printing, various editions were published of the works on natural history, written by the fathers of that science.

Thomas Hyll, in 1568, produced his first work on Bees, sixth edition in 1608. Sir Edward Wotton, Conrade Gesner, and others, produced conjointly a work on insects, the manuscripts of which came into the possession of Dr. Thomas Penry, an eminent physician and botanist in the reign of Queen Elizabeth (A.D. 1570). After devoting fifteen years to the improvement of the work, the Doctor died, and the unfinished manuscripts were purchased at a considerable price by Mouffet, a contemporary English physician of singular learning, who, with great labour and at great expense, arranged, enlarged, and completed the work. When nearly ready for the press, he also died; and the papers, after lying buried in dust and obscurity for several years, at last fell into the hands of Sir Theodore Mayerne (*Baron d'Aubone*), a court physician in the time of Charles the First, who gave them to the world in 1634.

The arrangement of this work is defective; but for the period in which it was written, it is a very complete and respectable treatise on Entomology. It was highly recommended by Haller; and as a storehouse of ancient entomological lore it has not yet lost its utility. Its pages are embellished with nearly 500 wood-cuts. An English translation of it was published in 1658. Prince Frederic Cesi, President of the Roman Academy of Sciences, wrote a treatise upon bees; but the work has not been preserved, and we are unacquainted with its merits.

Bee-keeping never flourished in any age of the world as it did after the sixteenth century. In 1609, Rev. Charles Butler, D.D., (the father of English Apiarians) produced his first work on bees. I see in the interesting article written by Mr. Henderson (page 179 *British Bee Journal* for February, 1877,) he claims for Mr. Butler the discovery of the drones being males, worker bees and queens females; for Butler says, on page 54, "I conclude that the drones are males, and that the ruler and the honey bees are all females, and that the bees are not copulative]; but conceive in a secret, unknown way by the drones; that queens produce queens only, and that the common bees are the mothers of common bees."

Now Aristotle (writing 1939 years before Mr. Butler's first work) says in book 1, chapter iii., page 10, "That it is the opinion of others that bees breed by copulation, and that the drones are males and the honey-bees females;" but he calls the ruler a king. It was left for that clever bee-master, the Rev. Samuel Purchas, to describe the ruler by her true definition, namely, "queen mother." In his work *A Theatre of Political Flying Insects*, published in 1657, and on page 86 he says, "Bees will swarm any time of the day, between eight in the morning and four in the afternoon, but the chief time of swarming is between eleven and one. Signs of after swarming are more manifest and certain, for about eight to twelve days after the first swarm is cast, the next princess will begin to tune in her treble voyce a mournful and begging note, as if she did pray her *queen mother* to give her leaf to begone, unto which voyce, if the queen vouchsafe to reply, tuning her bass to the young princess treble, as commonly she doth (though sometimes not entreated for a day or two), then she consents, and the third day after expect a swarm. The first day after the grant from the *queen mother*, how fair soever the weather may be, they will not go; and not ordinarily on the next day, except it be very fair; but on the third day, though it be somewhat close and cloudy weather, they will swarm; but when it has been very cold and windy I have known them stay five or six days after liberty granted."

Sir Christopher Wren, the great architect of St. Paul's Cathedral, invented a three storied octagon hive in 1654.

Goedart (whose work appeared in 1662) spent forty years of his life in attending to the proceedings of insects,—"daily conversing with insects," as he expresses it.

Swamerdam published his celebrated work, *A General History of Insects*, in 1669; a more enlarged edition, in two volumes, containing the history of bees, was afterwards published in 1737, under the auspices of Boerhaave, from the manuscripts of Swammerdam. It appears that Swammerdam stated "that from one female, the only one in the hive, all these kind of bees are produced," viz.: queens, workers, and drones. This is the first distinct statement of the fact of the reproduction of bees, so Swammerdam has the credit of being the discoverer of this important fact.

