

# The Cheat and the Microscope: Plagiarism Over the Centuries<sup>1</sup>

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## INTRODUCTION

Much is written on plagiarism in academia, particularly in connection with students who utilize material available on the Internet and submit it as their own work. Google “plagiarism” and you will get some 5,000,000 references. Amend the search to include the word “student” and you still have 50% of that total. The Internet has brought so much information so easily to our desks that plagiarism has become fashionable and, in some quarters, almost acceptable.

The April 2004 issue of the *Harvard Business Review* included a heading “Plagiarize with Pride” and advocated serious businessmen “to steal any good idea they see.” Students — and, it seems, many academics — now regard this deliberate misappropriation of intellectual property (IP) as acceptable.

Yet, just as the Internet offers novel mechanisms for plagiarism, it also brings cutting-edge facilities for identifying it. Software such as Turnitin and Viper now make it easier to identify copied text. Turnitin is intended for teachers to help them identify plagiarists (Figure 1), while Viper is aimed at students to assist them in rewording their assignments so that plagiarism is less easily detected by their teachers. Professor Harold “Skip” Garner, executive director of bioinformatics at Virginia Polytechnic Institute, tells me that he has used such methods to investigate the extent of the problem. He has already unearthed 162 recent scientific papers of which very similar versions have subsequently been published by disparate au-

thors. So far 83 investigations have been set up; there have been 46 retractions of plagiarized work.

It is not such a new phenomenon, however. Since the dawn of microscopy in the 17th century, ideas, drawings and IP have been repeatedly misappropriated. We will look at some flagrant examples from the earliest years of the discipline and culminate in perhaps the most extreme example — when authors plagiarize themselves.

## THE FIRST VICTIM

Robert Hooke was the first professional microscopist and was destined to become one of the first to be plagiarized. On March 25, 1663, he was solicited by the Royal Society of London to compile a series of observations with the microscope that the Society planned to publish. One week later, he was ordered to present a microscopical demonstration every week.

Hooke was a brilliant innovator who complained that others misappropriated his ideas throughout his career. Isaac Newton’s theories of light and color were stolen from his own ideas, claimed Hooke, and what wasn’t stolen was incorrect. In 1672, he advanced an inverse square law to explain the movements of the planets, though he did not formally publish the concept. When Newton subsequently claimed the idea as his own, the relationship between the two men became increasingly bitter. Every reference to Hooke was removed from Newton’s *Principia Mathematica* prior to its publication in 1687, and the two men remained

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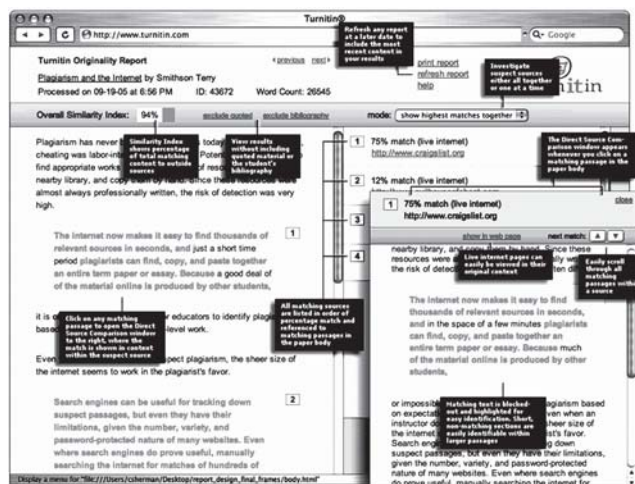


Figure 1. The Turnitin website shows how plagiarized essays can be identified. Similar software is available for students to help them reword their assignments to avoid plagiarism.

implacable foes. After that, complaints about his work being plagiarized became a feature of Hooke's life.

Hooke published his microscopical observations in his grand book *Micrographia* in 1665, and he attracted a wide and diverse readership. The famous diarist Samuel Pepys wrote that he stayed up late into the night looking at the book and its extraordinary portrayals of fleas and lice, flies and seeds. Among the keenest readers were others who were eager to publish on the new science of microscopy. Many of them also flagrantly plagiarized Hooke's work.

Hooke's magnificent studies of the human flea *Pulex irritans* and the louse *Pediculus humanus* (Figure 2) were published as plates in *Micrographia* on folded sheets measuring about 32 x 53 cm. Each of the images is over a foot long, and they are eye-catching and memorable. The first edition of the book is dated 1665, and a second appeared in 1667 after the Great Fire of London. In 1681, Filippo Bonanni published his own accounts of these parasitic insects in his book *Observationes circa Viventia, quae in Rebus non Viventibus*. To this day the studies are cited in the reference works as "studies by Bonanni" (thus, Wikipedia has the image of a flea identified as "drawn by Bonanni") but both are copied directly from Hooke's *magnum opus*.

Authors often divert attention from their plagiarism of other people's work by insisting that their published drawings were their own creation. Eleazar Albin copied Hooke's diagrams in his *Natural History of English Insects* (1720). The book contained 100 copper plates which, he insisted, were "curiously engraved from the

life." Setting the images in juxtaposition reveals the duplicity of this claim.

Hooke's *Micrographia* remained popular, and in 1745 what remained of his plates (with some newly engraved substitutes) were published in a book entitled *Micrographia Restaurata*. Many of them reappeared once more in 1771 when they were re-engraved at reduced scale and featured in George Adams's *Micrographia Illustrata, or the Microscope Explained*. Adams's book was essentially a sales catalogue, as the final section was a price list of the instruments that he could provide. Adams included a large selection of previously published images in his book and in many cases he did so without direct attribution.

Adams was clearly a great enthusiast for the work of Louis Joblot, and part of *Micrographia Illustrata* includes an acknowledged "translation of Mr. Joblot's observations on the animalcula" and is clearly identified with the original author. Joblot published a curious book which appeared in 1718 under the title *Descriptions et usages de plusieurs Nouveaux Microscopes*. He included many plates of microorganisms, and historians of science take his work very seriously.

My colleague Marc J. Ratcliffe of Geneva, in his book *The Quest for the Invisible* (2009), discusses how Joblot "scrutinized" the morphology of microorganisms and was "the leading discover of infusoria" of his time. But those are the views that are typical of historians, and historians of the microscope rarely look through one. Joblot's published drawings are more like caricatures, and most of them lack a sense of verisimilitude. Nevertheless, a number of these illustrations reappear in Adams's volume.

Adams also reproduced the work of another microscopist, Abraham Trembley (Figure 3). Says Adams (*Micrographia Illustrata*, page 164): "I shall lay before the reader the following observations, which were made by Mr. Trembley." Adams included in his book a number of re-engraved copies of Trembley's published work. Thus, the magnificent study of *Hydra* on Plate 47 of *Micrographia Illustrata* is clearly copied, line for line, from Plate 6 of Trembley's *Mémoires . . . d'un genre de Polypes d'eau Douce*, which had been published in 1744.

