Consumption and the World of Goods

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Presuming images and consuming words: the visualization of knowledge from the Enlightenment to post-modernism

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The production, management and consumption of a flood of bytes spilling out of world-wide databases and computer networks has become a universal obsession. It is not accidental that this overwhelming volume of information – likened to drinking from the proverbial firehose by coincidence with a mounting concern for bolstering and maintaining language ‘literacy’. Yet the simplistic identification of only verbal skills with a properly ‘humanistic’ education is profoundly disturbing. It does not take into account the conceptual and perceptual revolution occurring in the presentation of knowledge since the eighteenth century. Equally limited, to my mind, is the notion that educational visualization should use images merely to convey information. This opinion holds that the illustrated data derived from graphics is important, not the image itself. Inscribed into this equally linguistic bias is the false severance of how things are presented from what they express. Anyone dismayed by the concealed manipulations often operating in broadcast journalism or political advertisement must see the danger inherent in such a division.

However briefly, I wish to show that present-day written forms of communication were already being challenged, and even swept aside, in an earlier era. My heretical point-of-view is that this turn of events does not necessarily represent cultural decline or a great social evil. In fact, it provides a splendid opportunity for exiting, at last, from Plato’s Cave. The newly found and ubiquity of images calls for teaching innovations and for altering venerable, but unexamined, epistemological models and textual metaphors (‘codes’, ‘alphabets’, ‘letters’, ‘spelling’, ‘grammar’). I believe that only a serious training in visual proficiency will allow us to assimilate, integrate and understand a ‘holographic’ and multi-disciplinary reality increasingly filtered, transformed and synthesized through three-dimensional imaging. Furthermore, as the battle over the reauthorization of the National Endowment for the Arts and the National Endowment for the Humanities is proving, those of us involved with the visual arts cannot be content simply to champion freedom of speech and to produce or consume innovative artistic works. We are also responsible for articulating to a wider public that understanding the communicative modes and tactics of images is essential to a thorough, humanistic education. We must strive to develop future directions and strategies to prepare broad and informed constituencies for technology’s ever-advancing power to make the invisible visible.

If our post-modern times are indeed pre-eminently visual times, they can be set in valuable relief against an earlier chapter in the history of visual communication. For it was precisely in the eighteenth century that the persisting rationalist philosophical attitude towards images hardened into ‘systems’. Such theories claimed that pictures and perceptual apprehension, in the words of Baumgarten, were an inferior gnosis. This consumption of presuming and popular images by an official hermeneutic of higher interpretive words was evident in the academic devotion of pictures to an ornamental, or merely craft, status when bereft of a superior non-visual ‘method’. Paradoxically, but not surprisingly, this attempt at textual control occurred in a century unprecedented until then for its sophisticated visual practices, technological inventions and sheer pictorial production. The prejudicial implications of continuing to see images linguistically, that is, as a lesser, transitory and illusory form of written communication, are still playing themselves out.

I

Early twentieth-century modernism was characterized by printed manifestos, by a conceptual abstraction, by painted word games, by alphabetic and numbered collages and calligrams, by what one contemporary architectural critic has termed ‘the writing on the walls’. Conversely, the late twentieth century is the media age of vocal, aural and, above all, optical rhetoric, of television cinematics and video spectacles, of interactive computer displays, of performance art, of procedural art, of fractal and math-art, of holography and of that hyper-advertisement, the block-buster exhibition. We are awash in entertainment and information presented sensorially. On the domestic front, it is now possible for the average person to assemble a small-scale television station within his or her four walls. New ultra-stereo wrap-around systems coupled to gigantic screens seem to be fostering a society of Romantic solitaries communicating with other electronically generated spectres. On the biological and cosmic front, the Human Genome Project and the Hubble Space Telescope are on the verge of spewing forth data by the gigabyte. Imaging lies at the heart both of this private creation of evanescent ghosts and the public decipherment and cataloguing of reams of evocative facts and figures that would otherwise remain uninterpretable. Instead of sequencing three billion pieces of DNA, scientists – relying on a visual metaphor – now favour sketching out a ‘road atlas’ of the genome indicating genetic markers or distinct biochemical features. Yet the overarching human need to find meaningful visual patterns, whether in the living of a life or the conduct of research, has not been seen as a positive aspect of the broader drive towards the visualization of knowledge initiated during the Enlightenment. Giving shape to, or mapping, experiential confusion requires learning and special skills. The history of the general move towards visualization thus has broad intellectual and practical implications for the conduct and the theory of the humanities, the physical and biological sciences, the social sciences and, indeed, all forms of education – top to bottom.

