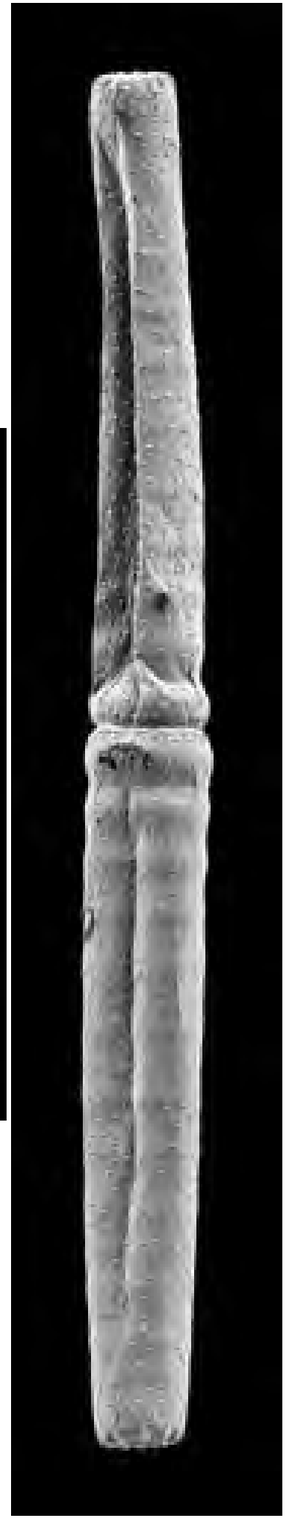
Akihiro. Tabellaria fenestrata. 8 Heads High, 2016
Scanning electron microscopic image, 80.2 x 87.2 cm



Katarina. Pleurotaenium ehrenbergii. 8 Heads High, 2016
Scanning electron microscopic image, 169.2 x 31.2 cm

Photosynthesis, Photography and Drawing: Anna Atkins' *British Algae*

Fotosyntese, fotografi og tegnekunst: Anna Atkins *British Algae*

Anna Atkins: Asperococcus echinatus; Sargassum plumosum; Padina pavonia; Ptilota sericea; Halymenia furcellata; Desmarestia aculeata
Photographs of British Algae: Cyanotype Impressions, ca. 1850. Cyanotype / Cyanotopi, 26 x 21 cm. © New York Public Library

In Victorian England, scientist, photo-pioneers and amateur botanists belonged to the same circle of people, and the photograph was thought of as a nature-given drawing.

I det victorianske England tilhørte videnskabsfolk, fotopionerer og amatørbotanikere samme kreds af folk, og fotografiet blev opfattet som en tegning fra naturens egen hånd.

Between the announcement of its invention in 1839 and the present digital moment, the photograph has been many different things. In most accounts, it is an image made by the camera rather than by the hand, different from other forms of image-making – such as drawing – in its mechanical production and reproduction. Most surveys of the history of photography begin with the camera obscura, and, after detailing the chemical developments of the nineteenth century, proceed through the history of the progressive improvement of the camera, its optics, and the state-of-the-art technical and visual skills associated with those optics, assuming the photograph to be synonymous with the camera-image. Here and there in some of those surveys, however, are hints that something came before the camera, that the camera itself – the *camera*, or the *room* in which the photograph is made – might be considered something other than a man-made mechanism or technology, and that something other than the camera provides the photograph with its most fundamental definition, its material and generative ground – a shifting ground, perhaps, or a base on which different superstructures have been built and that can only now be recovered archaeologically – but a ground nevertheless.[1]

Siden offentliggørelsen af dets opfindelse i 1839 og frem til nutidens digitale virkelighed har fotografiet været mange forskellige ting. Ifølge de fleste fremstillinger er det et billede skabt af et kamera i modsætning til af menneskehånd, hvorfor det adskiller sig fra andre former for billedskabelse – for eksempel tegning – i sin mekaniske produktion og reproduktion. De fleste fremstillinger af fotografiets historie begynder med camera obscura, og efter en nøje gennemgang af det 19. århundredes kemiske fremskridt fortsætter de med historien om de gradvise forbedringer af kameraet og dets optik for at slutte af med de tekniske og visuelle færdigheder, der knytter sig til denne optik, idet man antager, at fotografiet er synonymt med kamerabilledet. Indimellem rummer disse gennemgange dog også små vink om, at der var noget, der gik forud for kameraet, at selve kameraet – det *camera* eller *rum*, hvori fotografiet fremstilles – måske kunne betragtes som noget andet end en menneskeskabt mekanisme eller teknologi, og at det grundlæggende er noget andet end kameraet, der definerer fotografiet, udgør dets materiale og danner grundlag for dets frembringelse – et skiftende grundlag måske eller med flere forskellige overlejrede lag, som nu kun kan afdækkes arkæologisk – men ikke desto mindre et *grundlag*.[1]

For instance, though Beaumont Newhall's classic 1964 text begins with "camera pictures," he also tells us that "the an-

Selvom for eksempel Beaumont Newhalls klassiske tekst fra 1964 begynder med "kamerabilleder", fortæller han os også, at

cients had already observed that light not only forms images, but changes the nature of many substances. The chlorophyll of vegetation becomes green on exposure to it; coloured fabrics fade. Among the substances radically altered by light are certain salts of silver, especially the halides ...". The man responsible for the latter discovery, Newhall goes on to point out, Johann Heinrich Schulze, experimented with stencils in the eighteenth century to arrive at his chemical conclusions.[2] Thus Newhall associated the origins of photography with the organic process of photosynthesis (discovered likewise in the eighteenth century) and the chemical changes wrought by light on certain substances. In a more recent history of photography by Robert Hirsch, we are told that "in the West, the first recorded description of the pinhole was made by the Greek philosopher Aristotle ... who in circa 330 B.C.E. observed the crescent-shaped image of the sun, during a partial eclipse, projected through a small opening between the leaves of a tree onto the ground."[3] Hirsch reminds us that the "original" camera was not a machine at all, but nature herself, that the shutter was not a metal mechanism in a box but a cluster of leaves, and that the recording surface was the ground of the earth. The Victorian edifice of the *Oxford English Dictionary*, moreover, informs us that the word "photo-graphy" comes from the Greek word for "light" plus "writing" or "delineation" – an inscription by light, in short; that the word was probably first used in a paper given by Sir John Frederick William Herschel before the Royal Society on March 14, 1839; that it combined William Henry Fox Talbot's "photogeny" with Nicéphore Nièpce's "heliography"; and that it is now to be defined as "the process or art of producing pictures by means of the chemical action of light on a sensitive film on a basis of paper, glass, metal, etc."[4] Nowhere in that definition does the camera figure. Neither does it figure in the words the awestruck Victorian experimental scientist Michael Faraday exclaimed upon seeing the magic of Talbot's photographic "fairy pictures": "No human hand has hitherto traced such lines as these drawings display: And what man may hereafter do, now that Dame Nature has become his drawing mistress, it is impossible to predict."[5] A friend of Talbot's, Faraday was instrumental in nudging him forward to publicize his invention, but only after Louis Jacques Mandé Daguerre had already presented his version of the drawing-by-light – the one-of-a-kind metal daguerreotype – to the Academy of Sciences in Paris. (Faraday's remark referred not to the daguerreotype, but to what would become the talbotype or calotype, which shared its paper support with drawing.) It appears that Faraday made no particular distinction between a photograph made in a camera and a photograph made without recourse to a camera – a photograph made by "superposition," as Talbot put it, or by direct contact with the object that it represented and reduplicated: what we now call a photogram. But one thing is clear: Faraday thought of the paper photograph as a kind of drawing. That is, the photograph was not just any old inscription by light; it was a special kind of nature-guided drawing, an iconic image of nature indexically traced by nature. The photographic lexicon of the mid-nineteenth century suggested the same: The photograph was a "sun drawing," a "photogenic drawing," a drawing made by the "pencil of light," as suggested in the title

