



# MEDICAL PHOTOGRAPHY IN PRACTICE

*A SYMPOSIUM EDITED BY*

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## *PUBLISHER'S NOTE*

IN THE OPINION of most thinking and progressive medical men every hospital should be equipped with an up-to-date photographic department. With this aim in view, publication of the contributions in this volume dealing with various aspects of Medical Photography becomes more than an ordinary publishing venture.

The contributors comprise an important group of well-known practising medical photographers, and with the ever-increasing call upon the time of such men, production has of necessity been a lengthy and protracted undertaking. We are therefore grateful to the contributors for their co-operation in making final revisions to their original work where they have felt this to be necessary.

Our hope is that this important book will achieve its objective, namely, that it will not only be useful to practitioners already working in this field, but will also serve as a guide in the training of new entrants into medical photography, thus leading to a better understanding and an easier solution of some of the problems confronting the medical profession.

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## MEDICAL ILLUSTRATION IN THE PAST

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FROM its beginnings in antiquity medicine has made demands upon such processes of illustration as were at the time available. The earliest Arab manuscripts were illustrated, and in the incunabula we find such pictures as the Nuremburg skeleton of 1493 (Fig. 1) and the woodcuts in the *Fasciculus Medicinæ* of de Ketham (1491). The calibre of artists was in the main inadequate, though there are honourable exceptions such as da Vinci, Dürer, and of course John Stephen of Calcar, the artist of Vesalius's *De Humani Corporis Fabrica*, the woodcuts of which can stand comparison with much later work (Fig. 2). It is, therefore, hardly unexpected that the camera obscura, described first with any degree of completeness by Giovanni della Porta in 1589, should have been seized upon by medical illustrators, and I feel that it is fair to discuss it in the present context; it is, after all, the camera with everything but the sensitive surface. The only point for surprise is that it should have taken until 1733 for any detail of the instrument to appear in medical literature. In that year William Cheselden published his *Osteographia*, and the title-page of this work carries an engraving of the artist, said to be van der Gucht, at work with a camera obscura, a skeleton hanging inverted (presumably to simplify the artist's view) on a tripod (Fig. 3). The description in the text, which is reproduced in full in Fig. 4, can hardly be bettered today. The Oxford English Dictionary gives 1727 as the first English reference to the camera obscura, which makes it fairly certain that Cheselden's was the first reference to its use in medicine.

The curiosity inseparable from the pursuit of medicine continued to lead its authors to employ the most up-to-date methods of illustration available to them, and the full catalogue is a fascinating one. After woodcut and wood engraving came copper engraving (Fig. 5) followed by stipple, aquatint and lithography, invented by Alois Senefelder in Munich in 1797. Some of the finest dermatological illustrations ever made are lithographs, in von Hebra's *Hautkrankheiten* (1860). In a short survey, however, the non-photographic

processes must be largely neglected and an assessment made of the impact of the photographic process on medicine both from the illustrative viewpoint and in research. The possibility of fixing permanently an image formed by an optical system had exercised scientists for a long time, and it is fair to begin the list of medical applications with the modified Wedgwood prints of the image

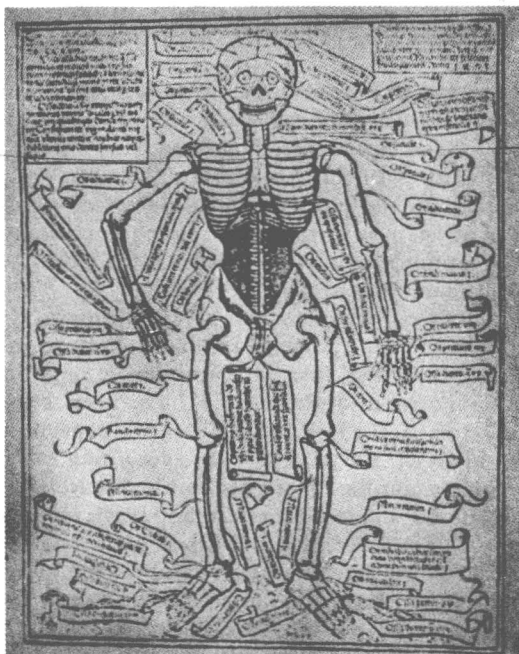


FIG. 1. A typical pre-Vesalian woodcut. The skeleton by Richard Helain, published in Nuremberg in 1493.