The multiple ramifications of this far-ranging aesthetic process of opticalization rest submerged in a culture that, despite its clear reliance on a spate of images, remains ironically mired in a deep logoscentrism. By logoscentrism I mean that cultural bias, convinced of the superiority of written, or ‘propositional’, language, that devalues as unknowing sensory,
affective and kinetic forms of communication precisely because they often baffle verbal resolution. To produce a new world of perspicuous and informed observers (not just literate readers) will, I believe, require a paradigm shift of Copernican proportions. As more and more people are producing and consuming their own productions, and as cable television and video cassettes further particularize and decentralize messages, the need to sunder together a shared culture becomes greater. These marvellous and sophisticated contemporary gadgets for watching belong among the technological apparatus characterizing a long evolution in perception. Knowing something about the common myths surrounding images, their past uses and structures, would help to forge models for future interactive communication as the old linguistic hierarchies fracture. In the era of personal broadcasting and the demassification of visual consumption, perceiving should be given at least as much, if not more, attention than reading. These activities (as we are increasingly learning from the neurosciences) are not merely interchangeable functions or skills. Interconnected (or possibly orchestrated in a network), yes; the image subsumed or generalized to extinction in a number- or text-based logic, no.

Two major periods of production and consumption will be juxtaposed for their mutual illumination. First, I offer a brief overview of the visualization challenge facing us now. Second, I identify telling instances of the idea of communication as informing display developing in the early modern period. Like the twentieth-century electronics revolution, eighteenth-century technology encouraged the privatization of pleasurable beholding. While not yet making it feasible for people to spend more time at home and less time going to their places of work, shops or theatres, it none the less initiated a consumer-driven flexibility in visual communication. New graphic techniques widened the possibilities of articulation within a given medium and provided greater subjective power to what one was able to see. Eighteenth-century aesthetic and technological innovations, and the visual skills to analyse them, thus have much to teach the twentieth century about the presentation, construction and interpretation of graphical messages of all sorts.

If one were to raise a periscope to survey the contemporary sea of visual information inundating all disciplines, what might one behold? I call attention to a few salient outcrops. Understanding their significance within the current structure of knowledge is enhanced by knowing that they still reverberate with allusions developed in the early modern period. The burgeoning field of neuroscience has led to the ‘spatialization’ and visualization of the brain’s concealed terrain in a kind of neural photography. Three examples must serve to highlight the ‘theatricalization’ of mental phenomena in apparitional scenic events. Computer simulations of the brain’s interconnected nerve cells provide neuroscientists and cognitive psychologists with literal insights into the dynamic processes by which the mind thinks, senses, feels. Medical imaging devices transparently and non-invasively ‘open’ opaque surfaces permitting physicians to gaze into formerly hidden depths. X-ray tomography (CT) exposes bone structures. Magnetic resonance imaging (MRI) gives a cross-sectional picture of the architecture of the brain at different levels or ‘cuts’. Computers are then used to reconstruct in visual form a three-dimensional translucent display in rotation, or a hovering ‘transparent brain’. Its inner parts can be dissected at a touch of the keyboard by stripping away the skull’s layers electronically. Difficult craniotomies can thus be ‘rehearsed’ visually. Positron emission tomographic (PET) scanners provide ‘portraits’ of the brain as a whole caught in the act of thought. This instrument is a kind of neo-Albertian window on mental operations, and by its means we can view clairvoyantly spatio-temporal patterns of activity arising from neural performances. Mobile chromatic shapes map various cellular and electrochemical properties of the brain involved in diverse sensory and affective processes. Most spectacularly, the superimposition of PET and MRI (Plate 22.1) is leading to the establishment of detailed three-dimensional correlations between specific functions and their location in the brain. As with widespread genetic screening, these imaging breakthroughs are fraught with ethical concerns. The sombre question arises whether insurers, employers and other institutions might be lured by the physiological fallacy and try to predict, and exclude, through prognostic tests individuals who carry the ‘wrong’ genes or mental ‘defects’.

Spectacle has also entered the domain of physics. The major American sculptor Kenneth Snelson, in his essay-portrait of the atom, longed for the day when computer graphics might allow us to sit ‘in a theater and observe the true wonders of the microphysical world’. In a three-dimensional project which came to fruition only because of computer simulation, Snelson went beyond any currently realizable atomic model. He conjectured about the ‘atomic condition’ as he saw it, from within, from the electron’s perspective, not from the physicist’s external and bombarding point-of-view. He thus challenged the thesis held by the founding fathers of quantum theory. These pioneers of the invisible claimed that no pictorial representation could be devised to permit an unmediated description of the quantum world filled with untrackable quarks, interactions among electrons and mysterious quantum exchanges among particles. The mathematical theory which de Broglie, Bohr, Schrödinger and Heisenberg established aimed only to describe systematically the response of apparatus. Yet Snelson’s gossamer computer panoramas poignantly harken back to the Enlightenment’s desire for diaphaneity. Like Piranesi, and a host of early modern antiquarians, he desired to render perceptible realms declared to be unperceivable directly.