Similarly, on page 93 of his book, Adams mentions that "Seignior Redi hath obliged us with microscopical drawings," referring to the illustrations published by Francesco Redi whose best-known book was *Experiments on the Origins of Insects* (1668). We can see that George Adams was not wholly averse to citing his sources, but he was circumspect on other occasions, preferring to take the credit for observations that resulted from the painstaking labor of others.

Some of his pictures are copied from the Leeuwenhoek papers. Adams does not like to say so directly, and prefers to quote Leeuwenhoek's words in his text. Thus he writes on page 1: "As Mr. Leeuwenhoek has shewn in his 128th epistle to the Royal Society." On page 16 and again on page 27 he says: "Mr. Leeuwenhoek informs us." These frequent references in the text show his admiration for his Dutch predecessor, though he avoids giving direct credit for the illustrations.

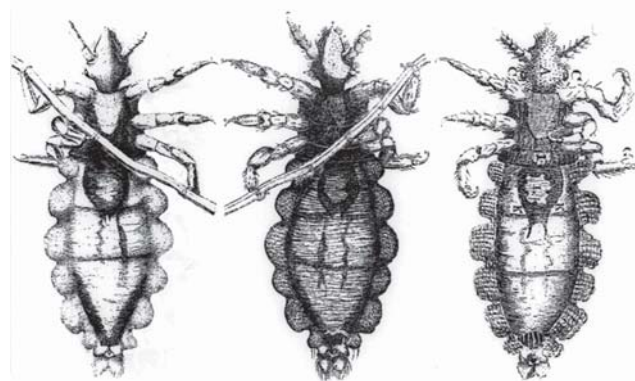
Adams also reproduced a number of Hooke's illustrations from *Micrographia* and in many ways they are the core of his book (Figure 4). They are certainly the most eye-catching of all the illustrations in *Micrographia Illustrata*, yet Adams is less than honest when referring to Hooke's contribution. Hooke is cited in the text (as "Hook"), but the reader would have the clear impression that the drawings originated from Adams himself. He states (on page 40 of his book): "Fig 82. A, is a microscopic representation of the foot of a fly."

In writing of a gnat (page 76) he describes it as: "exactly of the shape of one of those which Mr. Hook observed." On page 86, he writes of "a microscopic picture of a perfect flea" and describes it as "a surprising object." He publishes Hooke's images of cloth, describing one of them (page 324) as: "lawn [cloth] as it appears through the microscope." Adams even prints copies of Hooke's images of cork sections, and then adds (page 306): "Mr. Hook told several lines of the pores" — "told" in this context meaning "measured." Although Hooke is mentioned in passing, his role as the originator of the illustrations fades from sight.

Adams's eye-catching images of the flea and the louse were copied directly from Hooke but no mention is made of their source. Versions of the Hooke engravings have been collated by Dr. James McCormick (Figure 2), and the similarities are unmistakable. Hooke's images were still being copied in 1825, when a popular reference work, Blair's *Prescription*, included them as illustrations. We can see how justified was Hooke's insistence that he was the victim of plagiarism. Clearly, he was right.

## HOOKE AS PLAGIARIST

It was the magnificent quality of Robert Hooke's microscopical studies that made them objects of attention for other writers who were to follow. Yet there is another side to this coin: Hooke himself was a plagiarist before his own work was misappropriated. One of the most eye-catching plates in *Micrographia*



Images courtesy of Dr. James McCormick

**Figure 2.** Hooke's 1665 drawing of the louse *Pediculus* (left) was copied by Bonanni in 1681 (center) and later by George Adams (1771), among others.

was flagrantly copied by Hooke from another investigator.

The prolific Danish philosopher and writer Thomas Bartholin published a book entitled *De Nivis usu medico Observationes variae* in 1661. The book contained a modest plate of snowflakes (Figure 5). They owed more to artistic license than to painstaking observation, and although they clearly showed the six-rayed structure of a snowflake, they had details that we do not observe in nature. Some were solid spherical rays; others had fine needles as side-branches, like a herringbone. Because of their characteristic nature they are uniquely recognizable caricatures.

It is surprising to discover that a similar portrayal of snowflakes features in Hooke's Scheme VIII that is devoted to snow (Figure 5). Hooke has blatantly plagiarized Bartholin's figures and included them as though they were his own, original work. Wrote Hooke:

"I have often with great pleasure, observ'd such an infinite variety of curiously figur'd *Snow* . . . Some coarse drafts, such as the coldness of the weather would permit me to make, I have here added in the Second Figure of the Eighth Scheme."

The reader is led to feel sympathy for poor Hooke, struggling to observe freshly fallen snowflakes in the bitter winter weather, his fingers blue with cold. At least, we feel for him until we set "his" drawings alongside those by Bartholin. These "coarse figures" which Hooke claimed to have made were clearly copied from the Danish book of 1661. Thus we must accept that this victim of plagiarism was, first and foremost, himself a plagiarist. Hooke's protestations about the misuse of his own findings, though justified in fact, seem suddenly less substantial as a matter of morals.



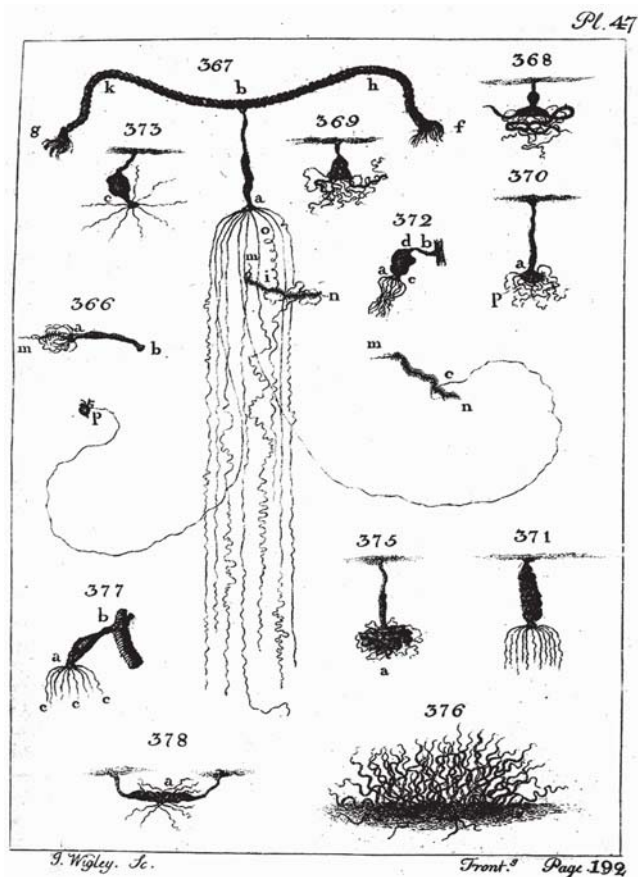
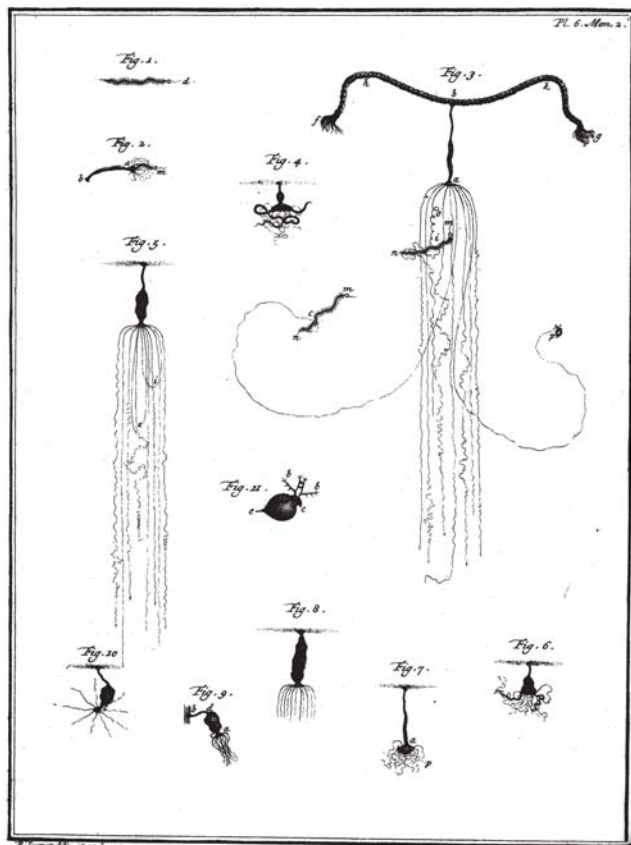


