In the second half of the eighteenth century, the towns of Derby, Lichfield, Stoke and Birmingham became the dispersed centres of an important provincial cultural and intellectual revival, which discarded the self-regarding Augustan values of the metropolis in favour of an empirical and sceptical attitude of serious enquiry, and was paralleled by similar movements in Liverpool, Newcastle, Manchester, Glasgow and Edinburgh. Drawing inspiration and energy from the gradual industrial development and consequent increased economic importance of the Midland and Northern cities, these revivals found expression in the founding of a succession of Literary and Philosophical Societies and subscription libraries, whose interests were both practical and speculative, aiming towards the betterment of society through the application of recent scientific discoveries to industrial processes, agriculture and transportation. This was a new kind of provincial culture, autonomous and independent, redefining itself through serious debate and enquiry, and consciously opposed to metropolitan values and procedures.

In 1773 William Roscoe founded the Liverpool Society for the Encouragement of the Arts of Painting and Design, Thomas Spence was a founder-member of the Newcastle Philosophical Society, and both Robert Owen and John Dalton were members of the Manchester Philosophical Society. In the Midland towns, the Lunar Society of Birmingham, founded in the 1760s, numbered among its members Matthew Boulton, Erasmus Darwin, Josiah Wedgwood, Joseph Priestley and James Watt. The group was characterised by a wide-ranging curiosity about all aspects of the natural world, a common enthusiasm for speculative thought and its practical applications, and a very pragmatic political radicalism which resulted in the sacking of Priestley's house and laboratory by the Birmingham mob in 1791, and Canning's attack on Erasmus Darwin's religious scepticism and enthusiastic support for the American and French Revolutions.

As well as being a founder-member of the Lunar Society, Erasmus Darwin founded the Botanic Society at Lichfield and supervised publication of a number of volumes of translations from Linnaeus in the 1780s, and, following his move to Derby in 1780, founded the Philosophical Society of Derby. Darwin was for many years the most famous doctor in England, repeatedly refusing requests that he become the King's personal physician, and, briefly in the 1790s, he also became the most celebrated poet in England. His interests embraced geology, chemistry, biological evolution, educational theory, prison reform, the rights of women, the anti-slavery movement, meteorology, transportation and a wide variety of industrial processes; the formidable number of practical inventions with which he is
credited included a canal-lift, a horizontal flint-mill for Wedgwood’s factory at Etruria, and a ‘speaking-machine’. Darwin was a Fellow of the Royal Society, the Medical Society, the Linnean Society and the American Philosophical Society, a polymath who, in his breadth of interests and sheer creative energy, can bear comparison with Goethe or Benjamin Franklin – the latter being a close friend and, later, correspondent of his.

Darwin published a number of medical and geological papers in the Philosophical Transactions of the Royal Society, translated Linnaeus in an interpretative rather than literal manner, and attempted a complete classification of all fauna in his Zoönomia, published in 1794-6. This went into several editions, was translated into German, French and Italian, and was honoured with a place on the Vatican Index of Prohibited Books. He expressed all his scientific and intellectual interests in the long poem The Botanic Garden, published in two parts in 1789 and 1791 – in the preface to the complete edition of 1791, Darwin wrote;

The general design of the following sheets is to instill Imagination under the banner of Science; and to lead her votaries from the looser analogies, which dress out the image of poetry, to the stricter ones which form the ratiocination of philosophy, and the mass of discursive notes appended to the poem are almost as important as the poem itself.

The Midlands cultural and scientific milieu can be regarded as the outcome of an aspect of the Age of Reason that had effectively bypassed the metropolis. In attempting a synthesis of immediate scientific concerns and broader imaginative constructs, it was still possible and legitimate to welcome enthusiastically the new discoveries and their industrial application. At this innocent, optimistic, meliorist stage of the Industrial Revolution, few foresaw the appalling social consequences, and a belief in its limitless possibilities for the betterment of the quality of life was widespread. Thus Erasmus Darwin could write, in his Botanic Garden;

Soon shall thy arm, UNCONQU’R’D STEAM! afar
Drag the slow barge, or drive the rapid car; Or on wide-waving wings expanded bear
The flying-chariot through the fields of air.
- Fair crews triumphant, leaning from above,
  Shall wave their fluttering kerrchiefs as they move;
Or warrior-bands alarm the gaping crowd,
  And armies shrink beneath the shadowy cloud.

- a prophecy of aerial bombardment as well as of air travel.

