

Constable's Clouds

Author(s): John Thornes

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Constable's Clouds*

'LARGE clouds like rocks, forebode great showers';¹ alongside this statement Constable wrote 'cumulostrati' in his own copy of Thomas Forster's *Researches About Atmospheric Phaenomena* (2nd edition [1815]). This and other annotations, especially to the first chapter entitled 'Of Mr. Howard's Theory of the Origin and Modifications of Clouds', awake new interest in the supposition that Constable became fully familiar with Luke Howard's cloud classification before he painted his cloud studies of 1821–22, some of which have meteorologically accurate² weather notes on the reverse (see Figs. 22–25). Constable's copy of Forster's book came to light as recently as 1972, when the artist's library was catalogued by Leslie Parris and Conal Shields.³ Before this discovery there was no direct evidence that Constable was familiar with Luke Howard's cloud classification, or that he possessed any meteorological text. In a letter to George Constable on 12th December 1836 Constable mentioned Forster's book, but gave no indication that he owned a copy:

'My observations on clouds and skies are on scraps and bits of paper, and I have never yet put them together so as to form a lecture, which I shall do, and probably deliver at Hampstead next summer . . . If you want anything more about atmosphere, and I can help you, write to me. Forster's is the best book – he is far from right, still he has the merit of breaking much ground . . .'⁴

Kurt Badt, in an attempt to account for Constable's remarkable cloud studies of 1821–22, made much of the intellectual stimulus that might have been provided by Constable suddenly becoming familiar with Howard's classification.⁵ Badt hypothesised that Constable achieved

this familiarity by studying Howard's *Climate of London* (1st edition [1818–20]):

'And it was this book of Howard's which probably – almost certainly – spurred Constable to the most intensive study of the sky and to the creation of these special cloud pictures, the same which had the effect for Goethe of "limiting the indefinite, the unstable and the unattainable", and which "gave him a thread on which to hang his numerous isolated observations in a sensible and illuminating way".'⁶

Howard's 'Essay on Clouds' formed the first chapter of the first volume, which appeared in 1818. Badt dismissed Forster's book as unlikely to have been a source of inspiration to Constable, except those sections dealing with Howard's classification:

'The book by Thomas Forster . . . altered . . . Howard's original classifications . . . only in quite unimportant details . . . when it comes to Constable's actual *painting* of clouds, nothing in all the meteorological literature could have had a fruitful influence upon him except that portion which dealt with the basic forms of clouds, which alone was concerned with the direct observation of clouds. That is to say, nothing could have influenced him fruitfully except Howard's contribution.'⁷

An examination of Forster's book, and Constable's annotations to it, reveal that Constable was not only interested in Howard's cloud classification. He was also interested in the formation of clouds and precipitation, and he paid attention to Forster's comments relating to the illumination of clouds by the sun.

Louis Hawes has challenged the idea that Howard's classification could have stimulated Constable's cloud studies of 1821–22.⁸ He has put forward a series of 'environmental' reasons, adding that:

'Constable's voluminous correspondence and notations – so generous in reference to books and ideas that specially interested him – nowhere mentions Howard or his terminology.'⁹

Constable's annotations to Forster's book confute Hawes's argument: twice Constable wrote 'cumulostrati' and once 'Howard'.¹⁰ However, Hawes justly cautions that even if Constable became fully familiar with Howard's classification just before his cloud studies of 1821–22, it is dangerous to presume that the studies resulted directly from Constable's discovery of the classification. I shall examine, from a meteorological viewpoint, Constable's annotations of Forster's book, in order to illuminate

*I should like to thank the Royal Academy and The Tate Gallery for staging the Turner Exhibition of 1975, which first opened my eyes to atmospheric art, and to The Tate Gallery for the Constable Exhibition of 1976, which inspired this article. I would also like to thank David Lowenthal, Leslie Parris, Steve Ellis, Len Wood and especially Hugh Prince for commenting on early drafts of this paper, and Bergeron, Gwyneth, Ruskin and Maes-y-Neuadd for putting up with me.

¹ This quotation is taken from p.161 of Constable's copy of Forster's book which is currently on loan to the Tate Gallery library from Mrs Eileen Constable, whom I should like to thank for permission to publish this article.