Figure 3. Left: Abraham Trembley, whose fine research was unmatched for over a century, made extensive studies of the freshwater polyp *Hydra* and published the results in 1744. Right: Trembley's plates, like those of Hooke, were adapted for re-engraving at reduced scale for Adam's book *Micrographia Illustrata*. Trembley received more acknowledgment than Hooke.

## THE CASE OF LEEUWENHOEK

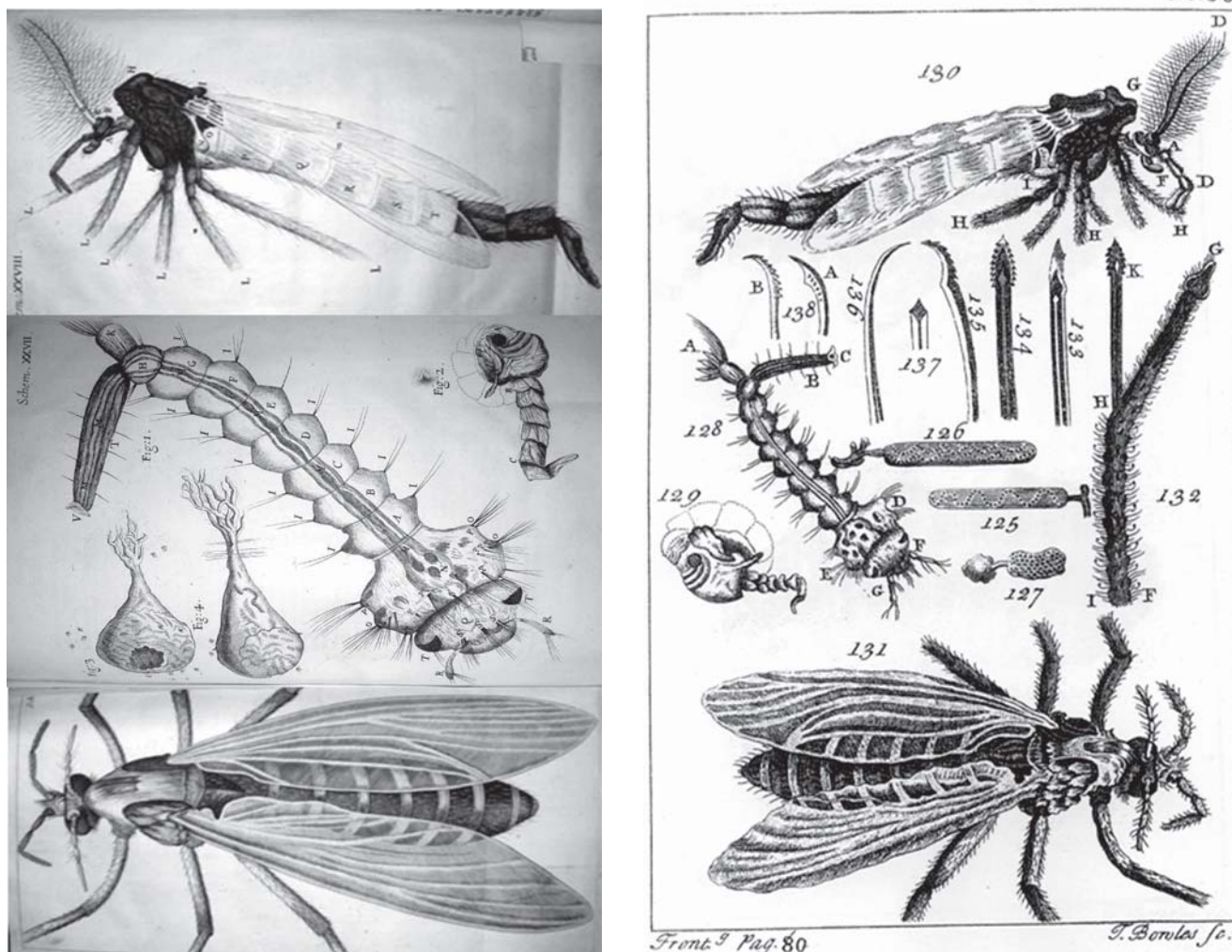
Antony van Leeuwenhoek, whom I have shown to have been inspired by Hooke's book to become a microscopist, gave inspiration to many later investigators. The numerous pencil drawings of microscopical specimens that Leeuwenhoek sent to his correspondents are widely described by historians as being made by his own hand. This is an error. Leeuwenhoek himself could not draw, and openly admitted the fact in his correspondence. In an early letter to the Royal Society of London (dated August 15, 1673) he wrote: "As I can't draw, I have got them drawn for me." Throughout his career, he resorted to the services of a limner.

When these studies were engraved for publication they became available for others to copy (Figure 6). Henry Baker, for example, included a number of re-drawn Leeuwenhoek studies in his book *The Microscope Made Easy* (1743) (Figures 7 and 8). In his early years, Baker pioneered a system of language for deaf mute

people, and came to the attention of Daniel Defoe (author of *Robinson Crusoe*, published in 1719). In 1728, under the pseudonym of Henry Stonecastle, Baker — jointly with Defoe — established magazines entitled *The Universal Spectator* and the *Weekly Journal*; and in the following year he married Defoe's youngest daughter, Sophia.