"man allerede i oldtiden havde lagt mærke til, at lyset ikke blot danner billeder, men også kan få mange materialer til at ændre karakter. Planternes klorofyl bliver grønt, når det eksponeres for lys, og farvede tekstiler falmer. Blandt de materialer, der ændres mest radikalt af lys, finder man visse sølvsalte, især haloiderne ...". Newhall påpeger, at manden bag den sidstnævnte opdagelse var Johann Heinrich Schulze, som i det 18. århundrede nåede frem til sine kemiske konklusioner gennem eksperimenter med stenciler.[2] På den måde knyttede Newhall fotografiets oprindelse sammen med den organiske fotosynteseproces (der ligeledes blev opdaget i det 18. århundrede) og de kemiske forandringer fremkaldt af lysets indvirkning på visse stoffer. I en nyere fremstilling af fotografiets historie skrevet af Robert Hirsch får vi at vide, at "man finder den vestlige verdens første dokumenterede beskrivelse af en hullinse hos den græske filosof Aristoteles ... som under en delvis solformørkelse cirka 330 f.v.t. observerede et halvmåneformet billede af solen projiceret ud gennem en lille åbning mellem bladene på et træ og ned på jorden."[3] Hirsch påpeger, at det "første" kamera slet ikke var et apparat, men naturen selv, at lukkeren ikke var en metalmekanisme i en kasse, men en klynge blade, og at filmen var selve jorden. Det victorianske storværk *The Oxford English Dictionary* oplyser endvidere, at ordet "photo-graphy" kommer af det græske ord for "lys" plus "skrift" eller "aftegning" – kort sagt en lysinskription – at ordet formentlig blev brugt første gang under en forelæsning, sir John Frederick William Herschel holdt for The Royal Society den 14. marts 1839, at det kombinerede William Henry Fox Talbots "photogeny" med Nicéphore Nièpces "heliography," og at ordet i dag defineres som "processen eller kunsten at fremstille billeder ved hjælp af lysets kemiske indvirkning på en lysfølsom film på et grundlag af for eksempel papir, glas eller metal."[4] Kameraet optræder slet ikke i den definition. Det optrådte heller ikke i den victorianske eksperimentalforsker Michael Faradays dybt imponerede udbrud ved synet af magien i Talbots fotografiske "alfebilleder": "Ingen menneskehånd har nogensinde tegnet sådanne linjer, som disse tegninger udviser: Og hvad mennesket vil kunne gøre, nu hvor Moder Natur er blevet dets tegnelærerinde, er aldeles umuligt at forudsige."[5] Som ven af Talbot var Faraday i høj grad med til at overtale ham til at offentliggøre sin opdagelse, men det skete først, efter at Louis Jacques Mandé Daguerre havde præsenteret sin version af fotogenisk tegning – det unikke metal-daguerreotypi – for Videnskabernes Akademi i Paris. (Faradays bemærkning refererede ikke til daguerreotypiet, men til det, der senere blev talbotypiet eller kalotypiet, som havde det tilfælles med tegning, at det var baseret på papir.) Det lader til, at Faraday ikke rigtig skelnede mellem et fotografi lavet i et kamera og et fotografi fremstillet uden brug af kamera – et fotografi lavet ved hjælp af "overlejring," som Talbot formulerede det, eller gennem direkte kontakt med den genstand, fotografiet repræsenterede og reduplikerede – hvilket man i dag ville kalde et fotogram. Men én ting står helt klart: Faraday opfattede papirfotografiet som en slags tegning. Fotografiet var altså ikke bare en hvilken som helst form for inskription med lys – det var en særlig form for naturstyret *tegnekunst*, et ikonisk billede af naturen indeksikalt aftegnet *gennem* naturen. Den fotografiske sprogbrug omkring midten af det 18. århundrede vidnede om samme tendens: Fotografiet var en "soltegning," en "fotogenisk tegning," en

Fig. 1 William Henry Fox Talbot, leaf / blad, ca. 1839. © Royal Photographic Society / Science and Society Picture Library

of an 1870s allegorical photograph by Julia Margaret Cameron of a Cupid wielding a photo-pencil, or, again as Talbot put it in his 1844–46 book on the subject, "the pencil of nature." Thus it seems that, at least for a brief moment, photography was not so much fundamentally different from drawing as it was a kind of drawing, and the defining distinction of the medium lay within, not outside of, drawing – drawing made by the tracing agency of light, with or without the camera; rather than "lines" made by the tracing action of the "human hand."

Talbot and Herschel, that preeminent "natural philosopher" of the Victorian regime and inventor of, among other things, the blueprint photograph or cyanotype, both made camera lucida drawings before they made photogenic ones. In these works, the old Aristotelian story is evoked in both the image of layered, light-sensitive leaves blocking and filtering the rays of the sun on a light-sensitive ground and in the very constitution of the "photogenic drawing," which was created through the contact between one light sensitivity and another, between an organic and a hand-prepared ground, between leaf and paper, botany and silver-salt chemistry (two of Talbot's and Herschel's favorite natural science subjects.)

In that contact, and in the overlapping foliate fascinations of the camera lucida and the photogenic drawing, lies something like an explanation for the botanical emphasis of the earliest photography. Or if not an explanation, then something like an allegory of the "original" medium-specificity of photography,

tegning lavet med "lysets pen," som det hedder i titlen på Julia Margaret Camerons allegoriske fotografi fra 1870'erne af Amor væbnet med lysets pen, eller som Talbot formulerede det i sin bog om emnet fra 1844–46: "naturens blyant." Det lader altså til, at fotografiet, i hvert fald en overgang, ikke var grundlæggende forskellig fra tegning, men snarere var en *form* for tegning, hvor mediets særkende – nemlig aftegning af lysets virkning, med eller uden kamera, i modsætning til "streger" lavet af den tegnende "menneskehånd" – lå i og ikke uden for tegnekunsten.

Talbot og Herschel, denne fremragende victorianske "naturfilosof," som blandt andet opfandt blåtryksfotografiet eller cyanotypiet, lavede begge *camera lucida*-tegninger, før de begyndte at fremstille fotogeniske tegninger. Disse værker leder tankerne tilbage til den gamle aristoteliske historie, både i kraft af billedet med de overlejrede, lysfølsomme blade, der delvis blokerer og filtrerer solens stråler ned på den lysfølsomme jord, og i selve sammensætningen af den "fotogeniske tegning," som blev skabt gennem berøringen mellem to forskellige former for lysfølsomhed, mellem et organisk og et håndlavet grundlag, mellem blad og papir, mellem botanik og sølvsaltenes kemi (to af Talbots og Herschels foretrukne naturvidenskabelige emner.)