Super-computers thus permit us to see internal local external worlds anew. Again, it is dynamic visualization that can transform an incomprehensible data file into more than a meaningless string of bits and pieces or an infinite series of unrelated fragments. Consequently, many astrophysicists and radiologists, meteorologists and engineers, have begun to decry the widening gap existing between the accumulation of raw numbers and their transformation into a visual format enabling practical analysis. Thunderstorm modelling and the animation of planetary magnetospheres represent only two small instances for making the larger case that visualization of complex data – otherwise literally unimaginable – is now critical to the advancement of many fields of science. In addition, there is a renaissance of widespread serious interest in the use of graphics in the mathematical field of statistics. It seems that the science of the measurement of uncertainty and the calculation of probabilities no longer spurs aesthetic concerns and user-preference evident in well-designed charts and histograms. Moreover, and more importantly, pictorial tools for the discriminant analysis of multivariate data are being created. Chernoff’s ‘heads’, or schematic faces operating on the principle of much in little advanced by eighteenth-century caricaturists – prove that statisticians, like the rest of us, need succinct images to help them think about multiple and heterogeneous variables.

Legal practice, too, has become increasingly ‘cinematic’. Trials are now routinely seduced by reliance on so-called ‘demonstrative evidence’ in the form of videos. The filming of everything from dramatized mugsshots, to ‘a day in the life’ of a victim, to the re-enactment of crime, gives the old problem of the nature of accurate witnessing and judging a new urgency. The ambiguities surrounding eyewitness testimony, specifically, are set in sharp relief. How does the law establish objective visual criteria for simulating a ‘performance’ meant to
capture 'what really happened' during a transitory event viewed by many subjects, seen from different perspectives, under a variety of emotional conditions, and remembered differently? In short, what constitutes reliable visual evidence? How does the jury member or the trial lawyer, for that matter, recognize distortion, slanting or bias, not only in the verbal account given by witnesses but in the film or representational version of that account? Given the lavish increase in sophisticated court exhibits, in scale models, multicoloured charts, computer simulations and multimedia 'shows', how does a visually naive and unsophisticated jury distinguish responsibly between a message corresponding to the complexities of the actual experience and contrived propaganda advancing a specific, but 'objectively' disguised point-of-view? As G. C. Lichtenberg, the superb eighteenth-century German commentator on Hogarth's graphic works, remarked, the great hermeneutic problem in life lies not in ferreting out truth or lies but in exposing 'very clever false interpretations'.

But the paradigmatic post-modern visual condition - the dissociation of hand from eye, cause from effect, stimulus from response, skill from signal - is to be witnessed in the business world. It is at the site of desktop workstations and farflung databases where the Enlightenment's fundamental contribution to the epistemological structure of the late twentieth century is most evident. In the corporate Platonic cave - a windowless, mirrored or darkly-glazed high rise - smooth and shiny surfaces reflect simulacra. The new workplace is an information-rich organization in which once physical labour and tangible objects related to administrative, productive and personnel activities have become etherealized into chromatic apparitions weightlessly floating across a computer screen. This 'New Immaterialism' was set in motion by Bishop Berkeley. The production of intangible 'liveness' by the media, and the consumption of the phantasmatic by a broad public, is part of a greater rapid and daily dematerialization by which manufactured objects evaporate into 'unreal' or evanescent appearances through the intervention of circuitry. In a world where information is just there, users increasingly neither know nor care where the free-floating and autonomous debris originated.

This present-day sense of the societal ambiguity of technology, accompanied by mixed feelings of excitement and unease, returns us squarely to the Enlightenment. The eighteenth-century preoccupation with visionary links was linked to an awareness that history had many potential realizations. Eluding the certainty of logical exposition, the total look of a bygone civilization could only be imagined or visualized through chance, partial discoveries. Contingency, variability and fluctuation - the signs of cultural unmooring - were endemic to a period experiencing an explosion of discontinuous and odd finds demanding representation. Optical classification of the strange, the scattered and the singular, in turn, was inseparable from the technological reproductive innovations needed to simulate them. Among the consequences of this dual development were the first sustained reflections on the possibilities, subtexts, power and beauty of visual information and on the importance of visual knowledge of all sorts. The age's chief aesthetic theorists - DuBos, Caslys, Diderot, Falconet, Addison, Shaftesbury, Hogarth, Reynolds, Winckelmann, Lichtenberg - drew an important distinction that is largely forgotten by twentieth-century verbally shaped disciplines. With great sophistication, these thinkers differentiated between imagery used as equivalents to discourse, or as illustration, and as an untranslatable constructive form of cognition, or as expression. Broadcast journalism and we who view it, for example, have to come to grips with this distinction in that we must fully understand how to co-ordinate and interpret not only what people say, but how they say it, that is, the style of what they observably do. The art of visual conversation is aided by a format that encourages speakers seated face-to-face to 'perform' their arguments at length. Such communication calls upon the discernment of an audience that, although absent, is urged to participate as if it were present.