Like many fashionable men about town, Baker became increasingly drawn to natural philosophy and was intrigued by microscopy. The work of Leeuwenhoek fascinated him. He prepared a paper for the Royal Society in 1739 entitled *An Account of Mr. Leeuwenhoek's Microscopes*, and in the following year he was elected a fellow of the Society. So excited was Baker by this acknowledgment of his work that he set out to write his popular book on microscopy. On page 7 of *The Microscope Made Easy*, Baker writes about Leeuwenhoek's instruments:

"At the Time I am writing this, the Cabinet of Microscopes left by that famous Man, at his Death, to the Royal Society, as a Legacy, is standing upon my Table."



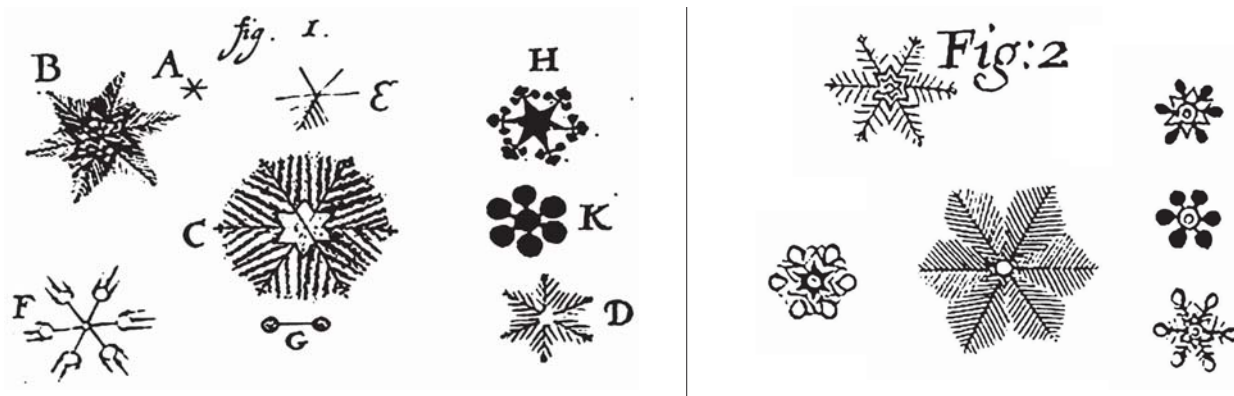
**Figure 4.** Left: Robert Hooke published studies of a gnat (top), its larva (middle) and a fly (below). Each of the original plates is a large, folio-sized engraving of unsurpassed quality and detail. Right: The lineage from Hooke's published engravings to these reduced-size copies from George Adams's book is unmistakable. Adams made only brief references to Hooke in his text.

Baker was a popularizer rather than a mere plagiarist. He describes Leeuwenhoek's work with words of admiration, and readily acknowledges the source of his own inspiration. He emphasizes the fact when his information comes from "Mr. LEEUWENHOEK's letters to the Royal Society" and, in describing Trembley's work on *Hydra*, states: "Mr. TREMBLEY was the first discoverer of this Insect [and] gives a drawing of the *Polype*" Baker has clearly copied the illustrations drawn by those pioneer microscopists, and he does acknowledge their sources.

Antony van Leeuwenhoek himself would be an unlikely individual to indulge in plagiarism: He was a pioneering microscopical investigator, and is renowned as the first person to make most of his ground-break-

ing observations. Yet Leeuwenhoek began his work by investigating areas that were already published by Robert Hooke, and took pains not to acknowledge Hooke by name. One could argue here about the exact boundaries of plagiarism. But however the matter is viewed, it is clear that Leeuwenhoek was drawing from Hooke's inspiration while making no reference to the fact.

The comparisons between Hooke's and Leeuwenhoek's accounts emerged during research for my book *The Leeuwenhoek Legacy* (1991). Hooke was fascinated by the way that the properties of a specimen were determined by its microscopic structure. His famous work on the cellular nature of cork, for instance, arose because he wished to see how such a material could be so unusual in several key respects.



**Figure 5.** Left: Thomas Bartholin had published these snowflake caricatures four years before Hooke's *Micrographia* appeared. They are unrealistic, and Hooke's indebtedness is unmistakable. Right: Snowflakes as illustrated by Hooke in *Micrographia*. He describes how his cold hands and insufficient clothing made the job of capturing the details difficult. Hooke, however, had plagiarized Bartholin's illustrations.

"First," he wrote, "why was it so exceeding light a body?" He went to wonder why cork was "a body so very unapt to suck and drink in Water," and thirdly he asked, "Why Cork has such a springiness and swelling nature when compres'd?" The microscopic structure that he discovered answered each question. It was the open cellular nature of cork (Hooke coined the term "cell" for this specimen) that made it so light, so waterproof and so inclined to regain its former shape after compression.

He went on to relate this open, spongy texture to other specimens he was examining. In *Micrographia* he wrote:

"Nor is this kind of Texture peculiar to Cork onely; for upon examination with my *Microscope*, I have found that the pith of an Elder, or almost any other Tree . . . have such a kind of *schematisme*. The pith also that fills that part of the stalk of a Feather that is above the Quill, has much such of a kind of Texture."

Let us now compare this with the notes that Leeuwenhoek prepared in 1674, where we find this description:

" . . . which kind of growing I apprehend may in some manner be seen in the pith of Wood, in Cork, in the pith of the Elder, as also in the White of a Quill, of which I have sent you . . . some small particles, cut off with a sharp razor."

Hooke had written of "cork, the pith of an elder and also the white of a quill"; nine years later we have Leeuwenhoek writing of "cork, the pith of the elder, and also the white of a quill" — exactly the same specimens and, furthermore, written up in exactly the same order. There can be no doubt (a) of Leeuwenhoek's familiarity with *Micrographia*, and (b) of the direct line of influence.

## QUESTIONS OF DEFINITION

These examples show how widespread plagiarism has been in the history of microscopy. Yet they reveal something yet more fundamental: There are shades of misappropriation and degrees of misuse. When Hooke wrote of his great discomfort in bravely capturing images of snowflakes — images that he had actually copied from an earlier microscopical publication — he was clearly a plagiarist. Hooke himself was obviously the victim of misappropriation when, in the following century, Albin copied Hooke's drawings and claimed that he had "engraven them from life." This claiming of intellectual property from a third party as one's own is what defines plagiarism.

How does this relate to Leeuwenhoek deliberately publishing his own observations on specimens already written by Hooke? What the Dutch pioneer was attempting to do was show how his observations could parallel, and then extend, those of Hooke in England. He was copying Hooke's selection of specimens, but to prove a point. It was his own observations that Leeuwenhoek wished people to understand, and he was not reproducing Hooke's findings and claiming them as his own. If plagiarism is the theft of IP, then all that Leeuwenhoek had misappropriated was the list of specimens. In communicating his own (later and better) findings, he was setting out his personal research and was not claiming to have discovered anything that properly belonged to Hooke. As such, it is arguable that this was not an example of plagiarism.