This stage of the Industrial Revolution in England finds its finest visual expression in a number of paintings by the artist Joseph Wright, or Wright of Derby. Although the familiar sobriquet was applied to distinguish him from another very minor painter of the same name, it nonetheless emphasises his identity as an unequivocally provincial and local painter – Joseph Wright was born, lived and died in Derby, and his refusal to move permanently to London was a matter of temperament rather than of ideology. The paintings he exhibited in London at the Society of Artists, the Free Society of Artists and the Royal Academy of Arts were all despatched from Derby, and although they established for him a reputation that was further enhanced by the reproduction of a number of his genre pictures in the form of engravings, the paintings themselves had generally been commissioned or bought by the Derbyshire gentry, and soon returned to remote country houses in the Midlands.

Wright was born in Derby in 1734, his father and grandfather being lawyers. He studied for two years in London under the portraitist Thomas Hudson, who had previously taught Joshua Reynolds, and returned to London for a further fifteen months with Hudson. In 1757 he set up in Derby as a portrait-painter, sending pictures to London for exhibition. In 1773, soon after marrying, he set off for Italy, and an arduous two-year working tour that appears to have permanently impaired his health. On his return, Wright moved to Bath for two years, and attempted to follow in Gainsborough’s footsteps as a portrait painter to the gentry at leisure, but he failed completely in this, and returned to Derby for the remaining twenty years of his life. While switching his allegiance from the Society of Artists to the Royal Academy, he nevertheless quarrelled with the Academy, and refused election as Academician – the circumstances of this quarrel remain a mystery; similarly, a commission to paint two canvases for John Boydell’s Shakespeare Gallery resulted in a bitter quarrel and much recrimination. Wright seems to have become rather morose and solitary; he died in 1797, and is buried in St. Alkmund’s Church, Derby. Apart from his resolute provincial identity, Wright is also remarkable as being the first English artist to organise a sole exhibition of his own work, in Convent Garden in 1785.

Joseph Wright’s paintings of scientific and industrial subjects date from the brief period 1765-1780, and constitute only a small fraction of his complete oeuvre – only twelve works out of a total
of 342, mostly portraits, listed in the catalogue raisonné. They cannot be said to predominate in terms of number, and yet it is the fact that Wright, a successful provincial portraitist and painter of ‘candle-lights’, chose to reflect in some of his paintings the speculative activities of the Midlands scientific societies, and the gradual intrusion of the factories and mills of the early Industrial Revolution into the contemporary conception of the Picturesque, that is the chief source of interest in his work.

In addition to the dozen paintings that specifically depict such subjects, mention must also be made of the portraits of provincial scientists and proto-industrialists which are eloquent of their own self-image — these include portraits of Richard Arkwright, Jedediah Strutt and Erasmus Darwin; of the widespread and varied influence of this scientific interest of the painter’s upon many of his other works, the genre paintings and the late landscapes in particular.

The concern with light as a dominant element in compositions as diverse as classical interiors and seascapes constitutes a methodical analytical study throughout Wright’s work, if not a personal obsession. Up to 1765, Wright seemed set to become another portrait painter in the rather ossified Dutch-derived tradition of Kneller and Hudson. He would have been assured of a constant and adequate income, especially if he had moved down to London, and could have expected the same degree of social prestige and respect as that afforded a local doctor, solicitor or parson. A decade later, however, when Wright was unsuccessfully trying to set up as a fashionable portrait painter in Bath, the situation had changed: ‘I am confident I have some enemies in this place’, he writes ‘who propagate a report that I paint fire-pieces admirably, but they never heard of my painting portraits’. A minor reputation as a painter of portraits had been replaced by a larger reputation as painter of ‘fire-pieces’ or ‘candle-lights’, dramatic outdoor scenes or group- interiors depending for their effect on spectacular lighting and virtuoso effects of light and shadow.

Wright’s candle-light paintings predate his Italian journey and may indicate that at some point during his studies in London with Hudson, he had both seen and absorbed the Caravagesque paintings of the Dutch and French Tenebrist painters — Honthorst, Terbruggen, Schalken, De la Tour, etc. Certainly there is very little English precedent for these exercises in chiaroscuro, and yet these works appear in Wright’s œuvre as fully-achieved works, not as tentative and developing attempts at an unknown and newly-discovered genre. Wright’s use of mechanical assistance also suggests knowledge of his European predecessors’ experience — he invented a contrivance of parallel screens, by means of which he could shut off a corner of his painting room to contain his artificially lighted subject, and by opening the panels as required, could view his subject from different points. This chiaroscuro style soon became absorbed into the generality of English painting.