Visual knowing entails viewing any problem in three dimensions, at many different levels of detail and from various perspectives. It is the result of an active and constitutive expression that makes visible and intellectually graspable impalpable, ambiguous, mixed, intricate experiences intractable to numerical or linguistic reduction. Conversely, illustration is the didactic pictorial imitation of a preformed, prepackaged simple quantum of verbal information easily ingested by a faceless public. The equally anonymous textual message hides the fact that there is a sender shaping the medium. Expression, on the other hand, as a dynamic, interactive and experimental procedure for the individual re-employment of an 'authorised' perception, brings about enlightenment. Understanding emerges progressively. It is the result of an investigative process as each viewer struggles to relate the medium-suffused message to his or her own experience. Such interactive graphic encounters do not illustrate. Rather, they set before the eyes, or disclose, the complexity and lack of clarity of phenomena that are not yet well understood.

It is on this major, and profoundly educational role of imagery that I wish to linger. Images are not only architectonic, they are iconoclastic in destroying specious certitudes and in revealing ignorance or the limitations of human comprehension. The unique perspective of the eighteenth century on the affective and pleasurable training value of pictures, coupled with the rise of a special technology for visualization, has much to teach the modern viewer (who has forgotten, or is ignorant of, these skills) about the analysis of contemporary visual material. Unlike the intervening age of photography which unwittingly fostered the illusion of neutral supports for information, the reception of 'reality' without toll and the self-explanatory nature of sight - the eighteenth century, I believe, initiated the pedagogical struggle to comprehend the full power of visual arrays now realized in our twentieth-century culture of pictorial information. Three examples, drawn from the varieties of visual history created during the Enlightenment, must suffice to demonstrate how an understanding of the processes that brought about past visual acuity might contribute to forming more astute observers of the present complexities of life. They are: the reconstruction of past cultures; the exhibition of biodiversity; and the externalization of somatic experience. In each case, the determining desire was to get a glimpse of the unseen. This held whether the goal was to reinstate a time different from now, long-extinct assemblages of organisms or the hidden shape and patterns of thought.

The desire to attain a visual stratigraphy of the past elicited from the tireless Venetian etcher, Giambattista Piranesi (1720-78), one of the greatest graphic innovations of the age. His radical experimentation with etching, a corrosive chemical procedure for 'biting' a copper plate, was matched only by William Blake's later revision of reproductive engraving. The English poet-illuminator punningly termed his own acid stereotype process the 'infernal' method because it required printing, or exposing to light, what was literally buried beneath an impervious ground, or covered over by drawing. Relying on the same surface and depth analogy implicit in the intaglio procedure, Piranesi performed perceptual rescue work. He systematically unearthed the maligned corpus of Italian antiquity. Unlike modern archaeological restorations, Piranesi's paper excavations in black and white did not despoil eroding monuments of their patina (Plate 22.2). Thus the 'suffering' surfaces, stuccos, ornament and even aging dirt of the tombs and cashier urns lining The Appian Way, were left
From the countless walls, temples, baths and amphitheatres of the Antichità Romane (1756), to the Republican and Baroque monuments of the Delle Magnificenza ed Architettura de' Romani (1760), to the subterranean chambers, cisterns and corridors of the Descrizione e disegno dell' emissario del Lago Albano (1762), Piranesi uncovered and retrieved the decaying body of Rome. With scalpel-like wielding of the etcher’s needle, he applied surgical procedures (learned, I suggest, from medical illustration) to turn the still-living fabric of architecture inside out (Plate 22.3). Furthermore, he appeared to be following Vesalius’s lead. The great sixteenth-century anatomist’s emotion-laden attitudes had recently received engraved rein-
D De Humani Corporis Fabricia. The anatomist’s mused dead were mobilized by the architect into lithic leporello. Bloodied bodies became analogues for hollowed-out ruins, for an eviscerated, but still potent, antiquity. As an intuitive explorer of monuments, he closely resembled the great analyst and extrapolator of the human body. Vesalius was the first to unite the separate functions of lecturer, dissector and practical demonstrator. Similarly, the artist-
historically contingent phenomenon that was Rome. As patient assessor, the Venetian etcher’s eyes to follow (Plate 22.4). In this visual and manual process of fleshed-out, not simplistic, showing, Piranesi, like the Renaissance anatomist and his important eighteenth-
century successors, put his own hand to the business of demonstration, thereby engaging the beholder.