The specimens of cork, elder pith and the white of a quill pen, which Leeuwenhoek sent to London, were packed in small paper folds using the method



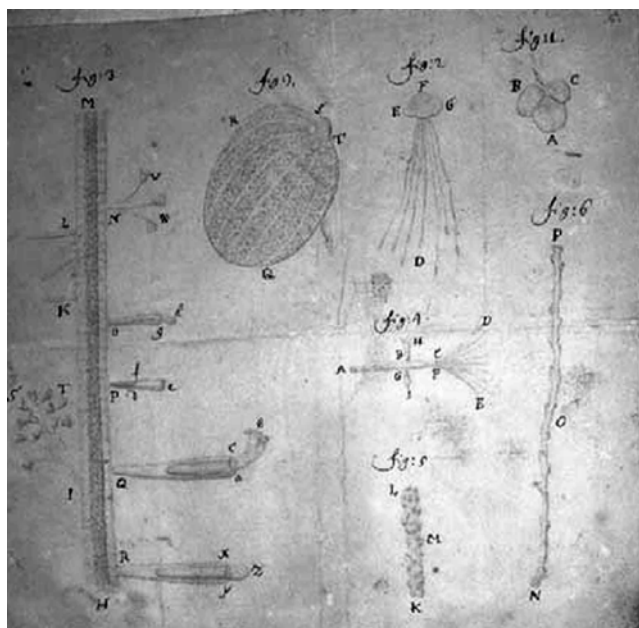


Figure 6. Antony van Leeuwenhoek sent these drawings of aquatic organisms, made in red crayon by his limner, to the Royal Society on December 25, 1702. They include rotifers (left) and *Hydra* (center).

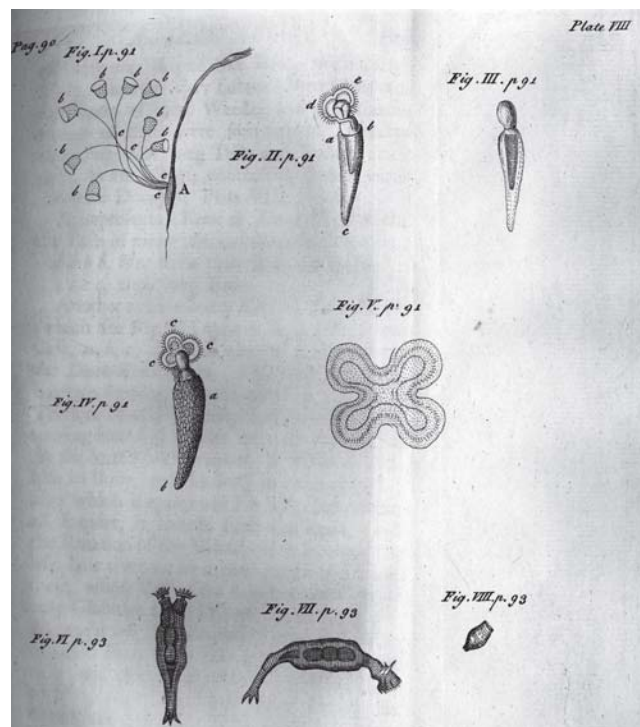


Figure 7. Henry Baker, Daniel Defoe's son-in-law, published versions of Leeuwenhoek's rotifers in his book *The Microscope Made Easy* (1743). Note the vorticellids (top left), which are also seen in the Leeuwenhoek drawing in Figure 6.

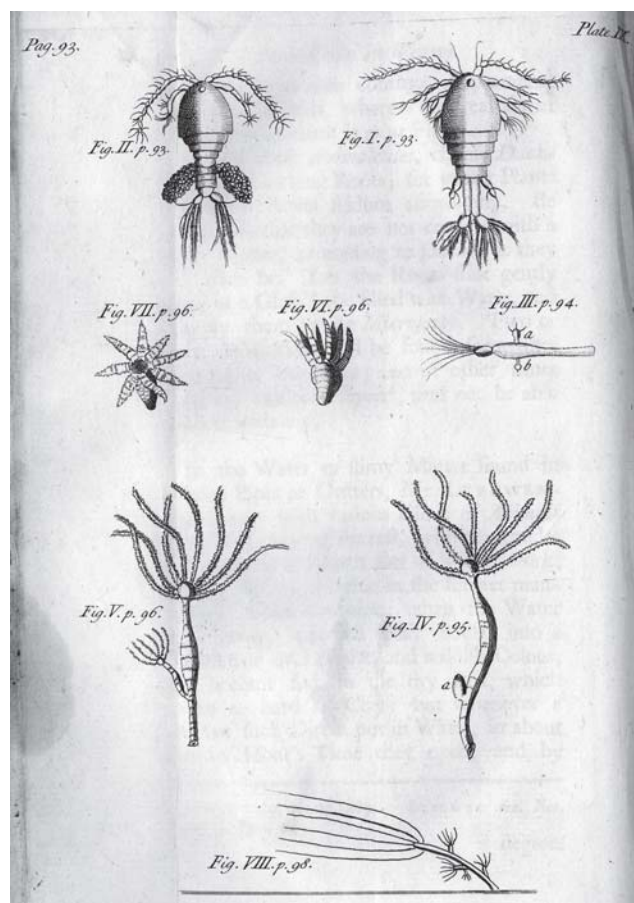


Figure 8. *Cyclops*, the water flea, and *Hydra* appeared in Henry Baker's *The Microscope Made Easy*. The budding *Hydra* (right center) is from the Leeuwenhoek drawing (Figure 6, center).

of folding still practiced by today's gem dealers. A fourth packet contained slices of dried bovine optic nerve. These were the packets that I found hidden among his papers at the Royal Society in London in February 1981. Sir Andrew Huxley, then the Society's president, had suggested to me one day that I might care to look though the Leeuwenhoek correspondence and I had accepted the opportunity with enthusiasm [See "Critical Focus: The Royal Society Turns 350" on page 35].

My remarks to Sir Andrew were that one might find contemporaneous spores on the paper or hairs from Leeuwenhoek's wig. Any thought that there might be specimens lurking within the pages of the letters was not even considered, and the sight of the specimen packets attached to the letter dated July 1, 1674 was a remarkable revelation. The sections were from the earliest years of science, and were to provide a unique insight into the dawn of modern microscopy.

## ON BEING PLAGIARIZED

The discovery of the Leeuwenhoek specimens became a major news item and was the subject of an interview with Sir Robin Day, the doyen of British broadcasters, in the BBC news on July 29, 1981, the day the network was also reporting on the wedding of Prince Charles and Lady Diana Spencer. The matter was formally published in *Nature* and *New Scientist* on July 31, 1981, and a full account appeared on the same date in *Notes and Records of the Royal Society*. It was heartening to see the work of our illustrious forebear being celebrated with such media coverage. Too few people have heard of Leeuwenhoek's achievements, and the extent of the news reports helped to educate the public.

The Boerhaave Museum in Leiden holds two of Leeuwenhoek's microscopes in their collections. Although they regard themselves as authorities on Leeuwenhoek's life and work, they had in the past crudely used a tube of glue to hold one of his priceless microscopes together. Their response to the announcement that these original specimens had been found was immediate. They organized an exhibition that would include these new findings but chose not to acknowledge the source.