² For a catalogue of Constable's dated 1821–22 Cloud Studies see J. E. THORNES: 'The Accurate dating of certain of John Constable's Cloud Studies 1821–22 using historical weather records', *Occasional Paper No.34*, Department of Geography, University College London. The weather notes that accompanied many of Constable's 1821–22 cloud studies are so accurate that I have been able to date nine of the cloud studies which only contain the day and month and not the year as either 1821 or 1822, using historical weather records. See J. E. THORNES: 'The Weather Dating of John Constable's Cloud Studies', *Weather*, Vol.34 [1979], pp.308–15.

³ The written annotations to Forster's book were first published by L. PARRIS, C. SHIELDS, I. FLEMMING-WILLIAMS: *John Constable: Further Documents and Correspondence* (hereafter J.C.F.D.&C.), The Tate Gallery and the Suffolk Records Society [1975], p.44.

⁴ R. B. BECKETT: *John Constable's Correspondence and Discourses* (hereafter J.C.C.&D.), V. The Suffolk Records Society, 11 [1967], p.36.

⁵ K. BADT: *John Constable's Clouds* [1950].

⁶ K. BADT, *op. cit.*, p.51.

⁷ K. BADT, *op. cit.*, p.50.

⁸ L. HAWES: 'Constable's Sky Sketches', *Journal of the Warburg and Courtauld Institute*, XXXII [1969], pp.344–65.

⁹ L. HAWES, *op. cit.*, p.346.

¹⁰ See later for details.

Constable's meteorological understanding.

Forster's book, first published in 1813, is one of the first meteorological texts to deal with explanations rather than descriptions of the physical phenomena of the atmosphere. As such it is a 'text book' in physical meteorology dealing with the common phenomena of weather as experienced in Britain. It is written lucidly, assessing various physical theories, backed up by Forster's own personal experience.

Forster's book appeared in three editions. The first edition was published in June 1813 by Underwood at seven shillings.¹¹ It devoted a major part of the first chapter to Howard's classification. The second edition 'corrected and enlarged with a series of engravings, illustrative of the modifications of the clouds, etc.' was published two years later in 1815 by Baldwin at a cost of ten shillings and sixpence. The third edition appeared in 1823, published by Harding at fifteen shillings, containing also a Calendar of Nature based on Forster's own observations from 1818 onwards at Hartwell in Sussex.

Constable owned a copy of the second edition. The book must have been highly regarded to have run through three editions in ten years. In the introduction to the third edition, Forster wrote:

'Two large impressions of this work having been sold, the Author has yielded to the solicitations of his friends in preparing for the press a third . . .'

but there is no record of how large were the sales of previous editions. As a general text book on atmospheric phenomena it had no equal in the English language until Howard himself published *Seven Lectures on Meteorology* in 1837.

The inside cover is inscribed 'Constable' and also '6/- Published at 10/6 scarce', the latter phrase does not appear to be in Constable's hand. It is probably written by a bookseller, and it seems certain that Constable bought the book secondhand. It was indeed published at ten shillings and sixpence, and was presumably out of print by 1823 when the third edition emerged. Two hypotheses therefore present themselves as to when Constable acquired the book: the first is that the book was bought secondhand some time before 1823; the second is that Constable did not buy the book until much later, in the late 1820s or early 1830s by which time probably all editions were scarce. We can only speculate as to which is correct. In the British Museum duplicate book sale at Sotheby's on 21st May 1818 a copy of the first edition of Forster's book was sold for one shilling, which hardly suggests that the first edition was a *scarce* book. At a similar sale on 27th February 1831 a first edition again fetched only two shillings and sixpence, while a second edition sold for nine shillings. Thus the second edition was selling at just below its original cost, and at three shillings more than Constable's copy.¹²

¹¹ The cost of each edition is included to provide a clue as to when Constable acquired his copy.

¹² Constable was friendly with the Carpenters, who were booksellers and publishers in Old Bond Street, London. James Carpenter and his son William supplied books to Constable for many years. It seems indeed that William Carpenter, as well as possessing an appreciation of Constable's art, also had an interest in clouds, for Constable wrote to him in 1833 (J.C.C.&D., iv, p.146): 'Dear Carpenter, . . . Your remark about the purple in the sky put me to a sad plunge (for it was quite just). It has caused me to go all over it again, and the devil of a tug I had with it, but it is now far less objectionable. I have now

If bought before 1823, the book would still be quite new, although not necessarily in good condition. If bought much later, its condition might have deteriorated sufficiently to place it at a price one third cheaper than the second edition sold by the British Museum.