I denne berøring og i de overlappende folierede fascinationer af camera lucida og lysbaseret tegning ligger noget, der kunne minde om en forklaring på det tidlige fotografis forkærlighed for det botaniske. Eller hvis ikke ligefrem en forklaring så noget i retning af en allegori over fotografiets "oprindelige" medie-spe-

a medium-specificity minus the camera, in which photography is the natural progeny of nature drawing as much as it is its alter-ego and other, its trace as much as its eclipse. This is a medium-specificity in which photography, like nature drawing, is constituted as an inscription *of* the natural world on a surface (paper) derived *from* the natural world, whose nature-made marks are inseparable from and intertwined with the nature-made ground of which they have become an integral part. Thus there seems to have been, at least at the beginning, some sort of organic, reflexive connection between an interest in the very structure of photosynthesizing plants and the investigation of the possibilities of the naturebased observation of nature that photography offered. This is suggested in Talbot's early cameraless "photogenic drawings," which are replete with the intricate veining and delicate, serrated edges of leaves [fig. 1 and 2], as well as the photomicrographs of cross-sectioned plant stems taken by the inventor in 1839, which are reminiscent of the cross-sections in botanical drawings and prints and proof of the founding intersection between botany and photography.

It is significant, then, that Talbot also called the photograph a "specimen" – as in "item," "example of an art" (with a lowercase "a"), "individual member of a natural species," and/or "illustration" (of a classification scheme, an optical or chemical principle or some other order of scientific knowledge). This was a term that spoke volumes about the way the photograph was thought of then: as a natural art as well as a natural thing, something made by nature as well as a piece of nature, in the same way that a sample of seaweed or fern was a piece of nature, an example of nature's art, and a member of one of nature's species, which in turn was a subdivision of a larger natural set, the genus, and so on. Photography was a species belonging to the genus of drawing, and individual photographs were specimens of that species. At the same time, those individual photographs were imprints of specimens of other natural species; as specimens themselves they were hardly distinguishable from the specimens of which they were the traces, especially if they were made without the camera, by direct contact with a botanical or other kind of item.

It is here that the distinction between the camera-made and the cameraless photograph begins to count. For in the mid-nineteenth century the cameraless photograph vied, though ultimately not very successfully, with a whole array of other forms of nature-made illustration (including dried and mounted "real" specimens, sometimes called "natural illustrations") that laid claim to being samples of a natural art, as well as to possessing an authenticity based on their being in direct touch with nature's specimens. These included various forms of "nature prints" – or "botanographs," as they were occasionally called – which were imprinted directly from the specimens they represented.

cificitet, en medie-specificitet minus kameraet, hvor fotografiet er et naturligt resultat af naturtegningen selv, på én gang dets alter-ego og dets andet, dets aftryk og dets afblænding. Dette er en medie-specificitet, hvor fotografiet i lighed med naturtegning er konstitueret som en inskription *af* naturens verden på en overflade (papir), der stammer *fra* naturens verden, og hvor de naturfremstillede aftryk på en gang er uadskillelige fra og sammenflettede med det naturfremstillede grundlag, som de nu er blevet en integreret del af. I hvert fald i udgangspunktet lader der altså til at have været en slags organisk, refleksiv forbindelse mellem interessen i selve de fotosyntetiserende planters struktur og undersøgelsen af mulighederne i den naturbaserede observation af naturen, som fotografiet stillede i udsigt. Alt dette kommer til udtryk i Talbots tidlige kameraløse "fotogeniske tegninger," som er fyldt med løvværkets intrikate åretegninger og sirligt takkede kanter [fig. 1 og 2], og i opfinderens mikrofotografier af plantestængel-tværsnit fra 1839, som minder om tværsnit i botaniske tegninger og tryk, hvilket i sig selv er bevis for det oprindelige krydsfelt mellem botanik og fotografi.

Det er således interessant, at Talbot også kaldte fotografiet et "eksemplar" – forstået som en "genstand" eller et "eksempel på en kunstart" eller som et "individuelt medlem af en art" og/eller en "illustration" (af et klassifikatorisk skema, et optisk eller kemisk princip eller en anden form for videnskabelige viden). Det

Fig. 2 William Henry Fox Talbot, *Leaf of a Plant*, before / før 1844, calotype / kalotypi. © The Metropolitan Museum of Art, New York

Fig. 3 Anna Atkins: Tridacna maxima, small giant clam / gigantmusling, 1823. 256 original drawings for / 256 originale tegninger til Jean-Baptiste Lamarck's *Genera of Shells*, 1822-1824. Watercolour on paper / akvarel på papir. © The Trustees of the Natural History Museum, London

Anna Atkins: Shells and Seeweeds

One of Daguerre's early daguerreotypes, taken (in a camera) some time between 1837 and 1839, was of an "arrangement of fossil shells" set on a series of natural-history shelves. Talbot's later camera-made photographs of shelves of china and glass articles, published in 1844 in the first installment of *The Pencil of Nature*, would take up Daguerre's composition, and like his *Arrangement of Fossil Shells*, they too would associate the photograph with the collection and its inventory.

As it happens, some sixteen years before either the daguerreotype or the calotype was finalized and announced to the public, Anna Atkins (she was then Anna Children) made a series of shell drawings for one of the English translations of Jean-Baptiste Lamarck's 1799 essays on conchology [fig. 3]. In 1823, her father, John George Children, Secretary of the Royal Society and Keeper of the Department of Natural History and Modern Curiosities at the British Museum, published his translation of *Lamarck's Genera of Shells* in *The Quarterly Journal of Science, Literature, and the Arts*. The 256 illustrations his daughter made for the text were immaculate and highly specific drawings of shell specimens, 29 of which appeared in a composite engraving published as a plate in the next issue of the magazine.[6] They inaugurated a fascination with the refuse of the sea that was to inform Atkins's work with the blue variety of "photogenic drawing," the cyanotype.

Twenty-four and still unmarried when she undertook her shell drawings for her father, Atkins was representative of the class of gentlewomen who drew not in order to become known as scientific illustrators but because it was a refined sketchbook skill that they had been taught at home as part of their training

er et ordvalg, der siger alt om, hvordan man opfattede fotografiet dengang: som en naturkunst såvel som en naturgenstand, som noget lavet *af* naturen såvel som en del af den, ligesom et tang- eller bregnepræparat på én gang var en del af naturen, et eksempel på naturens kunst og et medlem af en af naturens arter, som igen var en underafdeling af en større gruppe, slægten osv. Fotografiet var en art tilhørende slægten tegning, og de individuelle fotografier var eksemplarer af den art. Samtidig var disse individuelle fotografier aftryk af eksemplarer af andre naturarter – som eksemplarer var de selv nærmest ikke til at skelne fra de eksemplarer, de var spor af, især hvis de var lavet uden kamera, gennem direkte kontakt med et botanisk materiale eller en anden form for genstand.