The presentation was organized with the Science Museum of London and was launched in Leiden in November 1982. A museum catalogue was commissioned with a British writer on microscopy named Brian Bracegirdle to act as editor. When the catalogue appeared, there were photographs of the specimen packets that I had unearthed but no reference to any of the relevant publications. Bracegirdle directed readers instead to a publication of his own, entitled *A History of Microtechnique*, from 1978. This was a curious choice, as it contained the following words:

"The first microscopists . . . paid less attention to their specimens. No preparations from the seventeenth century have survived . . . they [were] prepared with little finesse."

It was intriguing that a Dutch exhibition catalogue would plagiarize this major discovery, and then publish — as their bibliographical source — a book asserting that the specimens did not even exist.

## SELF-PLAGIARISM

If plagiarists steal the work of others, then how can it be possible to plagiarize oneself? In this con-

torted world of misappropriated intellectual property, even this is possible.

The British Museum holds a unique treasury of bibliographical material: books and letters, pamphlets, papers and pictures. Browsing their collections has long been a favorite occupation of mine, and to write in the Round Reading Room where Karl Marx and Lenin, Bram Stoker and Sir Arthur Conan Doyle had all composed their books was an experience that fueled the creative impulse. As it happens, the British Library runs a commercially successful publishing house specializing in the highest quality of books, and 20 years ago I was deep in discussions with them about a book on one of my passionate personal interests, the history of scientific illustration. The result proved to be *Images of Science: a History of Scientific Illustration*, which was published in 1992. An American edition was produced in New York by Oxford University Press.

The idea behind my book was pure pragmatism. Since the British Library held the greatest collection of early scientific publications anywhere in the world, backed with all the administra-

tive and technical facilities anyone could need, they could easily source all the pictures that I required. These would illustrate the text, in which I would show how the imagery of the sciences had changed over the centuries. I was able to access the early herbals, for example, to substantiate my view that the unrecognizable woodcuts with which they were decorated had been deliberately distorted in order to prevent the herbalists' specialist knowledge from being spread amongst the wider population. It was a challenging and exciting project that was to give rise to a book extending to more than 200 pages and which was widely reviewed around the English-speaking world. There was, of course, a chapter devoted to microscopy.

But as soon as the contract was signed the concept collapsed. It is true that the British Library's administration was second to none — at least in terms of complexity and inertia. The editors sent over the first of my lists of required images and soon found that they would be impossible to obtain all the pictures in time. I was informed that the time taken to look up the references, identify the shelf mark, retrieve the book and locate the image; and then to transport the book to the photographic studio, fill in the forms for requisitioning the photographer, stipulate the format, have the book carefully photographed (bearing in mind that some of these old volumes will not open properly and

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*In this contorted world of misappropriated intellectual property, even self-plagiarism is possible.*

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can easily be damaged), and then — once the photography was done — to have all the images color corrected, mounted and collated, prior to being conveyed to the editorial department where the pages would be designed and laid out. It would all be too complex (and take far too long) for the book to be produced within the scheduled time. Just one picture had been obtained, and that served to prove how complex the entire task would be. We, therefore, agreed a secondary arrangement whereby I would provide the bulk of the illustrations from private sources.

When the proofs began to arrive, we were informed that the single picture which the publishers had in hand was due to appear on page 184 (Figure 9). I was surprised to see it; the plate was from a 1686 book by Carlo Di Napoli entitled *Nuove inventioni di tubi ottici*, a rare tome. It is hardly ever cited (for instance, the title is only referenced six times worldwide in Google). I managed eventually to find a copy when writing my book *The Revealing Lens, Mankind and the Microscope* (1973) and had not encountered it since.

Out of curiosity, I retrieved my earlier book and set it alongside the page proofs of the new volume. The pictures were the same (Figures 10 and 11). Even the slight imperfections in the paper, and the occasional spots and dots that can occur when an image is photographed, were identical. The two printed images then went under the microscope, and the printed half-tones unequivocally confirmed the point. One could see how a minute dot had been rendered by the half-tone screen in the original book. In the new proofs, the half-tone version of the original had been meticulously captured by the new printing process.

It is not that the photograph had been taken from the same plate of 1686, with identical imperfections. Were that the case, then each mark would be freshly half-tone screened and uniquely reproduced. The photomicrographs show clearly that the new image had been obtained from the original printed page in my 1973 book. It was clear what had happened. The requisition had been passed through the British Library's conventional channels and someone had remembered that they knew a source for one of the pictures. They had secured the image and had it photographed, and passed it on for inclusion in the new book.

By a curious coincidence, the source of the plate was my earlier book, *The Revealing Lens*. The contents are copyright, and the pictures cannot lawfully be copied for re-use by others. In this case, the British Library — the definitive deposit library that virtually defines copyright — had the image copied and offered for use in their new publication. My new volume was

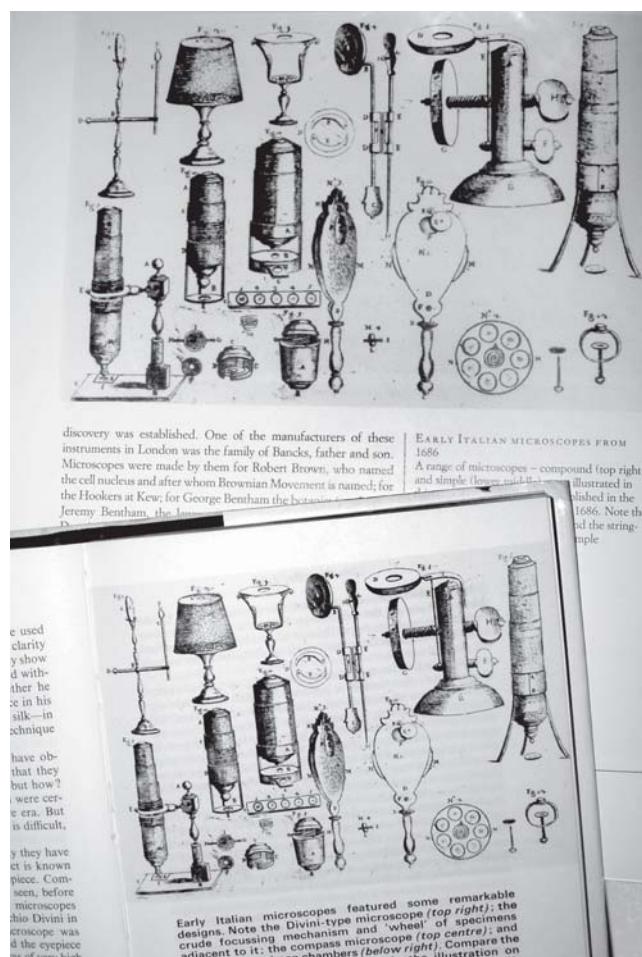
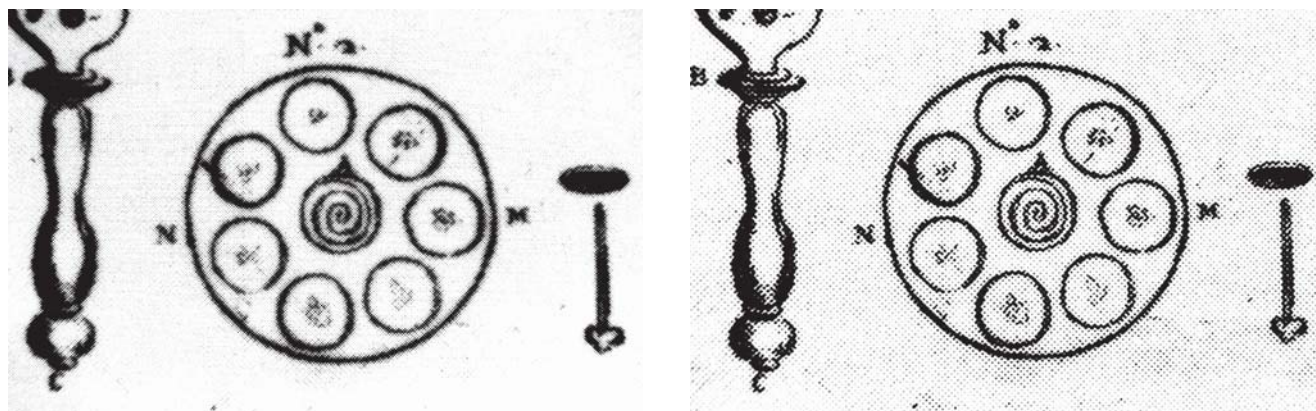