Dr. Gedde, in 1675, published an excellent work on Bees, *The English Apiary*, and obtained a patent from Charles II. for his invention of octagon hives of three

stories; so Gedde was the inventor of the storifying system, and the now called Stewarton hives. (This is the only patent ever taken out in England for a bee-hive.) What a contrast this is to America, where they have one thousand and one patent bee-hives.

Moses Rusden, Bee-master to the King's most excellent Majesty, published his work, "A Further Discovery of Bees," in 1679. Rusden improved Gedde's hive, and put a frame in it for the bees to fasten their combs upon. This is the first account we have of a frame being put inside a bee-hive.

In 1712, Dr. Joseph Warder published his first edition of his work on bees, "The True Amazons, or The Monarchy of Bees." This work went to the ninth edition, published in 1765.

Maraldi, a mathematician of Nice, in 1712, published the first edition of his work on bees. He was the first to invent a glass hive, in which the indoor proceedings of the bees could be seen; and his description of the manners, genius, and labours of the bees, which was published in the Memoirs of the Royal Academy of Sciences in 1712, gave a wonderful stimulant to the study of bees. Maraldi was the first to measure the angles of a bee's cell. He was struck with the fact that the three lozenge-shaped plates, forming the base of a bee's cell, always had the same angles, so he took the trouble to minutely measure them, and found that in each lozenge the large angles measured 109° 28′, and the smaller 70° 32′, the two making 180°, the equivalent of two right angles. He also noted the fact that the apex of the three-sided cup was formed by the union of three of the greater angles, 109° 28′.

Some time afterwards M. Reaumur, thinking that this remarkable uniformity of angle might have some connection with the wonderful economy of space, which is observable in the bee-comb, hit upon a very ingenious plan. Without mentioning his reason for the question, or telling him of Maraldi's researches, he asked Kœnig, the celebrated mathematician, to make the following calculation:—"Given a hexagonal vessel terminated by three lozenge-shaped plates; what are the angles which would give the greatest amount of space with the least amount of material?"

Kœnig made the calculations, and, by employing what geometricians denominate the "infinitesimal calculus," he found the large angles should be 109° 26′, and the smaller 70° 34′, or about two-sixtieths of a degree, less or more, than the actual angles made use of by the bees, and measured by Maraldi.

Mathematicians were naturally delighted with the result of the investigation; for it showed how beautifully practical science could be aided by theoretical knowledge, and the construction of the bee-cell became a famous problem in the economy of nature.

In comparison with the honey which the cell is intended to contain, the wax is a rare and costly substance, as the bees consume about one pound of honey to make one ounce of combs. The wax is secreted in very small quantities, and requiring much time for its production; it is, therefore, essential that the quantity of wax employed in making the combs should be as little, and that of the honey contained in it as great as possible.

For a long time these statements remained uncontroverted; any one with proper instruments could measure the angles for himself, and the calculations of a mathematician like Kœnig would hardly be questioned. However, Maclaurin, the well-known Scotch mathematician, was not satisfied. The two results very nearly tallied with each other, but not quite; and he felt in a mathematical question precision was a necessity.

So Maclaurin tried the whole question himself, and found Maraldi's measurement correct, namely, 109°28′ and 70°32′. He then set to work at the problem which was worked out by Kœnig, viz., "What ought to be the angles of a six-sided cell with a concave pyramidal base, formed of three similar and equal rhomboidal plates, so that the least possible matter should enter into its construction?" Maclaurin found the true theoretical angles were 109°28′ and 70°32′, precisely corresponding with the actual measurement of the bee-cell.

Another question now arose. How did this discrepancy occur? How could so excellent a mathematician as Kœnig make so grave a mistake? On investigation, it was found that no blame attached to Kœnig, but that the error lay in the book of logarithms which he used. Thus a mistake in a mathematical work was accidently discovered by measuring the angles of a bee-cell; a mistake sufficiently great to cause the loss of a noble ship and the lives of all its gallant seamen, whose captain happened to use a copy of the same logarithmic tables for calculating his longitude. All honour due to Maraldi, Reaumur, Kœnig, and Maclaurin.