Three persons viewing the Gladiator by candlelight, A philosopher giving a lecture on the Orrery, An experiment on a bird in the air-pump and An academy by lamplight date from 1764, 1766, 1768 and 1768–9 respectively, and establish the features of the genre — a group of people arranged around the object of their concentrated attention, surrounded by darkness, the light-source being concealed behind one of the observers or by some other object and dramatically lighting up the observers through secondary reflection as well as by contrast with the surrounding darkness. Faces lit from below acquire
an eerie and dramatic quality, and the structure of the interior within which the group of people is contained is suggested without being completely defined.

The Gladiator depicts a group of dilettanti examining a copy of the Borghese Gladiator comparing it to a drawing of the original; the painting is a virtuoso exercise in the use of chiaroscuro and silhouette, and in rapid transition between extremes of light and shade.

A philosopher giving a lecture on the Orrery, painted in 1764-6, is both more unified and more ambitious a work than its predecessor. Orreries performed a demonstrational function for a variety of contexts: a series of concentric steel bands represented the dispositions of the stars as seen from within the Solar System, which was itself represented by small metal spheres attached to spokes centred on the Sun; movement of the planets around the Sun enabled the demonstrator to represent eclipses, the relative positions of the stars, etc., and one popular variant of this demonstration was to replace the sphere representing the Sun with a small light-source, and observe the whole apparatus in a darkened room—this is the subject of Wright’s painting. The light source is concealed behind a small boy, whom we see entirely in silhouette, and the scene appears to be both a serious lecture and a popular demonstration, combining conscientious note-taking with the presence of small children. A heavy curtain and some weighty tomes add to the gravity of the context of the painting. Attempts to identify the sitters are neither conclusive nor very interesting, but it is possible that Whitehurst and Darwin may be depicted in the painting.

An experiment with a bird in the air pump is more complex and more concentrated, enclosing its participants in a large sweeping oval shape, and balancing the concealed light-source at the centre of the composition with the moon, seen through the window among clouds; recent cleaning of the painting has added more detail to the background of the painting, and lessened its wobbling effect.

The air-pump had been invented a century earlier by Otto von Guericke, and was developed in England by Hooker, Boyle, Hawksbee and Smeaton. By the middle of the eighteenth century it was the central apparatus in most experiments to determine properties of gases, and in particular the effect of a vacuum on living creatures. In his notebook reporting his experiments in the 1670s, Robert Boyle describes one, dated September 9th, 1670, thus:

We conveyed into a receiver, capable of holding about 4; pints of water, a lark, together with the gauge, by the help whereof we pumped out of the receiver of the air that was in it before; then heedfully observing the bird, we perceived it pant very much, so that a learned physician (from whom I yet dissented), judged those beatings to be convulsive; having continued thus for a little more than a minute and a half, the bird fell into a true convulsive motion, that cast it upon the back. And although we made great haste to let in the air, yet before the expiration of the second minute, and consequently in less than half a minute from the time immediately preceding the convolution, the lark was gone past all recovery, though divers means were used to effect it.

The procedure was soon refined until the demonstrator was able to judge how long the captive bird could be kept in a partial vacuum, and still be capable of being revived when the air was restored to the receiver. This is clearly the subject of Wright’s painting, although a dramatic tension is set up by the possibility that the lecturer may misjudge his timing and the bird may die: the effect of this tension humanises what had by then
become a fairly mundane routine. That such demonstrations did not invariably succeed is evidenced by a letter written in 1763 by Reverend Thomas Twining to his younger brother Daniel, commenting on the latter's new-found interest in such experiments:

When you have an air-pump, I shall thank my stars that I am not one of the kittens of your neighbourhood! – alas, how many poor, innocent dumb creatures will have their breath sucked out of their bodies, and dye in vacuo to satisfy your rage of experiment!

James Ferguson, writing in 1760, likewise seems less hopeful of the outcome of this experiment:

If a fowl, a cat, a rat, mouse or bird be put under the receiver, and the air be exhausted, the animal is at first oppressed as with a great weight, then grows convulsed, and at last expires in all the agonie of a most bitter and cruel death. But as this Experiment is too shocking for every spectator who has the least degree of humanity, we substitute a machine called the lungs-glass in place of the animal; which, by a bladder within it, shows how the lungs of animals are contracted into a small compass when the air is taken out of them.

Christopher Smart, in his *Jubilate Agno*, makes a hopeful metaphor of the air-pump, and also indicates a familiarity with the machine on the part of his audience:

For the AIR-PUMP weakens and dispirits but cannot wholly exhaust.
For SUCKTION is the withdrawing of life, but life will follow as fast as it can.
For there is infinite provision to keep up the life in all parts of Creation.