Further, the intaglio process itself allowed him to take ‘physiological’ soundings. In the Section of the Tomb of Alessandro Severo, the superficial or deep registration of various architectural ‘issues’ to longer or shorter exposure to acid, to more or less delicate or rough stimulation by the etching needle, clarified the complex vertical structure (Plate 22.3). Piranesi’s experimental method for visualizing the ‘irritability’ of the ancient fibres on copper leaves belonged to the inductive mentality determining the practices of such Hallerian contemporaries as Felice Gaspar Ferdinand Fontana (Plate 22.5) (1730–1805) and Leopoldo by palpably probing and poking beneath the veneer. Material digs and jabs literally traced the motions of raw muscle as well as the changes occurring within exposed stone and mortar. The actual arduous and lengthy process of physical exploration and visionary invention was cent prints (Plates 22.2 and 22.3). Thus the piecemeal and medley activity of retrieval was experienced corporeally by the viewer in the time spent looking, searching and visually wandering among the membra disjecta of ruins.

The power of Piranesi’s expressive hieroglyphics lay in abbreviating and synthesizing complex spatio-temporal events without blurring particular divisions (Plate 22.6). The consequences of this interactive approach for visual knowledge was that he broke down longstanding classificatory schemes emphasizing uninterrupted sequence, similarity and homogeneity. The odd, disruptive and heterogeneous appearance of these images suggested that supposedly canonical monuments were simply the accidental results of what had been left over or dug up. Piranesi carefully demonstrated, and asked us to evaluate, how his subjective taxonomy might serve as a guide for ordering a lost world. Yet this vision of totality was always provisional or alterable through the discovery of new remnants.

What Lessing and his followers never understood was that the expressive ‘spatial’ arts do not seek to represent time. Rather, they prod the observer to experience time by inviting him actively to engage in the construction or deconstruction of the image. From this perspective, Piranesi’s ‘surgical’ methods of demonstration are revealing. These included, first, the use of accidental sections or ‘wounds’ gaping in deteriorating masonry. Thus the decaying pilasters in the interior of the Portico of the Pantheon were made to exhibit the details of their internal structure (Plate 22.4). Like Fontana’s anatomical waxes containing nesting parts, the areas for intensive study were controlled and highlighted (Plate 22.5). Second, multiple images were displayed limb-like on the same plate to avoid confusion and to demonstrate conflicting information (Plate 22.7). Third, this candid strategy offered the viewer options through the indication of hypothetical or ‘scarred’ solutions when a structure was partially buried under accumulated debris. Consequently, Piranesi responsibly sutured the certain to the conjectural, thereby revealing the sealed nature of his vision. He trained the observer, as he trained himself, in the fine art of probability. He taught the viewer — non-didactically and enticingly — to estimate the unknown by knowledgeably judging a maze of seemingly isolated and dispersed remains. In his spatial and temporal series, Piranesi began by anatomizing, or visually separating, parts, and ended by organically synthesizing into a heroic span of views what he dismembered. He thus continues to help the modern beholder to reintegrate and contextualize historical fragments into the living totality or evolving urban context of Rome.

Piranesi’s expansion of the orthodox boundaries of Roman history and classification resulted from his showing the dramatic effects of contingency operating within material culture. He made manifest, instead of concealing, the alien look of a complex antiquity known only through essay, and even extinct, descendents (Plate 22.2). Displaying the fragments of a broken lineage, of course, had been central to collections of all sorts since the Renaissance (Plate 22.8). The eighteenth-century scientific quest for origins, ancestry and genealogy, however, was permeated by the conviction that images possessed a unique capacity to teach, to uncover the relation of known parts to an unknown whole. The creation of galleries, museums, libraries and natural history cabinets was grounded in a visual encyclopedism persuasively encouraging cross-referencing in a disparate public that strolled and paused before minute details and eye-arresting features (Plate 22.9). Such visual searching and bodily travel, roaming from the insignificant to the significant and back again, prompted mental locomotion. The fluid this’s and that’s of a rising phenomenal tide were exhibited, and kinetically encountered, as the flotsam and jetsam of an upheaved and changing world that they, in fact, literally were (Plate 22.10).