"How most exact is Nature's frame!
How wise the Eternal mind!
His counsel's never change the scheme
Which his first thought designed."

"On books deep poring, ye pale sons of toil,
Who waste in studious trance the midnight oil,
Say, can ye emulate with all your rules,
Drawn from Grecian or from Gothic schools.

This artless frame? Instinct her simple guide,
A heaven-taught insect baffles all your pride.
Not all yon marshal'd orbs, that ride so high,
Proclaim more loud a present Deity.

Than the nice symmetry of these small cells,
Where on each angle genuine science dwells,
And joys to mark, through wide creation's reign,
How close the lessening links of her continued chain."—*Evans.*

The French natural historian, M. Reaumur, stands prominent among the students of entomology, for the unsurpassed enthusiasm and accuracy with which he has investigated some of its most intricate parts. To him the genus Apis is under greater obligations perhaps than to any entomologist either of ancient or modern times. See his immortal work, in 6 vols. 4 to. 1732, 1744, *Mémoires paur servir à l' Histoire des Insectes.*"

About this period also flourished the great, the illustrious Linnæus, whose labours diffused light over every department of natural science, and have justly caused him to be regarded as one of its brightest ornaments. He has generally been considered as the founder of the artificial system of arrangement; but a very near approach to it was made by that brilliant constellation of naturalists whom I have enumerated as having flourished at the close of the seventeenth century, and who may probably be regarded as having paved the way, and prepared materials, for the formation of his more perfect system.

Afterwards appeared the works of the celebrated M. Bonnet, of Geneva, in 1745, the admiring correspondent of Reaumur, and the patron and friend of Huber. This great physiologist became addicted to the study of entomology before he was seventeen years of age, from reading *Spectacle de la Nature*; and his decisive experiments upon Aphides do him the highest credit. His works are universally admired for

their candour and ingenuity, as well as for their manifest tendency to promote the happiness of man, by exciting in him the love of knowledge and virtue.

The Rev. John Thorley's excellent work on bees, "The Female Monarchy," appeared in 1744, and was succeeded by the Rev. Stephen White, who invented the collateral bee-hives in 1756.

The Society for the encouragement of Arts, Sciences, Manufactures, and Commerce, in England, offered four hundred pounds to encourage bee-keeping in 1765 (a very large sum in those days). A premium of five pounds was given to every person who had in his possession on February 1st, 1766, being his own property, any number of stocks of living bees, in hives or boxes, not less than thirty; and also a premium of five pounds to every person who shall take ten pounds of merchantable wax, from any number of stocks of living bees, in hives or boxes, who shall preserve their lives till the 1st of March, 1767; but in case there shall be more claimants then the sum of four hundred pounds, shall be distributed between the candidates, in proportion to the number of claimants.

This gave such a great impulse to bee-keeping that I have a list with the names of the authors of no less than forty-two works written on bees during the next six years, amongst whom was the celebrated Wildman, 1768, who performed numbers of wonderful feats with bees, that have never been equalled in any country up to the present time. For instance, when he appeared before King George III., standing upright on horseback, with a swarm of bees suspended in garlands from his chin, like a great beard, and after transferring them from his chin and breast to his hand, stretched out to full length, and then on firing a pistol the bees all swarmed in the air and went back to their hive, with numbers of other equally wonderful performances.

The following is a copy of his advertisement:—"June 20, 1772. Exhibition of bees on horseback! at the Jubilee Gardens, Islington, London, this and every evening until further notice (wet evenings excepted). The celebrated Mr. Wildman will exhibit several new and amazing experiments, never attempted by any other man in this or any other kingdom before. The rider standing upright, one foot on the saddle and one on the neck, with a mask of bees on his head and face. He also rides standing upright on the saddle with the bridle in his mouth, and, by firing a pistol, makes one part of the bees march over the table, and the other swarm in the air and return to their hive again, with other performances too tedious to insert. The doors open at 6; to begin at a quarter before seven. Admittance:—Box and gallery 2s.; the other seats, 1s."