thrown by a solar microscope, made in 1837 by the Rev. John Reade: Reade preceded Fox Talbot and Daguerre by two years. The daguerreotype was also employed in medical work, and there are a few which survive today, principally some photomicrographs in the Wellcome Medical Museum. Clinical photography as we know it seems to have developed later, perhaps because the micrographers were more laboratory-minded than their colleagues in the wards. Reproduction of photographs by book-printing processes was not possible, but in Donn 's *Cours de Microscopie* (1845) photo-

micrographs originally made as daguerreotypes were beautifully engraved by Léon Foucault, and indeed engraving and allied procedures based on photographs were common until the turn of the century and are still by no means outmoded.

From the beginning, as is true today, the strength of photography as an illustrative method lay in its ability to record accurately,

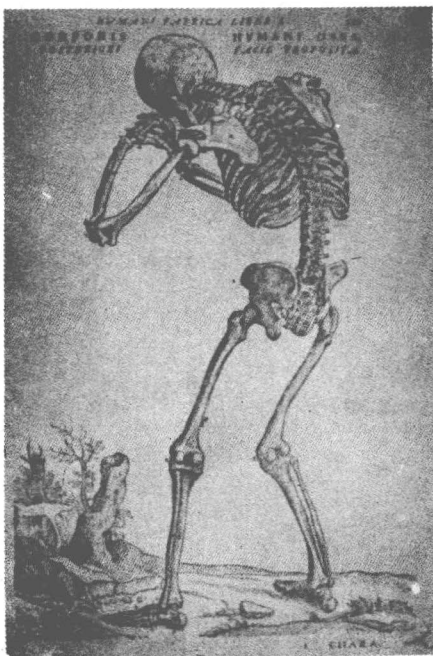


FIG. 2. Woodcut by John Stephen from Vesalius's *De Humani Corporis Fabrica*: these pictures set an entirely new standard in medical illustration. 1543.

rapidly, perhaps cheaply (though this is a feature of lesser importance), and repeatably; these points were stressed in the first published paper *Ueber die Benützung der Lichtbilder für Heilwissenschaftliche Zwecke* (Berend, 1855); the first journal devoted to medical photography, the *Internationale medizinisch-photographische Monatschrift*, appeared in Leipzig in 1894. In the more straightforward forms of illustration it was from the first too easy to make some kind of picture and too difficult to make a good one; it is fair to say that the arrival of photography as a readily available method tended to



# OSTEOGRAPHIA, OR THE ANATOMY OF THE BONES.

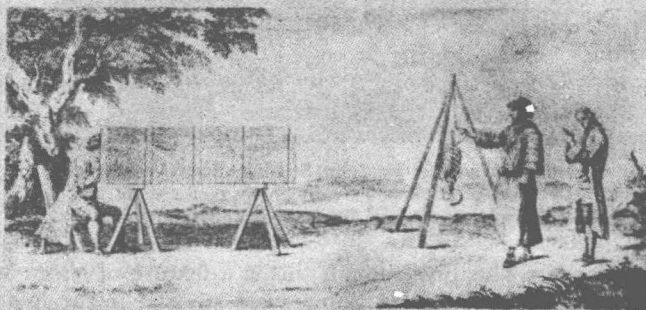
BY WILLIAM CHESELDEN

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LONDON MDCXXXIII.

FIG. 3. The title page of Cheselden's *Osteographia*, showing the artist at work with a camera obscura, the skeleton hanging inverted to simplify the tracing. 1733.



THE FRONTICE-PIECE represents Galen contemplating the skeleton of a robber, who being killed by a traveller had his bones picked in two days by vultures. This opportunity he mentions as a piece of good fortune, though he had seen another skeleton which was accidentally washed out of a burying place, by the overflowing of a river; besides one which was shewn in a public school at Alexandria, which he thought was worth the trouble of any one to go on purpose to study.

THE PRINT IN THE TITLE PAGE represents the camera obscura, with the manner of using it: About six inches within that end where the draftsman sits, is fixed the table glass, upon the rough side of which he draws with a black-lead pencil, which he afterwards traces off upon paper; towards the other end, in a sliding frame, is put the object-glass, which being moved backward or forward, makes the picture bigger or less, and the inside of the case is made black to prevent reflections of light.