Det er her, at distinktionen mellem kameraproduceret og kameraløst fotografi begynder at tælle. For i midten af det 19. århundrede kappedes det kameraløse fotografi, om end i sidste ende uden det store held, med en bred vifte af andre former for naturfremstillet illustration (herunder tørrede og monterede "virkelige" eksemplarer, som man undertiden har kaldt "naturlige illustrationer"), der både kunne påberåbe sig at være eksempler på naturkunst og at besidde en autenticitet baseret på deres direkte berøring med naturens eksemplarer. Disse indbefattede forskellige former for "naturtryk" – eller "botanografier," som de nogle gange blev kaldt – der var direkte aftryk af de eksemplarer, de repræsenterede.

Anna Atkins: Muslingeskaller og tang

Et af Daguerres tidlige daguerreotypier, taget (i et kamera) på et tidspunkt mellem 1837 og 1839, var af en "opstilling af fossile muslingeskaller" på en række forskellige naturhistoriske hylder. Talbots senere kamera-fremstillede fotografier af hylder med porcelæn- og glas-artikler, som blev offentliggjort i 1844 som en del af første hæfte af *The Pencil of Nature*, overtog Daguerres komposition, og ligesom hans *Arrangement of Fossil Shells* knyttede også de fotografiet an til samling og registrering.

Omkring 16 år før daguerreotypiet og kalotypiet var blevet færdigudviklet og præsenteret for offentligheden, lavede Anna Atkins (hun hed dengang Anna Children) en serie af skaltegninger til en af de engelske oversættelser af Jean-Baptiste Lamarcks essays fra 1799 om konkyliologi [fig. 3]. I 1823 udgav hendes far, John George Children, der var sekretær for The Royal Society og inspektør på Afdelingen for naturhistorie og moderne kuriositeter på British Museum, sin oversættelse af *Lamarck's Genera of Shells* i *The Quarterly Journal of Science, Literature, and the Arts*. De 256 illustrationer, hans datter lavede til teksten, var uforlignelige og særdeles detaljerede tegninger af eksemplarer af muslingeskaller, hvoraf 29 figurerede i en sammensat gravering, der blev udgivet som planche i det følgende nummer af tidsskriftet.[6] Disse tegninger gav anledning til den fascination af havets rester, som kom til at styre Atkins' arbejde med den blå variant af "fotogenisk tegning" – cyanotypiet.

Atkins var 24 år og endnu ugift, da hun lavede skaltegningerne til sin far. I den henseende var hun repræsentativ for den klasse

as ladies – and in Atkins's case because, left motherless at an early age, it was her father who directed that training and encouraged her to become his domestic assistant and companion in his scientific pursuits. As it was with her shell drawings of the 1820s, so it was 20 years later with her blue "photogenic drawings": After her marriage (in 1825) to John Pelly Atkins, country sheriff, railroad promoter and a man of property, her father's retirement to that property (Halstead in Kent) in 1840, and her Kent neighbor Sir John Herschel's finalization of the cyanotype negative process in 1842, she took up a new illustration project set in motion by her father's scientific connections but driven by an image-making curiosity that was hers alone.[7]

One thing is clear from Atkins's shell drawings: Atkins could draw. Thus when she turned to the blue variety of the "photogenic" or "sun drawing," it was not because of any lack of draftsmanly ability. She took up a photographic process that had been invented by Herschel, an interest in botanical specimens that was shared by Herschel and Talbot, and a particular subset of botany – what now would be called "algology" – that was most recently codified by William Harvey of Dublin University.

For a decade, Atkins laboured intensively in the field of marine botany and towards the end of that period she began adding other kinds of specimens to her albums – ferns predominantly, but also poppies, feathers, and other miscellanea. Between 1843 and 1854, she compiled three albums: *Photographs of British Algae: Cyanotype Impressions* (1843–54), *Cyanotypes of British and Foreign Ferns* (1853) [fig. 4], and *Cyanotypes of British and Foreign Flowering Plants and Ferns* (1854). The first of these was the most ambitious: It was initially gathered into twelve parts, then into three volumes, consisting of over 400 plates; some thirteen copies in different versions currently exist, having been given as gift albums to important scientific individuals and institutions – among them Talbot, Herschel, the British Museum, and the Royal Botanic Gardens at Edinburgh. The other two albums were single presentation albums, one of them made in collaboration with Atkins's childhood friend Anne Austen Dixon, the other made for her.

Across these albums, Atkins transferred the strategies developed in her shell drawings to the blue cyanotype medium. The cyanotype's oceanic colour and watery production may have seemed particularly appropriate to her marine subject matter, some of which may have been immediately available to her on the beaches of Kent. Perhaps, too, she was struck by the organic relation between Herschel's earlier contact printing of botanical specimens and his ongoing experimentation with botanical substances – a "series of exposure tests of 'vegetable colours' using extracts obtained from the juices of plants and flowers ... [to represent] natural objects in their proper colours," in which "[m]ultitudes of domestic plants had been pressed into service for their coloured juices and even dog's urine and an 'extract' from his pet boa constrictor" – before he turned to the inorganic "[s]alts of platinum, iridium, gold, mercury, iron, lead, silver, and chromium," not to mention ferric ferrycyanide, the most complex of the cyanide compounds.[8]

af dannede kvinder, som ikke tegnede for at blive kendte som videnskabelige illustratorer, men fordi det var en sofistikeret kunnen, de havde lært hjemmefra som en del af deres dannelse som damer. I Atkins' tilfælde fordi hun mistede sin mor som helt lille, således at det var hendes far, der stod for hendes dannelse – og han tilskyndede hende til at blive sin private assistent og videnskabelige samarbejdspartner. Situationen omkring tilblivelsen af hendes skaltegninger fra 1820'erne gik igen i forbindelse med tilblivelsen af hendes blå "fotogeniske tegninger" 20 år senere. Efter sit ægteskab (indgået i 1825) med John Pelly Atkins, amtmand, jernbaneinvestor og godsejer, indledte hun et nyt illustrationsprojekt. Dette projekt kom i stand på baggrund af farens pensionering i 1840, hvor han flyttede ind på hendes mands ejendom i Kent, og under indtryk af bekendtskabet med Anna Atkins' nabo, sir John Herschel, som netop færdiggjorde sit arbejde med cyanotypiet i 1842. Et illustrationsprojekt, der blev sat i gang gennem farens videnskabelige forbindelser, men var drevet af en nysgerrighed omkring billedskabelse, som var helt hendes egen.[7]

Én ting fremgår tydeligt af Atkins' skaltegninger: Atkins kunne tegne. Så da hun skiftede til den blå variant af "fotogenisk" eller "soltegning," var det i hvert fald ikke på grund af manglende evner inden for tegnekunsten. Hun tog udgangspunkt i en fotografisk proces, som var blevet opfundet af Herschel, sin interesse for botaniske eksemplarer, som hun delte med Herschel og Talbot, og en særlig botanisk undergruppe – som man fra da af begyndte at kalde "algologi" – som kort forinden var blevet kodificeret af William Harvey fra Dublin Universitet.