These performances were considered at that time as feats of legerdemain or witchcraft, but the secret of Wildman's skilful manipulation with bees is well understood now; it consisted of a careful holding and disposal of the queen, together with confidence in the generally inoffensive disposition of bees. Dr. Evans thus speaks of Wildman's feats:—

"Such was the spell which, round a Wildman's arm,
Twined in dark wreaths the fascinated swarm;
Bright o'er his breast the glittering legions led,
Or with a living garland bound his head.
His dextrous hand, with firm yet hurtless hold,
Could seize the chief, known by her scales of gold;
Prune 'mid the wondering train, her filmy wing,
Or o'er her folds the silken fetter fling."

We now come to the physiological discoveries of Schirach, 1761; Hunter, 1789; Huber, 1796; and others, men who have wonderfully advanced the science of ento-

mology by a series of experiments most ably conducted, by the most patient investigation, and the most accurate and enlightened observation, and placed it upon the solid foundation of rational induction.

Several other writers also, both in systematic works and in periodical publications, have contributed to throw much light upon the economy and habits of the bee. Amongst whom was John Keys, who published his first work "The Practical Bee Master" in 1870. My father was a disciple of Keys, and adopted his system, and never killed his bees to take the honey. He was a very humane good man, and almost the first thing he taught us was

"Take not that life, thou canst not give,
For all things have an equal right to live."

I haye now some bees in a wood hive that my father got made in 1806, on Keys' system, and there has been bees in it from nearly that time to the present, yet it is as sound and good as the day it was made. This shows the great durability of wood over straw hives.

The immortal Thomson thus describes the barbarous practice of murdering the bees with sulphur, to take the honey, in his own energetic language :—

Ah, see where robb'd, and murder'd, in that pit
Lies the still heaving hive! at evening snatch'd
Beneath the cloud of guilt-concealing night,
And fixed o'er sulphur : while, not dreaming ill,
The happy people in their waxen cells
Sat tending public cares, and planning schemes
Of temperance, for winter poor ; rejoiced
To mark, full flowing round, their copious stores.
Sudden the dark oppressive steam ascends ;
And, us'd to milder scents, the tender race,
By thousands, tumble from their honeyed domes,
Convulsed, and agonizing in the dust.
And was it then for this you roam'd the spring,
Intent from flower to flower ? For this you toiled
Ceaseless the burning summer-heats away ?
For this in Autumn searched the blooming waste,
Nor lost one sunny gleam ? For this sad fate!
O man! tyrannic lord! how long, how long,
Shall prostrate nature groan beneath your rage,
Awaiting renovation ? When obliged,
Must you destroy ? Of their ambrosial food
Can you not borrow ? and in just return,
Afford them shelter from the wintry winds ;
Or, as the sharp year pinches, with their own
Again regale them on some smiling day ?
See where the stony bottom of their town
Looks desolate, and wild ; with here and there
A helpless number, who the ruin'd state
Survive, lamenting, weak, cast out to death.

For Thomson's humane appeal he has been thus apostrophised by Dr. Evans.

"And thou, sweet Thomson, trembling alive.
To pity's call, hast mourn'd the slaughter'd hive,
Cursing, with honest zeal, the coward hand
Which hid in night's dark veil the murd'rous brand.
In steam sulphureous wrapt the peaceful dome,
And bore the yellow spoil triumphant home."

I am pleased to be able to tell you that bee-murder is now practised by only the most ignorant people, as we have been able to show them at the meetings of the

British Bee-keepers' Association, that by murdering their bees, was like putting their hands in their pockets and throwing their money on the highway, as the bees are wanted to work for them next year.

Keys was succeeded by a host of writers on bees, including Sydserf, 1792; Bonner, the clever Scotch apiarian, in 1795; the illustrious Huber, 1796, the king of bee masters, who (although he was perfectly blind) made more true discoveries about bees than all the writers before him or since. Huber invented the first bar-frame hive; but his frames formed the hive, and the frames opened with hinges, the same as the leaves of a book. He was succeeded by Kirby, 1801; Buffon, 1812; Huish, 1815; and Dunbar in 1820.