If we accept the fact that Constable bought the book secondhand, then we must ask whether or not he wrote all the annotations. The handwriting has been identified as Constable's and the other markings are so closely related to each other that there can be no doubt that all are Constable's.¹³

On pages vii and viii of the Preface, a line is drawn down the right hand margin and over the page, to mark the following paragraph:

'Meteorology considered as a subject of amusement seems to have some advantages over many other pursuits; in as much as it may be studied and will afford interest in places unfavourable to the cultivation of other sciences. The botanist, who delights in the diversification of nature exhibited in the endless variety of the forms and colours of flowers; or the naturalist, who finds amusement in contemplating the habits of animals, and the adaptation of the structure of each to its mode of life, cannot indulge their inclination except in habitable countries, or where the vegetation and life abound. But on the barren mountain's rugged vertex in the uniform gloom of the desert, or on the trackless surface of the ocean, we may view the interesting electrical operations which are going on above, manifested in the formation and changes of the clouds, which bear water in huge masses from place to place, or throw it down in torrents on the earth and waters; and occasionally creating whirlwinds and water spouts; or producing the brilliant phaenomena of meteors and of lightening; and constantly ornamenting the sky with the picturesque imagery of coloured clouds and golden haze. The atmosphere and its phaenomena are everywhere, and thunder rolls, and rainbows glitter in all conceivable situations, and we may view them whether it may be our lot to dwell in the frozen countries of polar ice, in the mild climates of the temperate zone, or in the parched regions which lay more immediately under the path of the sun.'

This passage would surely appeal to Constable as one who rarely wandered out of South East England. It would content him to know that nearly all atmospheric phenomena are likely to be experienced at one location, given time. Hampstead Heath provided all the atmospheric inspiration for his 1821-22 studies.

It is also interesting to note that Forster is selling his subject meteorology 'as a subject of amusement', suggesting that the book was written for country gentlemen.

A short line in the right hand margin of page x picks out the following sentence: 'The heads of the ancient Greek philosophers are of a remarkably fine form for intelligence.' Constable had been interested in physiognomy since at least 1793, when he acquired Lavater's

got some light in my eyes, and some wind in my face. I am sure you will like it better. What a glorious morning is this for clouds . . .' Forster's book would have been of interest to both of them, but I have been unable to trace any record of a sale.

¹³ J.C.F.D.&C., p.44 does not express any doubts.



22.

Hampstead
 Sep 11 1821
 10 & 11. Morning } clouds along range on western
 side of the town -
 clearing. Light wind to the S.W.
 fine all day - but rain
 in the night following }

23.



26 & 27. Plates from Constable's copy of Forster's *Researches about Atmospheric Phaenomena* (Tate Gallery). The original explanations are: Fig. 26 No. 1 represents a Comoid Cirrus. This is the variety called the Mare's Tail. No. 2 A Cirrus lengthened out into a long pointed tail, above is a long straight Linear Cirrus. No. 3 are Cumuli; others are seen below them in the distance. Fig. 27. No. 1 Another Cirrus figured like a Cyma of Architecture. No. 2 Lines of Cirrostratus. No. 3 The same cloud breaking out into Cirrocumulus for being influenced by the Cumulostratus below. No. 4 Cumulostratus. Many of the long Cirrostrati align on its summits.



24.

By afternoon 27 Sept 1821
 wind broke & but
 very much of high
 after rain

25.

22. *Small cumulus clouds in a westerly airstream, September 11th 1821*, by John Constable. (Royal Academy).

23. Inscription on the *recto* of Fig. 22.

24. *Sky and landscape with distant cumulus, September 27th 1821*, by John Constable. (Royal Academy).