Gennem ti år arbejdede Atkins intensivt inden for marinbiologi, og mod slutningen af perioden begyndte hun at tilføje andre typer eksemplarer til sine album – fortrinsvist bregner, men også valmuer, fjer og diverse andre ting. Mellem 1843 og 1854 udarbejdede hun tre album: *Photographs of British Algae: Cyanotype Impressions* (1843–54), *Cyanotypes of British and Foreign Ferns* (1853) [fig. 4] og *Cyanotypes of British and Foreign Flowering Plants and Ferns* (1854). Det første af disse var det mest ambitiøse: Det var oprindelig samlet i 12 dele og efterfølgende i tre bind bestående af over 400 plancher, og der findes idag omkring 13 eksemplarer af værket i forskellige versioner, som blevet foræret som gaver til betydningsfulde videnskabelige enkeltpersoner og institutioner – deriblandt Talbot, Herschel, British Museum og The Royal Botanic Gardens i Edinburgh. De to andre album var enkeltstående præsentationsalbum – ét af dem lavet i samarbejde med Atkins' barndomsveninde Anne Austen Dixon, det andet som en gave til hende.

I alle disse album overførte Atkins de strategier, hun havde udviklet gennem sine skaltegninger, til cyanotypi-mediet. Cyanotypiets havblå farve og vandige fremstilling har muligvis forekommet hende særlig velegnet til de marinbiologiske emner, hvoraf nogle måske har været umiddelbart tilgængelige for hende på stranden i Kent. Det kan også være, at hun var fascineret af den organiske relation mellem Herschels tidligere kontakttryk af botaniske eksemplarer og hans løbende eksperimenter med botaniske materialer – en "række eksponeringsprøver med 've-

Fig. 4 Anna Atkins: Cover of / forsiden af *Cyanotypes of British and Foreign Ferns*, 1853. Cyanotype / Cyanotopi, 26 x 21 cm.
© The J. Paul Getty Museum, Los Angeles

The monochromatic language of tonal values that characterizes the pencil drawings also describes the "sun drawings," except that they are a dramatic blue; they are negatives (the blue describes the ground rather than the figure); and they are much higher in contrast, concentrating on the outer limits rather than the middle range of the blue-to-white scale. They are primarily one-to-one specimens, centered on the page, but this time all of them are necessarily life-size, and they occupy the same visual terrain as their genus-and-species names, handwritten by Atkins underneath each specimen. Each is one-of-a-kind, like the shell drawings, for as a negative each one had to be taken from the specimen itself. Like the shell drawings, their specimens are without context, the dead remains of living organisms removed from their habitats – a fact highlighted in the cyanotypes by the bleaching of the seaweeds – though the algae photographs transform the flat white of the drawing page into the colour of the deep sea, evoking the liquid depths of the ocean, penetrated with difficulty by light, rather than the dry shore and the botanist's cabinet.

Unlike the shell drawings, however, the "sun drawings" of seaweeds, ferns, and other specimens do not hide their means of production. Rather, they repeatedly demonstrate it. It is my view that Atkins was drawn to the cameraless blueprint not only because it was relatively easy and archivally permanent – and not just because of the coincidence of the blue of two media (seawater and cyanotype) but also because it dramatized its status as a light-made drawing.[9] In place of the one-to-one, specimen-to-species adherence to the biological system of the pencil drawings of shells, she emphasized over and over again the one-to-one, specimen-to-specimen relationship to the "real thing" that characterized the new species of drawing: drawing-with-light.

Both the capacities and the limits of this species of drawing were set on the blue page in great variety. For instance, *Alaria esculenta* [fig. 5] is folded over on itself in a backwards S-form

getabilske farver' under anvendelse af udtræk af saft fra planter og blomster ... [for at gengive] naturgenstande i deres rigtige farver," hvor "et væld af lokale planter var blevet presset for at kunne gøre tjeneste med deres kulørte safter, selv hundeurin og et 'ekstrakt' fra den kvælerslange, han holdt som kæledyr." Siden kastede han sig over uorganiske "salte af platin, iridium, guld, kviksølv, jern, bly, sølv og krom" for slet ikke at tale om ferricyanid – den mest komplekse af cyanid-sammensætningerne.[8]

Farvetonernes monokromatiske sprog er ikke kun kendetegnende for blyantstegningerne, men også for "soltegningerne," om end sidstnævnte er mere dramatiske i deres blålige nuancer – de er negativer (hvor det blå udgør baggrunden snarere end figuren), og de er langt mere kontraststærke med fokus på yderlighederne frem for på mellemtonerne i den blå-hvide skala. De er primært ét-til-ét-eksemplarer, centreret på siden, men i dette tilfælde må de nødvendigvis alle være i naturlig størrelse, og de indtager samme visuelle terræn som deres slægts- og artsnavne, som Atkins anførte med håndskrift under hvert eksemplar. Hvert eksemplar er helt unikt, ligesom skaltegningerne, for som negativer måtte de hver især tages fra natureksemplaret selv. Ligesom skaltegningerne er disse eksemplarer blottet for kontekst, de er døde rester af levende organismer fjernet fra deres habitater – hvilket i cyanotypierne understreges af tangens blegning, omend det hvide papir i algefotografierne får samme farve som det dybe hav og derved snarere leder tankerne hen på oceanets dybe vandmasser, hvor lyset har vanskeligt ved at trænge igennem, end på botanikerens arbejdsværelse på tørt land.

I modsætning til skaltegningerne skjuler "soltegningerne" af tang, bregner og andre eksemplarer imidlertid ikke deres egen fremstillingsmåde. De demonstrerer den snarere igen og igen. Jeg tror, at Atkins var tiltrukket af det kameraløse blåtryk, ikke kun fordi det var relativt let at udføre og kunne arkiveres permanent – og ikke kun på grund af sammenfaldet mellem farven blå i de to medier (havvand og cyanotypi) – men også fordi det

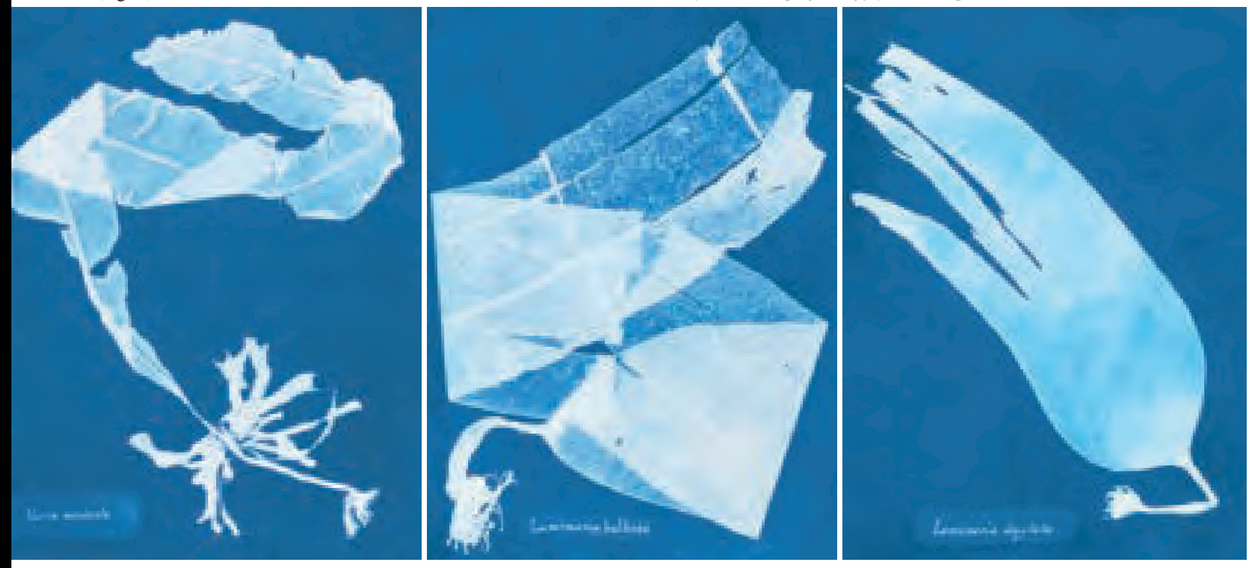


Fig. 5, 6, 7 Anna Atkins: Alaria esculenta; Laminaria bulbosa; Laminaria digitata. *Photographs of British Algae: Cyanotype Impressions*, ca. 1850. Cyanotype / Cyanotopi, 26 x 21 cm. © New York Public Library