Mimicking the discontinuous Wunderkammer, or magical-display of memory, this pragmatic form of historical reconstruction exposed uncertainty. It disclosed interruptions existing in contemporary systems of categorization. Like Piranesi’s etching style, the exhibiting method was juxtapositional. Unlike the false coherence implied by the sequential ‘begats’ of chronicles, annals or narratives, the multivariate gatherings of artefacta and naturalia were simultaneously accessible to sight. They thus provoked an immediate awareness of the miscellaneous and chance nature of the act of finding itself. These ill-assorted assemblages demonstrated how we learn painstakingly by gathering and arranging bits and pieces in the dark. There is always more evidence, always another, and better, mode of organization. Stray specimens of cultural and natural debris: portraits of historical figures, trompe l’ oeil still lifes, exotic species, scientific instruments, ‘sports’ of nature and marvels of metal casting, jostled another on charged tables. Instead of concealing the absence of connections, the layout or pattern summoned the observer to fill in the gaps.
This combination of recreation and research was intimately tied to the dialogic aspect of visualization. The mix of popular fun and serious scholarship, characterizing the display of collections, was especially in evidence in the spectacle provided by fossils. Their drama was significant, our contemporary non-anthropocentric environmentalist aesthetic originated in the eighteenth century when intrinsic value, and even vitality, was first widely ascribed to the record of its ongoing transformation in pictograms. Graphic granite bore decipherable developmental marks and traces. Dendritic and map agate carried surface landscape phenomena hierarchically exhibiting the record of their internal growth and material organization.

Through the broad dissemination of stone engravings, such as the Swiss Jean-Jacques Scheuchzer's natural-theological Bible, fossil impressions were consumed as instructive visible records of otherwise invisible events (Plate 21.11). Geological concepts such as are as the slow passage of time, received tangible and perceptible occurrence. The team of Augsburg engravers responsible for Scheuchzer's eight-volume work created poignantly realistic reliefs of fossil fish that obliged the eye to struggle. To discover form, the intellectual experience that eluded words. The viewer, like the performer, supplemented the non-finite. Fragile plaques broken from a primitive ocean floor were venerated performances excerpted from a larger spectacle graspable only in segments. These lithic picture-sculptures offered access to an otherwise unknowable past. As the user's eye 'handled' unfamiliar objects, he or she also learned them. Simultaneously, the intricately organized and labelled plates encouraged diverting interaction. They depended upon the viewer's playful, hide-and-seek engagement with extant and extinct organisms (Plate 21.11). But the union of laboratory science and diversified aesthetic experimentation was perhaps best served in the great technological innovations of colour printing. This evolution in creating chromatic anatomical reproductions that were 'true to life'. In the opinion of rival, J. C. Le Blon. The latter's multiple plate mezzotint, or improved three-colour process, facsimiles of full-colour pastels finally achieved the difficult co-ordination of Newton's spectrum on eight plates. French science was thus given the technology for visual cognition. Charles Melchior Descourtris's method of superimposing a limited range of colours, provided transparency revealing incrustations. More importantly, I suggest that it was specifically methods to conceptualize, that is to visualize, and thus actually to lay bare the hidden processes of crystal and mineral formation. Analogously, it is doubtful whether either century without the invention of aquatint. This Anglo-French resin-based chemical process of wetten but let one contemplate in detail the vagaries of cloudy weather.

For the Enlightenment, powers of discernment, visual acumen and the development of probing habits of sight were requisite skills, and not just in the domain of natural history. Perspicacity was the primary literal and critical tool for delving into the architecture of the body. Art and medicine shared and, indeed, still share somatic metaphors of sign, symptom and hand or touch. Their tangible procedures or material craft intermarried one another on many fronts. None, however, was more central than the need to perceive or make public that most private and most elusive space of all, the human interior. To return to my opening premise I want briefly, and by way of moving towards a conclusion, to develop a contrast in this biological sphere between a verbal and a visual way of knowing.

One strategy for reading hidden terrain (and I intend the linguistic analogy) was derived from rational philosophy (Plate 22.13). Dissection interrogated the inert body by violently laying it bare - much like the deductive disemboweling of a coherent thought by a syllogism. The aim of the anatomical method, and I use the term now with its broader epistemological connotation of measured vertical penetration, was to get at a fundamental truth. This important essence lurked beneath a merely visible, unimportant appearance or trivial surface. Such an invisible nugget of transcendent value, it was believed, could be manifest only through calculation, or the division of the organism into computable parts. The analytical and separating 'knife' of reason successively descended from the epidermal (appearance), to a subcutaneous myology, to attain, finally, the bedrock of bone itself (character). This slicing resembled the parsing of a sentence to arrive at clear meaning or the cutting of a corpse to reach the seat of life. One example, taken from particle physics, will have to stand for the ubiquity of this epistemological method for forcible entry in our contemporary culture. I quote Roy Schmieder, the Harvard physicist, on the importance of the new supercolliders in the search to make apparent the delicate traces of ghostly particles. 'We're going in [to the fundamental particles] with wrecking bars and sledge hammers to try to find the treasure.' What a contrast this rational-linguistic system of attack makes with visual cognition embodied in non-invasive and non-destructive medical probes (Plate 22.1). Recall that these instruments for the remote 'laying on of hands' transmit ghostly streams of light and dark messages requiring a new science of sensory detection. To make biological knowledge from copious symbolic information, the medical connoisseur of the future, like his artistic counterpart, will have to know how to decode at a distance. He must learn to interpret the infinitely nuanced and ambiguous phantasms emitted by the living human organism as they painlessly float in space. Conversely, the anatomical, lexical and logical mode of knowing tends to render insensate the objects of its scrutiny. By splitting, fragmenting and isolating biota in frozen moments, the procedure is antithetical to the mutable and metamorphosis life processes it purports to reveal.