25. Inscription on the *recto* of Fig. 24.

book on the subject.¹⁴

A line in the right hand margin of page xii is found against the following paragraph:

'But the stream of time is a fluctuating torrent, and intellectual excellence seems to flourish at alternative periods. Shortly after learning again began to flourish, and the energies of the human mind again exerted themselves according to the particular genius of individuals, there appeared persons who delighted in aerial phenomena, and Saussure De Luc, Berthalan and others at length roused the attention of mankind to the production of our atmosphere.'

Constable appears interested in the reawakening of interest in meteorology, as well as other natural sciences. His Hampstead lectures on the rise of landscape art, pick out the 'particular genius of individuals' that paved the way.¹⁵

The last three lines of a sentence occupying the whole of page xiv are marked by Constable:

'The ruins of stupendous cities once the ornament of the east; the numerous fortifications, walls, temples, aqueducts, and other works of art, now nothing but the desolated habitations of wild animals, and the traces left of sciences which, like fruitless flowers, bloomed in the spring of time only to decay, are monuments of human fatality which must impress reflecting persons with gloomy notions of the instability of society, and incline us to fear that, in spite of all the efforts of genius and of art of modern times, the light of knowledge which rose in the east, and civilized the oriental nations, will set on the western parts of the world, and leave us ere long a monument to future ages of the fluctuating nature of human perfection, unless by a strict attention to the improvement of the physical organization of our species, conjoined with the adoption of some general plan of education superior to any hitherto enforced, we should permanently improve the moral and intellectual character of future generations, without which all the scientific records imaginable would be to them only as cyphers scrawled on the barrenness of intellect.'

This sentence is echoed by Constable in his descriptions of 'Old Sarum' in *English Landscape* [1833] and 'Stonehenge' (exh. 1836).¹⁶

On page 9, under the heading 'Of the Cirrus', Constable has written 'doubtful' in the margin against the following sentence:

'... the long continued appearance, and the multiform and everchanging configuration of this [the cirrus] and

the other modifications, unattended by rain, and accompanied by dry, variable, and generally easterly winds' is 'indicative of a very peculiar state of the electric atmosphere...'

Constable's remark seems to be directed towards the last phrase, in other words he doubts whether the conditions outlined are 'indicative of a very peculiar state of the electric atmosphere'. Meteorological theory was pre-occupied at that time with the effect of atmospheric electricity on precipitation, and cloud form.¹⁷ Howard [1833] in his description of cirrus stated:

'The upward direction of the fibres, or tufts of this cloud is found to be a decided indication of the decomposition of vapour preceding rain: the downward as decidedly indicating evaporation and fair weather. In each case they point towards the place of the Electricity which is evolved at the time.'¹⁸

It is very difficult to understand today the importance that atmospheric electricity was given within meteorological theory at the beginning of the nineteenth century. It was quite common to use a rod of iron and pith balls to measure atmospheric electricity accompanying varying weather conditions. Howard [1833] devotes a chapter to observations of atmospheric electricity.¹⁹ The 'peculiar state of the electric atmosphere' referred to by Forster probably means that both positive and negative charges were obtained accompanying 'fair weather' cirrus on different occasions. Constable may have been concerned that Forster was linking stable weather conditions with apparently unstable electrical conditions; or it could be that he was confusing the cirrus that heralds an oncoming depression and westerly winds, with the 'fair weather' cirrus that accompanies generally easterly winds in Britain.

On page 9, under the heading 'Of the Cumulus' a whole phrase is written by Constable in the margin opposite the beginning of the section. Unfortunately it cannot be deciphered as the pencil appears to have been washed off. At some time the whole book appears to have been immersed in water or perhaps drenched by a heavy shower. Nevertheless, the annotation shows Constable's interest in cumulus – perhaps his favourite cloud. In the right hand margin there is a line against the following sentence:

'It is commonly of a dense structure, formed in the lower atmosphere and moving along in the current of wind which is next to the earth.'

Constable was no doubt familiar, from his keen observations, with wind shear and the common phenomenon of clouds at different heights moving in different directions, the small cumulus tending to move in the same direction as the wind close to the ground.

The next sentence is marked with a double line and a word which cannot be read appears in the margin:

'Its first appearance is generally a small irregular spot, which becomes the nucleus on which it forms.'

Howard's cumulus clouds were what we would probably call 'fair weather cumulus' today. If they grew larger they

¹⁴ The book is listed in J.C.F.D.&C., p.32 as part of The Constable Family Collection.