that simultaneously belongs to a tradition of drawn botanical illustration and demonstrates the fitting of the life-size specimen to the uniformly sized sheet of cyanotype paper – hence its particular, photographic requisite of having been there. Its wrinkles and tears are also found in botanical drawings and prints (and in "nature prints" and "natural illustrations" of various varieties too). Yet here they are tied to certain limitations of the "sun drawing" that paradoxically serve as guarantors of its authenticity, its having been in touch with the thing itself: namely, the slightly out-of-focus quality of the root-like system at the bottom of the page, caused by the specimen's thickness at its base; the image's ultra-shallow depth-of-field and the consequent slight refracting of light passing through the glass; and its slight remove from the paper on which the specimen rested.

The blur that infects some of Atkins's specimens of photogenic drawing differentiates them markedly from the linear code of handmade, pencil-point drawings. And yet that blur is merely the flip side of the distinct hair-lines and detail-ridden edges and interiors of most of Atkins's specimens: It is the product of light tracing the relatively flat specimen that has been placed between the flat glass and paper, minus the intervention of the camera. The same drawing agency produces the distinction between the white and various pale blues of the flat, folded specimen and the dark blue of the ground of *Laminaria bulbosa* [fig. 6], for example, whose stem has also lost some of its distinctness and the wash-like interior and sharp edges of the fringed but unfolded *Laminaria digitata* [fig. 7], for another example, whose stem is bent at its base, a vestige of hand-drawing conventions that is necessitated here by the life-size of the specimen traced by the "drawing mistress" of light. This species of drawing can render thicknesses as long as they are flat, but it can never render perspectival volumes (nor shadows cast by those volumes on the plane on which the specimen rests, as in Atkins's shell drawings).

Much of this is spelled out in Atkins's handwritten preface to Part I of the earliest version of her album:

> *The difficulty of making accurate drawings of objects so minute as many of the Algae, and Conferva, has induced me to avail myself of Sir John Herschel's beautiful process of Cyanotype, to obtain impressions of the plants themselves, which I have much pleasure in offering to my botanical friends.*
>
> *I hope that in general the impressions will be found sharp and well defined, but in some instances / such as the Fuci / the thickness of the specimens renders it impossible to place the glass used in taking Photographs sufficiently close to them to ensure a perfect representation of every plant. Being however unwilling to omit any species to which I had access, I have preferred giving such impressions as I could obtain of these thicker objects, to their entire omission – I take this opportunity of returning my thanks to the friends who have allowed me to use their collections of Algae on this occasion.*

iscenesatte sin egen status som lys-produceret tegning.[9] I stedet for blyants-skaltegningernes fastholdelse af det biologiske system ét-til-ét (som eksemplarer af en art), understregede hun igen og igen det ét-til-ét-forhold til den "virkelige ting" (som eksemplarer af et eksemplar), der karakteriserede den nye tegneart: tegning-med-lys.

Atkins udforskede med stor variation såvel mulighederne som begrænsningerne i blåtrykkets måde at tegne på. *Alaria esculenta* [fig. 5] er for eksempel foldet sammen i en slags omvendt S-form, der på en og samme tid refererer til den botaniske illustrationstradition og demonstrerer tilpasningen af eksemplarets naturlige størrelse til cyanotypi-arkets uniforme dimensioner – deraf den særlige fotografiske nødvendighed af rent faktisk at have været der. Man finder de samme krøller og flænger i botaniske tegninger og tryk (og ligeledes i "naturtryk" og "naturlige illustrationer" af forskellig art). Men her er de bundet til de særlige begrænsninger i "soltegningen," der paradoksalt nok tjener som garant for dens autenticitet, for det forhold, at den har været i berøring med tingen selv: nemlig uskarpheden i det rodnetslignende system i bunden af siden, som skyldes, at den afbildede algetype er større for neden, billedets ekstremt lave dybdeskarphed og den deraf følgende ombrydning af lyset, der passerer gennem glasset, samt at billedet er en anelse hævet over det papir, hvorpå eksemplaret lå.

Den uskarphed, der kendetegner nogle af Atkins' fotogeniske tegninger, adskiller dem markant fra de håndlavede blyantstegningers lineære kode. Ikke desto mindre er denne uskarphed et uomgængeligt modstykke til de hårfine, overdetaljerede kanter og inderrum i de fleste af Atkins' eksemplarer: Den er et resultat af lysets aftegning af den relativt flade algetype, der er blevet placeret mellem glaspladen og papiret – uden kameraets intervention. Det er samme tegnevirkning, der giver sig udslag i forskellen mellem de hvide og lyseblå farver af det flade, sammenfoldede eksemplar og baggrundens mørkeblå i for eksempel *Laminaria bulbosa* [fig. 6], hvis stængel står lidt uskarp, eller i de laverings-lignende inderrum og skarpe kanter af den frynsede, men udfoldede *Laminaria digitata* [fig. 7], hvis stængel er lidt bøjet i bunden, et spor af håndtegningens konventioner, som her er nødvendiggjort af eksemplaret, der aftegnes i naturlig størrelse af lysets "tegnelærerinde." Denne tegneart kan gengive tykkelser, når blot de er flade, men den vil aldrig kunne gengive perspektiviske volumener (og i modsætning til Atkins' skaltegninger ej heller de skygger, sådanne volumener kaster på den flade, hvorpå eksemplaret hviler).

Meget af dette forklares i Atkins' håndskrevne forord til første del af den tidligste udgave af hendes album:

> *De vanskeligheder, der er forbundet med at lave nøjagtige tegninger af genstande af så ringe størrelse som mange alger og vandhår, har foranlediget mig til at benytte sir John Herschels skønne cyanotypi-teknik til opnåelse af aftryk af planterne selv, og det er mig en stor glæde hermed at overbringe resultatet til mine botaniske venner.*

The names refer to Harvey's Manual of British Algae. *I have taken the Tribes and Species in their proper order when I was able to do so, but in many cases I have been compelled to make long gaps, from the want of the plants that should have been next inserted, and in this first number, I have intentionally departed from the systematic arrangement that I might give specimens of very various characters as a sample.*
(Photographs of British Algae, *Preface*)

In spite of her drawing skills, Atkins invokes the drawing-envy of the "photogenic drawing" – both its connection to and its difference from hand-made drawing. She lays particular stress upon what she sees as the special virtue of her specimens of the blue, cameraless variety of "photogenic drawing": that they are "impressions of the plants themselves." Adducing the "specimens" of the Fucus genus as examples, she homes in on the related questions of sharpness (or lack thereof), thickness, and closeness to the plant-specimen that I have raised, suggesting, above all, that the cyanotype medium appealed to her for its demonstration value as an illustrational medium with its own particular properties – that her photographs were self-reflexive demonstrations of those properties, as much as of the properties of algae. While explaining the profuseness of her albums as the result of her desire to achieve a kind of encyclopedic completeness and to follow the classificatory order given by William Harvey's *Manual of British Algae*, Atkins also admits the existence of "gaps" in the specimens available to her, and thus in the algological order given by that manual.