Both methods entailed psychological ramifications. The outer features of the body, especially those located on the face, were used since antiquity to infer an individual's unique, but masked, history. Yet plumbing the character, essence, temperament, spirit, aura or 'inner life' of a person from a marked exterior has proved as difficult as pinning down elusive prions, zoon particles or the Higgs particle. Physiognomy and phrenology involved reading the hidden properties of the soul and the intellect. The analysis was anatomical, depending upon the supposed legibility of fixed features and the bony topography of the head. Significantly, mental augury was raised to scientific status in the late eighteenth century through the publications of Johann Gaspar Lavater and Petrus Camper.
forecasting, such logocentric methods extracted semantic meaning from isolatable looks. Thus they continue to have profound implications evident not only in the screening for genetic predispositions, but in cosmetic surgery. Plastic surgeons use computer modelling in which noses, lips or eyes are so many recombinant spare parts. These biological fragments stock a seemingly infinite database of corporeal 'ready-mades'. This 'physiognomic' application of electronic imagery thus confirms Marcel Duchamp's prediction that the category of 'ready-mades' would eventually embrace the entire universe of objects. Now that the body has become a constructed artefact, the client may select his ideal and ageless persona, frozen in time. Removable is also an option. Wrinkles, personal past. Parenthetically, this cosmetic development appears to follow logically from the level, the application of a biological *ars combinatoria* conjures up visions of sperm banks and decontextualized, faceless couplings occurring in petrie dishes, or otherwise at a remove from particular human bodies.

Similarly, in nineteenth-century physiognomic analysis, the body became any body. This abstract abstraction was compounded from excisable qualities. Separable properties or characteristics were thus endowed with a meaning or value irrespective of the individual context in which they inhered. By contrast, the pathognomic theory developed by Georg Lichtenberg disputed the establishment of a presumed correspondence between timeless, the visualization of mutable chromatic appearances. The full range of human activity was to seize the method – enacted with paint and brush on springy and responsive canvass, or fingers pressed in clay or burin and needle exposing metal – aimed to sort out feelingly the transitory particular body's surface should be seen as analogous to the personal style or expressive could train himself and the willing viewer to perceive and make visible the invisible motions of the heart.

II

In sum, my point has been that we have been moving, from the Enlightenment forward, towards a visual and, now, an electronically generated, culture. Since the time of Plato, however, this visual culture and its magician-creators suffered from a low status. The Platonic analogy is especially apt in view of the contemporary proliferation of technological wizardry and the resulting bodilessness of things. The shadowy video screen and the ghostly computer semblance remind us of the philosopher's consignment of fantastic or sophistic appearances – associated with non-existent or false objects – to the bottom of his divided universe. He esteemed such bewitching phantasms, or dim visible, to be as indeterminate as platonic followers, in particular, located these insubstantial and overwhelming 'illusions', along with fluid fictions in general, in a subterranean cavern. That distant sensory darkness was situated at the antipodes from the true and sunlit intellectual verities (archai) accessible to rational philosophy. But it is precisely these unseizable images – unlike delusory 'clear and distinct' words or 'reliable' numbers identified with reason – that, paradoxically, do not lie. As kinetic, probable and interactive forms of expression, they openly attest to the conjunctural and fluid nature of life lived in the middle zone. They help us to organize and make sense of that floating world, or *milieu*, stretching considerably below certitude and somewhat above ignorance.

I believe, then, as imagists it is time we look to another quarter (the structure and activity of visual cognition itself) both for our praxis and our methods. We must frame a unified theory of imaging from the intersections of the old historical arts with the new optical technologies. True interdisciplinarity would be grounded in the acknowledgment that perception (*aisthesis*) is a significant form of knowledge (*episteme*), perhaps even the constitutive form. It is also time to assert that innovative collaboration can occur only in a community of intellectual equals. Moreover, creating such a hybrid or composite art–science of visualization would help to avert a broader social and cultural danger. It offers the model for a concept of learning that challenges our remaining unskilled and naive ingesters of misinformation we did not help to produce.