¹⁵ For an account of Constable's landscape lectures see R. B. BECKETT: *John Constable's Discourses* (hereafter J.C.D.). Suffolk Records Society, XIV [1970], p.28.

¹⁶ The text for 'Old Sarum' in *English Landscape* is given in full in J.C.D., p.24. Constable's thoughts are remarkably similar to Forster's. 'The present appearance of Old Sarum – wild, desolate, and dreary – contrasts strongly with its former greatness. This proud and "towered city", once giving laws to the whole kingdom – for it was here our earliest parliaments on record were convened – can now be traced but by vast embankments and ditches, tracked only by sheepwalks: "The plough has passed over it".' Constable's notes accompanying 'Stonehenge' (exh. 1836)–: 'The mysterious monument of Stonehenge, standing remote on a bare and boundless heath, as much unconnected with the events of past ages as it is with the uses of the present, carries you back beyond all historical records into the obscurity of a totally unknown period.'

¹⁷ See W. G. K. MIDDLETON: *A History of The Theories of Rain* [1965], p.111.

¹⁸ L. HOWARD: *The Climate of London*, I [1833], p.xlii Footnote.

¹⁹ *ibid.*, p.137.

were classed as cumulostrati as long as they did not produce precipitation, or nimbus if they did. The lifespan of a typical 'fair weather cumulus' is about half an hour, making it a particularly difficult cloud to paint (see Fig. 26).

A line in the right-hand margin of pages 10 and 11 appears against the following paragraph describing the formation of cumulus:

'The sun's rays warming first the surface of the earth, and their radiation causing warmth to be propagated upward, this warmth converts water on the earth's surface into vapour, which rises and exerts its electrical force on that which the nocturnal decrease of temperature had not decomposed, and which therefore remained diffused. The latter, in passing through the atmosphere to give place to that from below, changes its climate, arrives in a colder air, and is thereby decomposed and thrown into a statue of visible cloud.'

This explanation was written at a time before the concept of thermals – the upward convection of moist air – was established.²⁰ Nevertheless it shows that Constable was interested in the formation of cumulus. Although Badt denies that an interest in atmospheric physics would affect Constable's painting, Constable never painted a cumulus cloud when other weather elements were not conducive to its formation.

These notes and markings by Constable in the section 'Of the Cumulus' confirm his interest in that cloud type, and demonstrate conclusively that he knew that the cloud he perhaps painted most often, was cumulus.

On page 12, under the heading 'Of the Stratus', a line in the right-hand margin picks out the following two sentences:

'It may properly be called the cloud of the night, as it frequently makes its appearance about sunset, and disappears soon after sunrise. When ascending in the atmosphere, it often seems at a certain elevation to take the irregular hemispherical form and become a cumulus.'

In the margin is written 'but not in (bad?) weather'

Constable is here questioning a confusion in Howard's classification, in which only advection and radiation mist or fog are identified as stratus. It often occurs under anti-cyclonic conditions associated in summer with anything but bad weather. The low-lying cloud that is almost identical in appearance but accompanies 'bad weather',²¹ would today also be called stratus, or stratus fractus, if not precipitating, or nimbostratus if precipitating. These clouds are formed in very different weather conditions, usually associated with frontal systems accompanying depressions. Confusingly, Howard would have called low-lying, non-precipitating clouds (not of advective or radiational origin) cirrostratus, or nimbus if precipitating. In Howard's classification, cirrostratus is an all-embracing term for layer clouds. The confusion was removed by redefining stratus to include all cloud below one kilometre

in 1887.²² Constable, on the basis of his keen observations of clouds, points to an area of confusion in Howard's classification.

On page 14, a line in the right-hand margin is made against:

'The fine mists which creep, as it were, along the vallies of a summer's evening, are generally white, and, when seen at a distance by moonlight, have a very fanciful appearance. They are strikingly contrasted to the yellow fogs of November.'

Constable was probably interested in the different colouring of summer stratus and winter smog (a mixture of smoke and fog). Interestingly, Constable never painted smog in his views of London, restricting his outdoor painting to the summer months.