Over the years, Atkins departed increasingly from the order and the divisions of the manual. By the time she got to her volume sets, her blue algae became one long string of uncoded differences and similarities, divided only by the "gaps" in what she could find to represent. And then in 1853, when she turned from the sea to the fields, woodlands, and conservatory to make her fern and miscellanea albums, all pretensions to scientific rationale and order disappeared. There, Atkins dispensed even with the ratio of symmetry: Her ferns, feathers, leaves, lace, poppies, and grasses spread in wild abandon across each page, as if to declare their freedom from the botanist's cabinet and his scientific schematisms [fig. 8 and 9].

This article is an abbreviated version of Carol Armstrong: "Cameraless: From Natural Illustrations and Nature Prints to Manual and Photogenic Drawings and other Botanographs", originally published in *Ocean Flowers: Impressions from Nature*, ed. Carol Armstrong and Cathrine de Zegher (Princeton: Princeton University Press), 2004.

1 I mean "archaeology" metaphorically, both in the normal sense of unearthing something buried from the past and in the sense that Michel Foucault means it in *The Archaeology of Knowledge and the Discourse on Language* (1969) [(A.M. Sheridan Smith, trans.), New York: Harper and Row, 1972].

2 Beaumont Newhall, *The History of Photography from 1839 to the Present Day* (New York: MoMA, 1964), p. 11. Newhall's claim that "chlorophyll ... becomes green on exposure" to light is not technically true; it is rather that the green pigment cells in plants process the blue, violet, and red parts of the solar spectrum, converting light into usable energy, and reflecting the green part of the spectrum to produce the perceived green of plants. Newhall's point, nonetheless, is taken – that the history of observations about organic substances reacting chemically to light is

Jeg håber generelt, at man vil finde gengivelserne skarpe og veldefinerede, men i nogle tilfælde – det gælder for eksempel Fuci – gør eksemplarernes tykkelse det umuligt at placere den fotografiske glasplade så tæt på dem, at man kan være sikker på en perfekt eksponering af alle planter. Idet jeg imidlertid er uvillig til at udelade nogen af de arter, jeg har haft adgang til, har jeg valgt at medtage disse tykkere genstande i den gengivelse, jeg nu engang har kunnet tilvejebringe, frem for helt at udelade dem – og jeg vil gerne benytte denne lejlighed til at takke de af mine venner, der har tilladt mig at bruge deres algesamlinger i denne sammenhæng.

Navnene refererer til Harveys Manual of British Algae. *Jeg har så vidt muligt angivet slægter og arter i rette orden, men i mange tilfælde har jeg været nødsaget til at lave store spring af mangel på de planter, der skulle have fulgt som næste i rækken, og i dette første hæfte har jeg bevidst fraveget den systematiske opstilling for at kunne give en smagsprøve med eksempler af stærkt varierende karakter.*
(*Forordet til* Photographs of British Algae)

Trods sine tegneevner italesætter Atkins den "fotogeniske tegnings" iboende misundelse på tegningen – det faktum, at den på én gang er knyttet til og forskellig fra håndtegningen. Hun understreger især, hvad hun betragter som den særlige fordel ved de blå, kameraløse "fotogeniske tegninger", nemlig at de er "aftryk af planterne selv." Idet hun anfører "eksemplarerne" af fucus-arten som eksempler, stiller hun skarpt på de beslægtede spørgsmål om fokus (eller mangel på samme), tykkelse og afstanden til planteeksemplaret, som jeg har rejst i denne artikel, og her giver hun frem for alt udtryk for at være tiltrukket af cyanotypi-mediet på grund af dets demonstrationsværdi som et illustrationsmedie med helt specifikke egenskaber – og på den måde fremgår det, at hendes fotografier mindst lige så meget var selvrefleksive demonstrationer af mediets egenskaber som af algernes. Atkins forklarer sine albums voldsomme omfang som en følge af hendes ønske om at opnå en slags encyklopædisk fuldstændighed og at følge den klassifikatoriske orden indstiftet af William Harveys *Manual of British Algae*, men hun indrømmer også eksistensen af "huller" mellem de eksemplarer, hun har haft til rådighed, og dermed også i den algologiske orden opstillet af Harvey.

Gennem årene fraveg Atkins i betydelig grad Harveys orden og inddelinger. Da hun nåede frem til sine flerbindsværker, var hendes blå alger blevet én lang kæde af ikke-kodificerede forskelle og ligheder, kun adskilt af "hullerne" i det materiale, hun havde adgang til at gengive. Og da hun i 1853 flyttede fokus fra hav til mark, skov og vinterhave for at lave sine album med bregner og andre emner, gav hun helt afkald på enhver form for klassifikatorisk orden og videnskabeligt system. Her så hun endda bort fra symmetriske systemer: Hendes bregner, fjer, blade, vandplanter, valmuer og græsser spredte sig vildt og uregerligt over siderne, som ønskede de at frigøre sig fra botanikerens skuffedarier og videnskabelige kategorier [fig. 8 og 9].

Fig. 8 Anna Atkins: Equisetum sylvaticum (wood horsetail / skovpadderok), 1853. *Cyanotypes of British and Foreign Ferns*, 1853. Cyanotype / Cyanotopi, 26 x 21 cm. © The J. Paul Getty Museum, Los Angeles