Figure 9. Two books with the same image: page 184 of *Images of Science, a History of Scientific Illustration* (top), and page 57 of *The Revealing Lens, Mankind and the Microscope* (bottom).

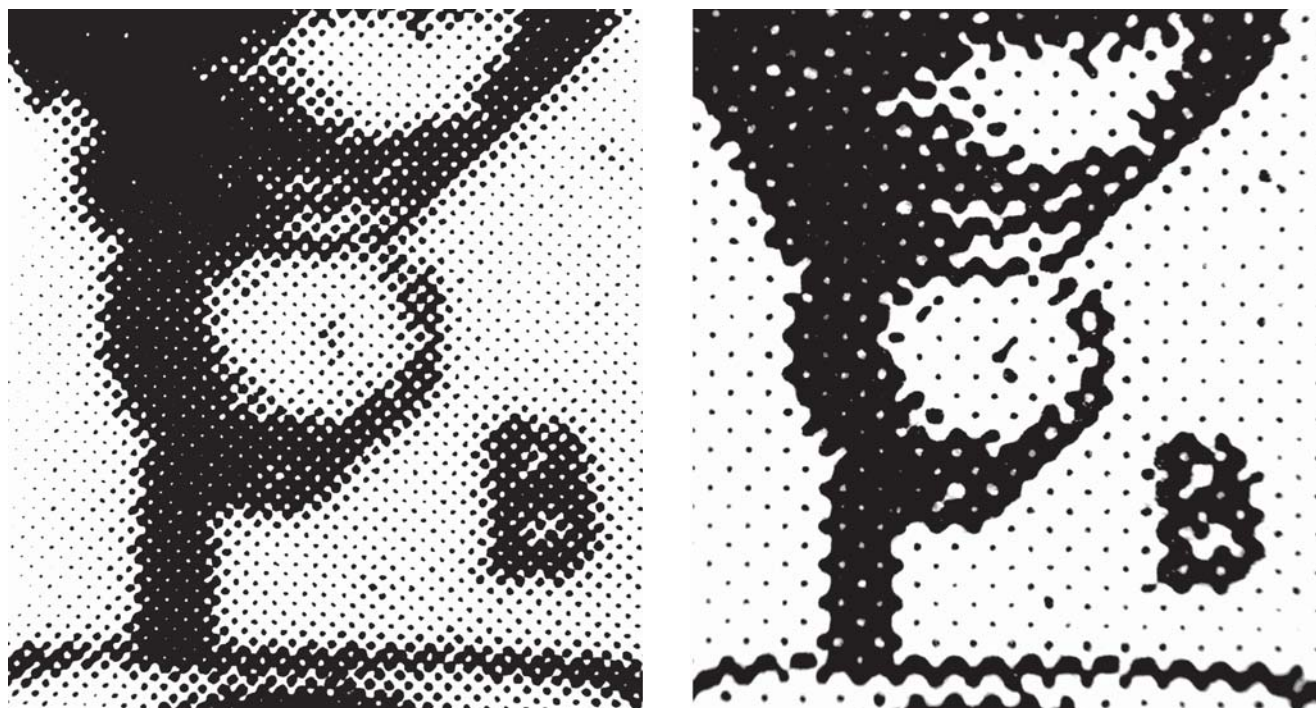
going to re-use intellectual property from my earlier book. I was plagiarizing myself. In February 1993, I spoke on the new book at a special public lecture organized by the publishers at the Natural History Museum in South Kensington. My illustrated presentation covered the main themes of my book, and I kept one further aspect for my closing remarks. With the blushing executives of the company seated in the front row, I related how the publisher of this new book had lifted an image from my earlier volume. It was a highlight of the evening, and a suitable commemoration of how an author can be led to plagiarize himself.

## PLAGIARISM IN CONTEXT

Microscopy has been dogged by plagiarists for centuries, and still is. I have heard people complain bit-



**Figure 10.** Left: Low-power microscopy shows the screened half-tone image of the circular stage from the plate in *Images of Science*. Small blemishes and some uneven printing can be identified. Right: Microscopic examination of the identical region previously published in *The Revealing Lens* shows that sharply printed blemishes had been half-tone screened for reprinting.



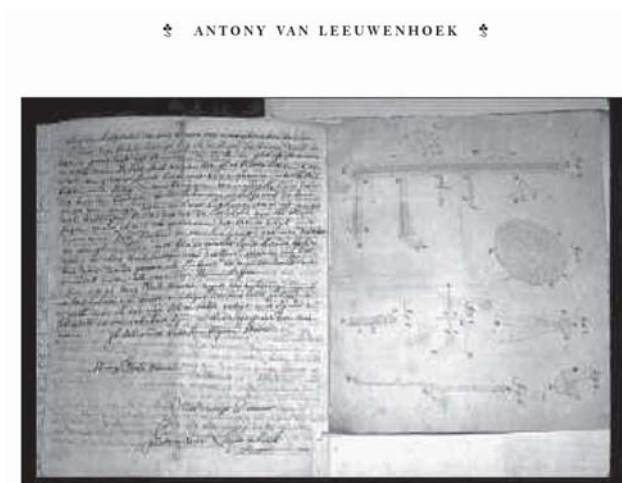
**Figure 11.** Under higher power, the screened appearance of blemishes is evident in *Images of Science* (left), which corresponds to the image published in *The Revealing Lens* (right).

terly about the infringement of their IP, and I point out that plagiarism is an occupational hazard of any productive person. We can see resonances of this in the popular saying: "Imitation is the sincerest form of flattery." The original coinage used subtly different wording: "Imitation is the sincerest of flattery," and it was coined by a celebrated Victorian writer in Britain, Charles Caleb Colton. He published the words in vol-

ume one of his book *Lacon, or Many Things in Few Words* (1820). The sentiment certainly applies to published scientific research and reminds us that plagiarism is in many ways a backhanded compliment.