In the top margin of page 19, under the heading 'Of the Cirrostratus' is written: 'heat, wind (?s) electricity moisture', a list of meteorological factors that, taken together, Constable would have believed to control cloud formation. These words are not directly linked to the text, but suggest that Constable was very interested in meteorological factors that produce cloud.

The paragraph immediately following is almost encircled by Constable, one phrase being also underlined twice. It must have been very important to him:

'All clouds are capable of becoming brighter and darker, according to their relative position with respect to the sun.'

In the margin Constable has written 'as seen opposite or under the sun'. Constable is pointing out that the position of the observer in relation to the sun is also important. To paint realistic cloud colours, according to the position of the sun and the aspect of a scene, is extremely difficult. Clouds also control the lighting of the landscape. Constable himself wrote elsewhere: 'any specific effect of lighting on the ground is consistent with one, and only one, distribution of clouds and with one position of the sun in the sky'.²³

On page 23, under the heading 'Of the Cumulostratus', Howard observes that the cumulostratus sometimes 'overhangs a perpendicular stem, and looks like a great mushroom'. Alongside this phrase Constable wrote 'it is only (caps with ?) a mushroom in thunder'.

Here Constable is insinuating that cumulostrati produce thunder, which is not the case. He is confusing the 'mushroom' shaped cumulostratus (see Fig. 27, which is formed from the spreading out of the top of a cumulus cloud, often in the evening when convection has ceased, with the 'anvil' or 'crown of cirrus' that is the hallmark of Howard's nimbus or thunderstorm (cumulo-nimbus in present day terminology). The main distinction is that the 'mushroom' is composed entirely of water droplets, whereas the 'anvil' is much higher and is composed of ice crystals, giving it a more fibrous appearance than the mushroom.²⁴ Howard's distinction between the two is confusing because he failed to take account of the

²⁰ H. Brandes first 'recognised that cumulus clouds were formed as a result of the convection upwards of moist air' in 1820. See J. A. DAY, F. H. LUDLAM: 'Luke Howard and His Clouds', *Weather*, 27 [1972], p.454.

²¹ 'Bad weather' is defined by the British Meteorological Office in *Cloud Types for Observers* [1962], p.11 as 'the conditions which generally exist during precipitation and a short time after', beneath a picture of 'stratus fractus of bad weather'.

²² See R. ABERCROMBY: 'Suggestions for an International Nomenclature of Clouds', *Quart. J. R. Met. Soc.*, 13 [1887], p.62.

²³ Quoted by F. CONSTABLE: *John Constable* [1976], p.88.

²⁴ Two excellent photos to distinguish the 'mushroom' and the 'anvil' are given in British Meteorological Office, *Cloud Types for Observers*, p.8 & 12.

differing heights of cumulostratus and nimbus, nor did he realise that all cirrus clouds are composed of ice crystals. Constable again points to a confusion in Howard's classification.

Beside the statement on page 24, under the heading 'Of the Nimbus':

'No cloud effuses rain until it has previously undergone a change sufficiently remarkable to constitute it a distinct modification, to which the term nimbus has properly been applied.'

Constable wrote:

'This is not correct electrical fluid will convert an (. . . ?) without an (. . . ?)'

Although two key words cannot be read, Constable would appear to contend that 'electrical fluid' will produce rain without a change in shape of the cloud. In those days, atmospheric electricity was widely considered as a fluid. Howard himself wrote in 1833 of the importance of atmospheric electricity as 'one of the most universally diffused, most active and most useful fluids in nature', but he regarded electricity as 'a secondary agent . . . in the production of rain . . . which modifies the effect of the two grand predisposing causes – a falling temperature and the influx of vapour'.²⁵ Constable, on the other hand, appears to regard 'electrical fluid' as a possible primary cause of rain, again demonstrating that he had sufficient meteorological confidence to disagree with Forster.

A line in the right-hand margin of page 27 emphasises the following paragraph:

'That cumuli are the immediate result of this process; and that in the evening, when the heat is diminished, the air deposits its vapour again in the form of dew, which gravitates to the ground, becoming more dense as it approaches the earth, because the lower atmosphere is not the coolest; and finally lodges on the surface of the herbage, or of the ground, where it awaits the reascending sun to be again evaporated.'