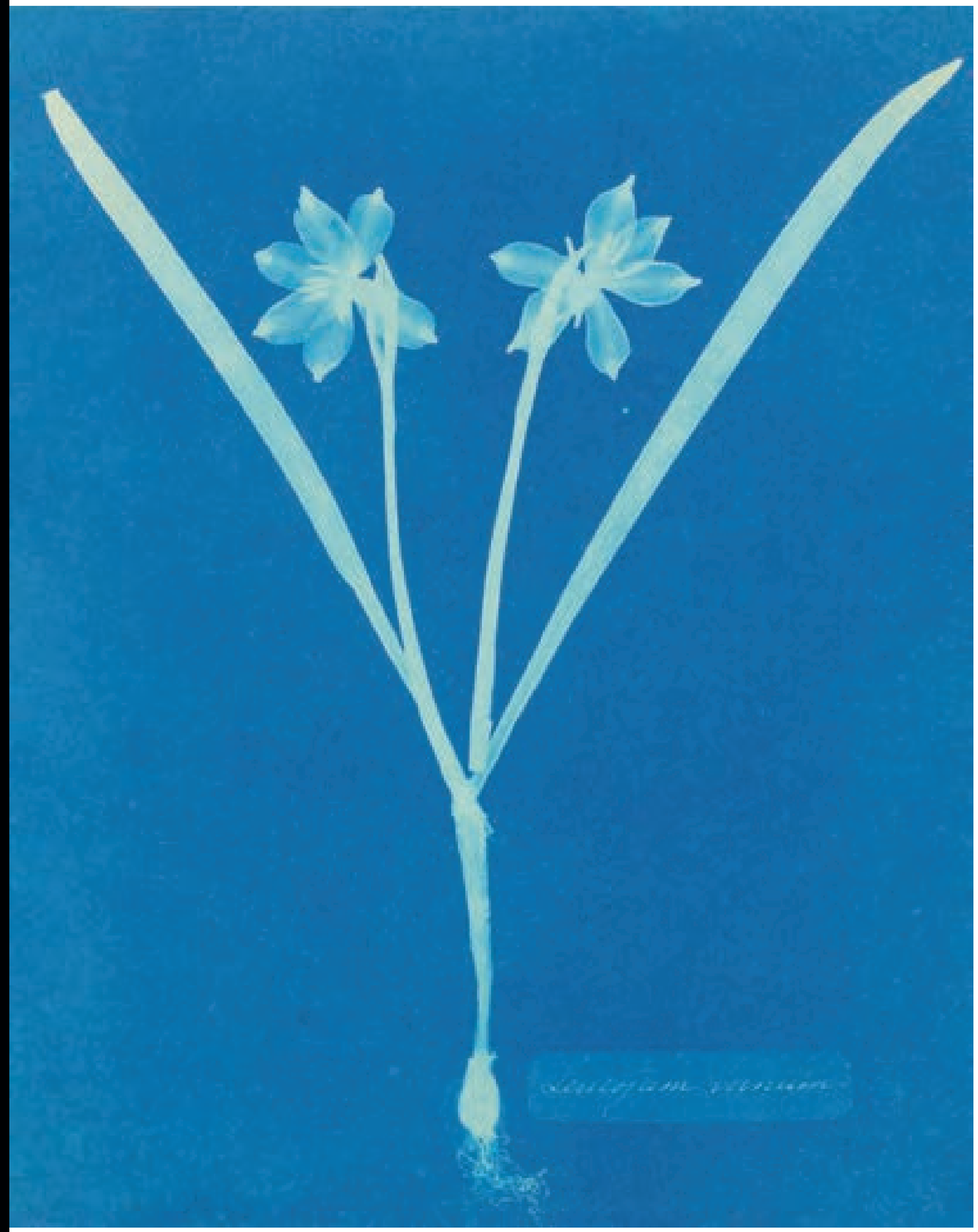


Fig. 9 Anna Atkins and / og Anne Dixon: Leucojam Varium (now known as / i dag kaldet Leucojum aestivum, summer snowflake / hvidblomme), 1854. *Cyanotypes of British and Foreign Flowering Plants and Ferns*. Cyanotype / Cyanotopi, 25.2 x 20 cm. © The J. Paul Getty Museum, Los Angeles

intertwined with the history of observations that eventually led to the fixing of the photograph, or in other words that photosynthesis, and photosensitivity are related areas of scientific research, and discovery.

3 Robert Hirsch, *Seizing the Light: A History of Photography* (Boston: McGraw-Hill, 2000), p. 4.

4 *Oxford English Dictionary*, 1971 edition.

5 See Vernon Heath, *Recollections*, London: Cassell and Company, 1892, 49; cited in: Larry J. Schaaf, *Out of the Shadows: Herschel, Talbot, and the Invention of Photography*, (New Haven and London: Yale University Press, 1992), p. 45.

6 On Atkins, and her father, see Larry Schaaf, *Sun Gardens: Victorian Photography by Anna Atkins.* (New York: An Aperture Book, 1985).

7 Atkins' interest in botany was clearly directed by her father's interests; in addition to her illustration ventures and her herbarium, she was also a member of the Botanical Society of London, of which he was the vice president. Her interest in representational media per se, including drawing and lithography (which she learned after completing her shell drawings), was more likely her own.

8 See Mike Ware, *Cyanotypes: The History, Science, and Art of Photographic Printing in Prussian Blue*, (Bradford, England, the National Museum of Photography, Film and Television, 1999), p. 24, p. 30.

9 This is my argument in *Scenes in a Library: Reading the Photograph in the Book, 1843–1875*, (Cambridge: The M.I.T. Press, October Books, 1998): "Blueprints For (And Against) Scientific Illustration: Anna Atkins's Botanical Albums," pp. 179–275.

Denne artikel er en forkortet version af Carol Armstrong: "Cameraless: From Natural Illustrations and Nature Prints to Manual and Photogenic Drawings and Other Botanographs," oprindelig trykt i *Ocean Flowers: Impressions from Nature*, red. Carol Armstrong og Cathrine de Zegher, Princeton: Princeton University Press, 2004.

1 Jeg bruger ordet "arkæologisk" metaforisk, dels i den normale betydning som det at afdække noget fortidigt, der ligger begravet, og i Michel Foucaults forstand, jf. *The Archaeology of Knowledge and the Discourse on Language* (1969) [(A.M. Sheridan Smith, trans.), New York: Harper and Row 1972].

2 Beaumont Newhall, *The History of Photography from 1839 to the Present Day*, New York: MoMA 1964, s. 11. Newhalls påstand om, at "klorofyl ... bliver grønt, når det eksponeres" for lys er teknisk set ikke korrekt: Der er snarere tale om, at de grønne pigmentceller i planterne omdanner de blå, violette og røde dele af sollysets spektrum til anvendelig energi og reflekterer den grønne del af spektret, hvilket får planterne til at fremstå grønne. Newhall har imidlertid ret i sin pointe – at historien om menneskets observationer af organiske materialers kemiske reaktion på lys er sammenflettet med historien om de observationer, der i sidste ende førte frem til fikseringen af det fotografiske billede – eller sagt på en anden måde, at fotosyntese og fotosensitivitet er beslægtede videnskabelige forskningsområder.

3 Robert Hirsch, *Seizing the Light: A History of Photography*, Boston: McGraw-Hill 2000, s. 4.

4 *Oxford English Dictionary*, 1971-udgaven.

5 Jf. Vernon Heath, *Recollections*, London: Cassell and Company 1892, s. 49; citeret efter Larry J. Schaaf, *Out of the Shadows: Herschel, Talbot, and the Invention of Photography*, New Haven og London: Yale University Press, 1992, s. 45.

6 Vedrørende Atkins og hendes far, se Larry Schaaf, *Sun Gardens: Victorian Photography by Anna Atkins*, New York: An Aperture Book, 1985.

7 Atkins' interesse for botanik var klart styret af farens interesser – ud over de forskellige illustrationsprojekter og sit herbarium var hun også medlem af The Botanical Society of London, hvor hun var næstformand. Hendes interesse i repræsentationelle medier som sådan, herunder tegning og litografi (som hun lærte sig efter færdiggørelsen af sine skaltegninger) var dog efter al sandsynlighed hendes egen.

8 Jf. Mike Ware, *Cyanotypes: The History, Science, and Art of Photographic Printing in Prussian Blue*, Bradford, England: the National Museum of Photography, Film and Television, 1999, s. 24, 30.

9 Dette argumenterer jeg for i "Blueprints For (And Against) Scientific Illustration: Anna Atkins' Botanical Albums", i: *Scenes in a Library: Reading the Photograph in the Book, 1843–1875*, Cambridge: The M.I.T. Press, October Books, 1998, s. 179–275

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