Dr. Edward Bevan published his first work on Bees in 1827. This was the most scientific and useful work on bees that had been published in England up to that date, nay, I may say up to the present time it has not been surpassed by any English writer. He was succeeded by Thomas Nutt, who brought the collateral system so prominently forward in his work "Humanity to Honey Bees," published in *1832;* and he says, "Is it not inhumanity to force bees to deposit their treasures in a garret, two or three stories high, when a far more convenient store-room may be provided for them on the first floor?" Now this sort of reasoning sounded very true and nice, but the bees' instinct taught them to reject his collateral boxes on the ground floor, and to deposit their honey in the highest, and consequently the warmest, part of the hive, as heat will ascend; so Nutt's collateral system has long since gone out of use.

Our late friend Rev. W. C. Cotton published his first work on bees in 1838, "Short and Simple Letters to Cottagers," of which 24,000 were distributed; and his enlarged work, "My Bee Book," in 1842, before he took the bees out to New Zealand, which so benefited the colony, as before the introduction of the honey-bee they had yearly to import fresh white clover seed (*Trifolium repeus*), but by the agency of the bees they are now able to export it. We should have little seed or fruit if it was not for the agency of bees in carrying the pollen from the male to the female blossoms. On April 8th, 1870, I visited the residence, at Highgate, of our noble and good President of the British Bee-Keepers' Association, the Baroness Burdett Coutts, whose name is almost a household word. When I went into the peach house the gardener said to me, "See what a quantity of peaches I have got set." I looked round and said, "You have, indeed; how do you account for it." "Well," he said, "I have always kept bees to fructify my fruit bloom, but last autumn I bought a stock of Ligurian or Italian Alp bees, and they being hardier than the common English bees, they began working earlier, and got into the peach house just as the trees were coming into bloom, and the result is I have nearly double the quantity of peaches set I ever had before." So you see it is not only honey that we get from the bees, but nearly everything else that we grow. Mr. Cotton published and printed a work on bees in New Zealand in 1848, "A Manual for New Zealand Bee-Keepers." The natives called the bee the "White man's fly." In 1872 Mr. Cotton published a most amusing work, entitled "Buzz-a-Buzz; or, the Bees Done freely into English," from the German of Wilhelm Busch.

Major W. A. Munn published his first work on bees in 1844, and took out a patent for his bar-frame hive in Paris in 1843. Munn was the first to put a bar-frame inside a hive; but it was left to the Rev. L. L. Langstroth, in America, Rev. John Dzierzon and Baron Von Berlepsch, in Germany, unknown to one another at the time, to simultaneously invent the modern bar-frame hive in 1852, which quite revolutionised bee-keeping, and brought it to such great perfection that it has now become

of national importance in many countries. These hives have rendered bee-keeping a more scientific study, as with them we have the full control over the bees, and can investigate all their proceedings whenever we like.

The Rev. John Dzierzon, the poor Carlsmark curate, published his first work on bees in 1846, and announced the discovery of the true doctrine of parthenogenesis in the honey-bee, or production by the queen, without having any intercourse with the male or drone bee. This is contrary to almost a universal law in the animal and vegetable kingdom, that he raised such a swarm of opponents, in nearly all the naturalists in Europe, who scouted the very idea of such a production, and raised such a host of objections against such a theory being true, that Dzierzon himself began to doubt the correctness of what he had seen with his own eyes. A number of them set to work to prove the fallacy of such a statement, but every experiment that was properly conducted only confirmed the correctness of Dzierzon's theory, and Professor Theodor Von Siebold (one of the most distinguished German naturalists and physiologists) fully confirmed this doctrine, after a laborious dissecting and microscopical investigation, he discovered a set of voluntary muscles for imparting some of the male element which is stored up in the spermatheca, to every worker egg, during its passage through the common oviduct. He also discovered lively spermatozoids in the semen of the drones, as well as in the contents of an impregnated spermatheca, and detected the same spermatozoids in worker eggs, whilst they were entirely wanting in those eggs that would produce drones.