A water cycle linking two of his favourite elements, dew and cumulus, no doubt appealed to Constable. His note also shows that he was interested in the physical origins of dew, as well as its visual appeal.

On pages 28–29, Forster uses the conclusion from Howard's article on clouds in Ree's *Cyclopaedia*:²⁶

'We shall conclude with a brief review of the modifications according from the STRATUS, formed by the condensation of vapour or its escape from the surface to the CUMULUS, collecting its water in the second stage of its ascent, both probably existing by virtue of a positive electricity. From there proceeding through the partially conducting CUMULOSTRATUS the CIRROSTRATUS and CIRROCUMULUS; the latter positively charged, and considerably retentive of its charge; the former less perfectly insulated, and, perhaps, conducting horizontally; we arrive thus at the region where the CIRRUS, light and elevated, obeys every impulse or invitation of that fluid, which, while it finds a conductor, ever operates in silence; but which embodied and insulated in a denser collection of watery atoms, sooner or later bursts its barrier, leaps down in lightning, and glides

through the NIMBUS from its elevated station to the earth.'

Constable marked this passage with a line down the right-hand margin. Here is conclusive proof that at some time, Constable was familiar with Howard's entire classification.

At the bottom of page 30 Constable wrote, 'not so', against the first two sentences of the following paragraph: 'M. De Luc asserts that clouds are not the constant result of evaporation from the earth. He accounts for them by supposing that the air is decomposed by the sun's rays, so as to deposit aqueous particles, which become clouds. If this be admitted to take place, it does not argue against the ascent of vapour: and whether the watery particles arise immediately from the ground, or are deposited by the air, they may equally be supposed capable of becoming cloud, when operated upon by the nubific principle which is believed to be electrical, indeed, these two processes may co-operate to the production of clouds, so that, if this hypothesis be advanced against Mr. Howard's theory it cannot be regarded as constituting a valid objection.'

As Forster said in his preface, De Luc was a powerful voice in meteorology, and Forster attempts to iron out an apparent contradiction between the two theories of cloud formation discussed, no doubt in an effort to quell criticism of Howard's work. Against the second part of the paragraph, at the top of page 31, Constable has written in the right-hand margin, '(. . . ?) as Howard's'. The first word cannot be read, but taken with the 'not so' on the previous page, Constable seems to dismiss De Luc's theory, and support Howard's.

The fact that Constable actually wrote Howard's name, affords further proof that he was aware not only of Howard's cloud classification, but also of Howard's theories on clouds and the origins of precipitation.

On page 50, in 'Of the Varieties of the Cirrus', are the words:

'Unusual motion of cirrus clouds, "as if every particle was alive".'

At the side of this Constable wrote, according to Leslie Parris and Conal Shields:

'this also happens in (cumulus ?) thunder clouds diverging (moisture ?)'.²⁷

The first bracket and question mark are my own. The interpretation of the word 'cumulus' is doubtful, not only because the word is not written clearly, but also because if Constable had gleaned anything from Howard's classification, he would not have associated cumulus with thunder. An accompanying pencil sketch appears to depict a swiftly growing 'thunder cloud'. Constable's use of the phrase 'thunder cloud' suggests that he had his own colloquial names for clouds. He would find it difficult to marry his phrase with Howard's term 'nimbus', which was also applied to other clouds that produced rain.

On page 52, at section II, 'Of the Varieties of the Cirrocumulus', a line in the right hand margin picks out the following paragraph:

'The permanent features of any cloud should be distinguished from those which are only transitory, or which the cloud exhibits in the progress of its change

²⁵ L. HOWARD [1833], *op. cit.*, p.lxxii.

²⁶ L. HOWARD: 'Clouds' in Ree's *Cyclopaedia*, viii [1807].

²⁷ J.C.F.D.&C., p.45.

from one modification to another. I have before noticed that in the change from the cirrus to the cirrocumulus, a number of appearances present themselves, which cannot be referred to either. They generally, however, end in a determinable modification, which I call its permanent form; and in which it generally remains for some time, and then evaporates, or changes again.'

This would be important for Constable in his attempts to capture on canvas the essential and distinctive qualities of a cloud type. The paragraph also emphasises that identifying clouds is not a simple task, and Constable would probably be pleased to read that Forster occasionally experienced difficulties!