As we have seen, we possess artistic models and visual methods of analysis – many deriving from the eighteenth century – for not receiving pictures passively but for entering and reassembling them actively. Yet the poverty of our current observational skills is such that the spectre looms of an engulfing, abstract and invisible, technology more sophisticated than its uncomprehending users. The time has also come, then, to cease being disembodied receivers and transmitters of a cynical linguistic propaganda packaged graphically. Educated seeing is precisely about recognizing that information cannot be separated from the manner or style of its display. As Piranesi, Scheuchzer or Lichtenberg demonstrated, the enlightened observer – with the guidance of the artist – patterns and constructs reality through process knowledge.

Let us prepare for this alternative future. In that illuminating image-world, the spatio-visual disciplines would model themselves upon the special characteristics of their 'graphicity'. I foresee that glad day when feared and despised images, and underrated affective sensory experience in general, are released from their penurious prison. The historical process, begun in the eighteenth century, coupling advances in imaging techniques with advances in technology, inevitably leads out of Plato's ill-lit and second-class hotel for experiential transients. No longer defined as subjugated illustrations, or just better conveyors of extant verbal information, images would be recognized as free agents needed to discover that which could not otherwise be known. In that second Enlightenment, our public policy and our pedagogical practice would coincide humanistically. Visual lessons and visual means learned from the past could be applied imaginatively to tackle current problems in imaging.

Notes
2 For this all-too prevalent view, see Judith R. Brown and Steve Cunningham, 'Visualization in higher education', *Academic Computing* (March 1990), 24.
I have examined this 'grammatological' aspect of eighteenth-century aesthetics in my Symbol and Myths: Theoretique de la Figure a l'Image en Art (Cranbury, NJ: Associated University Press, 1979). See esp. ch. 4, 'Kant, schema, signum'. More recently, I have discussed the reoccurrence of this word–image polemic in light of post-structuralism's 'theoretical' appropriation of art (March 1988), 6-24. More pointedly, perhaps, the hegemonic aspect of 'literary' control over visual. The academic economics of this takeover has yet to be 'deconstructed'.

For an excellent analysis of the distinction made in mid-century France between artificers and painters, sculptors and architects of the grand gout (shored up by pro-antique critics) who scorned them, see Marianne Roland-Michel, La Joie et l'Art roulé (Paris: Arthex, 1984). Italy, German artists (through a lesser extent) experienced this reversal when they sent their young academy and of a 'poetic' art that goes beyond the senses. David Irwin, 'On the imitations of the Greeks (1575)', in idem (ed.), Winckelmann: Writings on Art (London: Phaidon, 1972), 61-85.

Yve-Alain Bois, 'Malevitch, le carré, le dégré zero', Macula (1976), 28-49.


Benjamin H. D. Buchloh, 'Allogorical procedures: appropriation and montage in contemporary art', Artforum, xxi (September 1982), 43-56.


While post-modernist experience is that of visualization, paradoxically, post-modernist criticism privileges the linguistic signifier as in Althusser's notion of ideology as langue or Baussard's Désert (Boston: Institute of Contemporary Art, 1986), 107-22.

James Foley and Andreas Van Dam, Fundamentals of Interactive Computer Graphics (Reading, Mass.: Addison-Wesley, 1982).


The deep connection between a logocentrism and what might be termed a 'numeroscentrism' must also be stressed. Recall the Phoenician origin of numeral letters, their subsequent spread to oral and through gestures. See Georges Ifrah, From One to Zero: A Universal History of Numbers, tr. Howell Baily (New York: Viking, 1985), esp. 241-310.

To my mind the finest analysis of the metaphor of writing and the book for structuring all experience is that of Hans Blumenberg, Die Lesbarkeit der Welt (Munich: Suhrkamp, 1968).

See, for example, Stephen M. Kozolyn, 'Aspects of a cognitive neuroscience of mental imagery', Science, ccl (17 June 1988), 1621-6. Also see in the same issue, Michael I. Posner, Steven E. brain', 1627-31.

Visualization of knowledge


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Cited in Frederick Burwick, 'The hermeneutics of Lichtenberg's interpretation of Hogarth', Lesing Yearbook, xix (1987), 168. For the proliferation of 'visuals' in the courtroom, note the existence of the Atlanta-based firm Medical Legal Illustrations, Inc., now in its eighth year, and the Chicago-based firm Legal Graphics Inc., currently in its seventh year.


The contribution of the phenomenon of travel to the dissemination of a 'pictorialized' experience is studied in my Voyage into Substance: Art, Science, and the Illustrated Travel Account, 1760-1840 (Cambridge, Mass.: MIT Press, 1984).