Wright's painting depicts a variety of response to the demonstration in progress – fashionable interest shown by a young couple who appear to find one another rather more interesting, meditative thought stimulated in an older man, an objective concentration by the young man seated in front of the table, the two varieties of subjective human response (to the possibility of the bird's dying) in the two children, and the obsessive, wild-eyed attitude of the demonstrator (or 'philosopher') himself. The ambiguity of the action of the boy on the right of the picture adds to the dramatic tension of the whole: prior to the cleaning of the picture, most accounts had him drawing the curtain across the window in order to shut out the light of the moon, an image with powerful poetical preceidents, but since the picture was cleaned it is clear than the boy is holding a rope that is attached over a pulley to the empty birdcage. But is he raising the birdcage (as if to imply that it will not be needed, the bird being about to die) or lowering it (to receive back the bird once it has been restored to life)? Either seems possible, and the very direct glance the boy gives the viewer invests his action with a significance.

One point that has to be made is the strange and disturbing presence of the demonstrator himself, the philosopher. Whereas the presiding figure in the Orery has the benevolent air of a wise schoolmaster, the demonstrator in the *Air pump* looks like a magus, a conjurer, an alchemist, with his dishevelled appearance, long hair and strange gown, and his lined face dramatically lit from below. There is an echo in his appear-
The other objects on the table suggest that the air-pump experiment is one of several that are being demonstrated for the benefit of the small and varied audience. A set of Magdeburg Hemispheres lies to the right of the air-pump: these were hollow metal hemispheres which were placed together with a leather ring acting as a washer between them, forming a sphere; the air in the sphere was drawn out through a valve, and they were then handed to the audience with the challenge that they attempt to separate them. A pair of spectacles lies on the table, a glass bottle filled with a translucent liquid and a sponge on a stick - this latter was presumably used to clean the receiver of the air-pump, but in the composition of the picture it acts as a partial concealing-device for the light-source, diffusing the light and softening it in tone. By avoiding either a direct view of the light-source, or a sharp silhouette concealing it, Wright diverts the viewer's attention away from the light-source to the observers and the bird in the glass receiver.

In the years between the Orrery and Air pump pictures, and his Italian journey of 1753-5, Wright painted a series of industrial interiors, combining a realistic depiction of people working at night close to a bright source of light, with neo-classical architectural detail and a certain degree of idealisation. It must be remembered that interiors lit by only a candle or a small lamp, and otherwise filled with deep shadow, were a familiar part of the lives of all but the most wealthy in Wright's own day, and up to the early years of this century - this is not just a Romantic construct.

Two version of The blacksmith's shop of 1771 depict a half-ruined building that appears to incorporate fluted pilasters as well as rough brickwork; a white-hot bar of metal provides the source of light, again softened by contrast with the light of the moon, seen surrounded by cloud (this had by now become as much a personal signature of Wrights as was Whistler's butterfly).

An iron forge, dating from 1772, again has a white-hot bar of metal as its source of illumination, and the workman is depicted as a heroic figure. An iron forge seen from without, dating from 1773, blocks out the light-source by means of a stomping silhouetted figure, and contrasts the illuminated interior with the surrounding darkness; the building is seen entire, with one wall cut away as in an architect's drawing. This series of paintings represents the 'cottage-industry' stage of the Industrial Revolution. Making due allowance for the demands made on realism by the picturesque mode, these paintings show a small-scale industrial activity, still largely domestic, utilising out-buildings or sheds, generally isolated from other habitation.

During his Italian tour, Wright sketched two subjects which, on his return to England, were duplicated by him in a score or so paintings each, both of them being central to his interest in studying and reproducing dramatic light-effects in an exterior setting - the Girandola (the annual fireworks display from Castel Sant' Angelo, reflected in the 'Tiber'), and Vesuvius in eruption (though records show that any eruption Wright may have seen during his stay in Naples was distinctly minor).

On his return to England, Wright concentrated largely on portraiture, although his interest in scientific and industrial developments and in dramatic light effects found occasional expression in his views of Arkwright's Cotton Mills, by night and by day; these two paintings, dating from 1782 and circa 1790, reveal an awareness of new developments that were altering the English landscape beyond all recognition.

Wright's position in the history of English painting still needs to be re-examined; his portraits form a link between the school of Kneller and Hudson, and the contemporary portraits of Reynolds and Romney (although his sitters, mostly local and parochial, were simply not eminent enough); his landscapes, particularly the late views of the Lake District, bear direct comparison with those of Richard Wilson, and his genre paintings ask to be placed in context with contemporary works by Mortimer, Fuseli, etc. But his handful of paintings of scientific subjects remain unique - a rare attempt to understand and interpret a world which, from the turn of the century, ceased to speak the same language as that of artists and the public in general. Wright's paintings mark the point from which the paths began to diverge, the point when the homogeneity and contingency of the social fabric was about to fragment and separate the artist from the quotidian world of work and industry.

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