On page 60–61, at Section IV, 'Of the Varieties of the Cumulus', a line is drawn in the right-hand margin against:

'It is curious to watch the formation of cumuli in a morning, and trace them, when it is possible, from the minute specks of cloud which, here and there, seems to form out of the atmosphere, to those large masses which move majestically along in the wind, and convey water from place to place for the irrigation of the earth. In fair weather soon after sunrise, a small cloud appears; this increases, others form near it, and they fall into one another as if attracted: a large mass is at length upraised, and then all the smaller ones which form in its neighbourhood are soon lost, while the large one is augmented; and the spectator, though he seldom sees it in actual congression, feels no doubt that the disappearance of the smaller, and augmentation of the larger cloud, is owing to the larger mass having attracted the smaller into itself. It becomes a question however, why the small clouds are lost to appearance before they are quite drawn into the larger one? Possibly when the small cloud is very near, or most of its vapours drawn away, the rest rush with a velocity into the larger; as a magnet, when it has approached a larger within a certain distance, is forcibly and suddenly attracted to the latter. When these ephemeral mountains of electrified vapour have increased much, as they do towards the middle of the day; large ones often inosculate, and form dense and extensive irregular masses.'

Constable wrote in the margin against the last sentence: 'but the formation generally evaporates in the middle of the day.'

This lengthy account describes the formation of what today would be called strato-cumulus streets in 'fair' weather when convection is limited. Constable adds a general observation that a cloud must eventually evaporate, as the average life of a cloud of this type is only an hour or two. Again Constable demonstrates his sharpness as an observer of cloud formation and evaporation, and shows his interest in explanation, although in this case, Forster's likening of clouds to magnets was rather bizarre.

At page 161, in the section on 'Proverbs relating to the Months and Seasons', Forster has taken an extract from Chaucer's 'Canterbury Tales', one line of which reads:

'When the clouds are upon the hills, they'll come down by the rills'

An 'X' has been placed alongside this line, and at the bottom of the page Constable has written, 'X cumulostrati'.

This interpretation is not at all clear, and considering that Constable's only meeting with mountain weather was during his Lake District trip of 1806, it is strange that he has picked out this line.

On page 162, in the chapters 'The well known rules of the Shepherd of Banbury', 'Cumulostrati' is also written against the following line:

'Large clouds like rocks, forebode great showers'.

This interpretation is much better. Indeed Howard says of cumulostratus: 'It is among the regular harbingers' . . . of 'thunderstorm' and 'the cumulostratus affords in general a doubtful prognostic.'²⁸

Summarising what Constable's annotations tell us about his meteorological understanding, one arrives at the following conclusions:

- (a) The word 'cumulostrati' is noted twice, and Howard's name is mentioned once.
- (b) He had difficulty marrying his own colloquial classification with Howard's classification.
- (c) He was sufficiently familiar with meteorological theory to pick out ambiguities in Howard's classification, and also to disagree with certain of Forster's conclusions.
- (d) He was fully familiar with Howard's classification of clouds at some stage in his life.
- (e) He shows an interest in the physical processes that generate the different cloud types, particularly cumulus and also in the formation of dew.
- (f) The detailed annotations show that Constable studied the book very carefully, and suggest that he had not studied Howard's classification in detail before.

This study has not proved conclusively that Constable was aware of Howard's cloud classification before 1821, nor that he was inspired by it to produce his 1821/22 cloud studies. What it has shown is that Constable was interested in meteorology to a degree which has only been speculated upon in the past, and also that Forster's book could have helped Constable in his painting of clouds in other ways than just its description of Howard's classification. It will probably never be known what the real inspiration for Constable's cloud studies of 1821/22 was. The evidence seems to suggest that the 1821 studies were primarily stimulated by Constable's desire to master the skies in his 'six footers', and that the 1822 studies were the product of Constable's obsession with the atmospheric phenomena and a love of landscape meteorology.²⁹ Whatever the truth, Constable's clouds will continue to inspire and impress all who gaze upon them.

²⁸ L. HOWARD: [1807], *op. cit.*, 'Clouds'.

²⁹ For a definition of landscape meteorology see J. E. THORNES: 'Landscape and Clouds', *Geographical Magazine*, 51 [1979] pp.94–99.