This long and acrimonious dispute was at last conclusively settled, and it has explained many of the mysteries of the hive, in which the great king of bee-masters, the illustrious Huber, after discussing the effects of retarded impregnation, exclaimed, "It is an abyss wherein I am lost." All other great bee-masters have been equally lost in this abyss, until Dzierzon discovered the doctrine of true parthenogenesis, and it is now a confirmed fact that the queen bee has the power at will to lay drone or unfructified eggs, or fertilized worker eggs, and I have conclusively proved these statements with my own experiments.

All honour is due to pastor Dzierzon for his laborious observations, for which and his numerous other discoveries the Emperor of Austria in 1873 decorated Dr. John Dzierzon (formerly the the poor Carlsmark curate) with the Cross of the Knightly Order of Francis Joseph, and may he long live to enjoy his advancement and honours.

Dzierzon was succeeded by Miner, 1849; Rev. L. L. Langstroth and M. Quinby, who both wrote very excellent works on bees in 1853; and the Baron Von Berlepsch, who published his first work on bees in 1860; a second edition in 1868, in the production of which he bestowed immense labour, and it is said he read seventeen thousand pages, of the best bee-books in the world, to make it the most perfect bee-book ever published. The bee journals in different countries have done a great work in advancing bee culture.

I think I have now given you a short account of bee-keeping from the earliest date of which we have any records to the present time, the compiling of which has taken a very great amount of labour, and in conclusion I can truly say the culture of bees is indeed an object highly deserving the attention of the agriculturist, as well as of the natural philosopher. Their study is an endless source of pleasure, and the more you know about them the more you will want to know.

To go and sit down near your bee-hives when your mind is troubled with the cares, crosses, and afflictions of this life, the bees' soothing, happy hum, contented, busy

life, constantly going in and out of the hive, imperceptibly draws your attention from yourself and your great sorrow, for a time at least, and many an hour have thus been passed in comparative happiness by the poor sufferer that would otherwise have been spent in agony in mourning over his affliction or bereavement.

I will now conclude with the tale that some of you have probably heard of the good bishop and the curate.

Some years ago the Bishop was holding his first visitation of the clergy of his diocese in a town in one of the midland counties. Amongst those assembled he soon discovered an old college acquaintance whom he had not seen for a number of years. On comparing notes with his friend, he found he was still a country curate, at a stipend of £100 a year, and that he had a wife and a large family to support.

The worthy curate invited the bishop to spend a day with him before he left the neighbourhood, and not wishing to appear proud, he accepted the invitation.

On reaching his friend's house he was surprised at the degree of comfort there was about everything, all the family being so well dressed, and the dinner was worthy of the traditional customary fare of his order.

After the ladies had retired, he said to his friend (knowing that he was originally a poor man) he was afraid that he had gone to an unusual expense to entertain him, and that it would entail privation upon him afterwards. "Not at all," replied the curate, "I can well afford to entertain an old friend once in a while without inconvenience." "Then," rejoined the bishop, "I suppose you must have got a fortune with your good lady." "You are wrong again, my lord; I had not a shilling with my wife. But I am a large manufacturer as well as a clergyman, and employ many thousands of operatives, which brings me in an excellent living. If you will walk with me I will show you them at work."

The bishop went with him into the garden, and there saw a splendid apiary, with a large number of bee-hives, the source of the curate's prosperity.

The bishop never forgot the circumstance, and frequently when he heard some poor curate complain of his income, he would cut the matter short by exclaiming, "There, there, let's have no grumbling. Keep bees, like Mr.———. Keep bees, keep bees."

If you wish for a pleasant and profitable recreation, I say with the good bishop of old, keep bees, keep bees, keep bees.