Anyone who has made a substantial contribution is liable to be plagiarized, and when the fact is obvious and known, the victim gains nothing but kudos. People mention the unprincipled misuse of a scientist's IP and





Drawings from L's letters ipsum dolor sit amet, consectetur adipiscing elit. Nullam ullamcorper, massa sit amet tristique porttitor, mauris mauris varius lorem, quis porttitor enim tortor at ante. Lorem ipsum dolor sit amet, consectetur adipiscing elit. Lorem ipsum dolor sit amet, consectetur adipiscing elit.

In 1668, Leeuwenhoek visited London in the course of his work and while there he came across an extraordinary book filled with pictures of fleas and lice, bees and seeds, flies, midges and mould as seen through microscopes. The book, already in its second edition, was called *Micrographia*, and it was bursting with information about the amazing sights this new instrument could reveal; its author was the young Robert Hooke (p. 00). Both men were then in their thirties.



This pencil drawing by Leeuwenhoek's limner shows duckweed and microbes from a Delft canal. It was sent to the Royal Society of London with Leeuwenhoek's letter of 25 December 1702. The elongated structure in fig. 8 is the root of a duckweed plant seen under the microscope. Also clearly portrayed are rotifers, Hydra and Vorticella. The drawing was engraved and published in *Philosophical Transactions* (vol. 23, p. 1291) and *Collected Letters 1939–1999* (vol. XIV, pl. IX).

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**Figure 12.** Left: The publisher's page proof of *The Great Naturalists* shows the original Leeuwenhoek drawing of December 25, 1702 that was supplied by the author. Right: The final version of *The Great Naturalists* shows a new copy of the Leeuwenhoek image that the author researched, but which was reproduced by the publisher's photographer.

offer commiserations. It is the perpetrator who suffers, not the victim, because being plagiarized is the touchstone of any major new idea. I have dined out for years as a direct consequence of the Leiden exhibition catalogue and their unattributed use of my findings. To those who are plagiarized for the first time, I would say, it shows that you've arrived.

The unacknowledged use of Hooke's list of specimens by Leeuwenhoek in 1674 seems irregular to us, bordering on duplicity, but it may owe more to the *mores* of the time. In past centuries it was common for people to avoid the use of personal names. Books were published by "A Lady" or "A Reverend Gentleman" and pseudonyms were common. Rather than cite the author of a scientific publication, as is now conventional, it was perfectly normal to allude to someone without attribution. A scientist might challenge the view of "another person" or refer to the observations of "a gentleman from another country."

Resonances of this historical convention are still found. Members of the universities of Oxford and Cambridge do not ordinarily refer to them by name. Similarly, the British House of Commons and the

House of Lords do not refer to each other directly. A phrase like "at another university" or "in another place" is substituted, and this usage in the 21st century is a legacy of those earlier traditions. Leeuwenhoek's oblique references to Hooke can be seen more sympathetically in the light of this still-remembered social convention.

Sometimes IP is wantonly misused in a situation where there can be no redress. In 2007, Thames and Hudson (one of my publishers) were commissioned by the Natural History Museum to produce a book entitled *The Great Naturalists*. I was commissioned to write chapters on the two pioneers of microscopy, Antony van Leeuwenhoek and Robert Hooke. The publishers requested that we provide illustrations; these were researched and given to them (Figure 12). The pictures appeared in exhibits that the publishers prepared to promote the book prior to publication, and also in the page proofs.

In the final layout, however, they substituted virtually identical photographs, which their contract photographer had been instructed to take (Figure 12). They showed the same subject matter as our original



photographs but, because they had not been taken here, no reproduction fee was paid. The extensive and costly research that we had done went unrewarded. Snapping the photograph takes no more than a minute; finding the subject in the first place can take a month.

Plagiarism remains a multifaceted problem, and intellectual property rights are often highly valuable. There are occasions when the microscopist will need to tread carefully in providing valuable material for publication. The ubiquitous Internet adds further difficulties, because a published image can be copied and illicitly used on a remote Web site of an untraceable source. Personal experience has not shown this to be a problem. Regular requests are received seeking permission for the reproduction of my images on other Web sites (sometimes we receive several inquiries per day), and we have innumerable legitimate requests for the use of these pictures in textbooks and reference publications. On the infrequent occasion that images have turned up where they shouldn't, we have received full settlement of reproduction rights and a generous apology from the publisher. Plagiarism, diverting though it may be, has proved to be an infrequent event.

What of the case referred to above, where a publisher uses a photograph to produce an identical illustration? This is a well-recognized problem that has bedeviled picture libraries for decades. They will tell of publishers who ask for a selection of pictures to be sent over, after painstaking research, and print none of them. Instead, copies of the images are painted or drawn by an in-house artist. The original photograph becomes a "reference" for the artist, just as my photographs became "references" for the Thames and Hudson photographer. This is a well-known practice.

All the work in obtaining a stunning and unique image by a brilliant wildlife photographer comes to naught in a case like this. The rights to the picture as printed rest with the publisher who commissioned the illustration, however, the IP rights should remain with the photographer who captured the original image. This is a contentious issue, and one still unresolved by lawyers. Those who provide images would be advised to warn that the picture is not to be used as a mere "reference," but whether a case could succeed in law remains a mystery to me.

## CONCLUSION

For all its apparent novelty, and the ease with which the Internet offers opportunities for plagiarists, this increasing problem actually dates back to the very birth of the discipline. In the modern world, plagiarism in published scientific papers is a topic for concern and the perpetrators deserve sanction.

Exact definitions remain vague, however, and in the era of the Internet, the nature and extent of IP rights is overdue for a clearer definition. Meanwhile, full acknowledgment of IP should always be given by any meticulous microscopist. It is reassuring to note that, in practice, we have found that serious plagiarism by professionals is still an infrequent problem and is often due to inadvertence.

Among students, however, plagiarism is rife. We receive regular requests from postgraduate students for the use of images or published findings but also hear frequently of reports and essays which use material without the normal permissions being sought. As we have seen, there is a growing sense that this is acceptable behavior. A recent study by the Center for Academic Integrity has found that nearly 80% of college students admit to cheating at least once, and other surveys confirm that the number is steadily increasing.

To those who will suffer it in the future, let me advise you to view plagiarism as a form of *homage*. If your work was plagiarized, then it was regarded as great work. Fear not — fellow microscopists will sympathize with your predicament, gleefully ask you to recount the episode and invite you to dinner. And remember, it's not a wound but a badge of honor.

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