THE NEXT PRINT is the QUEENS arms set upon a pedestal; on which is represented in bas relief, arts and sciences flourishing under HER MAJESTIES protection.

FIG. 4. The description of the camera obscura from the *Osteographia*.

debase the quality of medical illustration. Every surgeon and physician could do his own button-pressing and the trained illustrator seemed to be an unnecessary luxury. The results are clearly seen in the literature of the latter half of the nineteenth century, and indeed well into the twentieth. It is only relatively recently that a more selective approach has been adopted, and that the illustrator trained to apply, if not actually to produce, all forms of representation has arisen as a specialist in his own right. Today we are not really concerned with the method of production of a picture so much as its purpose and its fitness for that purpose: the division between photographer and graphic artist is an unreal one.

Let us consider, then, the functions of photography which make it an essential medical illustrative medium and survey, however briefly, the origins of these features.

Photomicrography has been mentioned first, as it was probably one of the earliest branches to attract attention. Prolonged exposure times did not matter, and there were several attempts at colour work. Publication of the latter was delayed, for it was not until the



FIG. 5. A very fine example of copper engraving; the original is life-size. Plate XX from William Hunter's *Anatomy of the Gravid Uterus*, by W. Bryer. 1774.



FIG. 6. Wood engraving from Herman's *Difficult Labour* illustrating the treatment of prolapsed cord. The print shows how easy it was to introduce unconscious humour into an illustration. 1894.

closing years of the century that the half-tone block, an essential for economical colour printing, was introduced. One of the earliest trichrome photomicrographs, published by Bythell (1904), will stand comparison with much current work.

The line-block preceded the half-tone by some twenty years. Today it is employed principally for diagrammatic work but at its inception it provided a medium whereby an artist could base a line sketch on a photograph, with the advantage of simple elimination of unwanted detail but with the coincident grave risk of producing unintentional humour by mismatching representative drawing with diagram (Fig. 6). At the same time many of the old wood engravings were given a new lease of life by the production from them of electrotypes, which had a much better printing surface and from which long commercial runs were possible. The change thus made possible was a gradual one, and no firm date-line emerges.

In the more expensive works actual photographic prints, usually by the albumen process, were employed (Fig. 7). The process of 'photoglyphic engraving', first described by Fox Talbot in 1852, lay dormant for many years, and only re-emerged as the photogravure process of Karl Klic in 1879. The plates at that time were, of course, grained with resin, and had not the regular screen pattern of the

rotary gravure print of today. The first serious medical application of this process was in 1888, when there appeared the *Nouvelle Iconographie de la Salpêtrière*, under the direction of the great Jean Charcot, who had shortly before set up a Department of Photography in that hospital. The illustrations in the *Iconographie* set a new

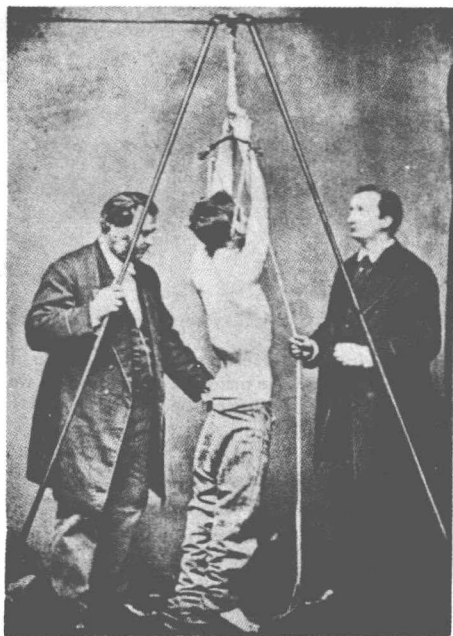


FIG. 7. An albumen print from Lewis Sayre's *Spinal Curvature*: photography at this date was strictly a recording medium, and there was no attempt at selection. 1877.

high standard, and it is just to present as an example a photograph of Charcot's arthropathy of the spine (Fig. 8), from a paper by Abadie (1900).

The possibilities of the photographic process for recording endoscopic appearances were early appreciated, and many were the attempts to provide for rapid exposures. Many of the improvements of course were linked with the appearance in 1880 of the dry plate, which displaced the old wet collodion and made technical pro-

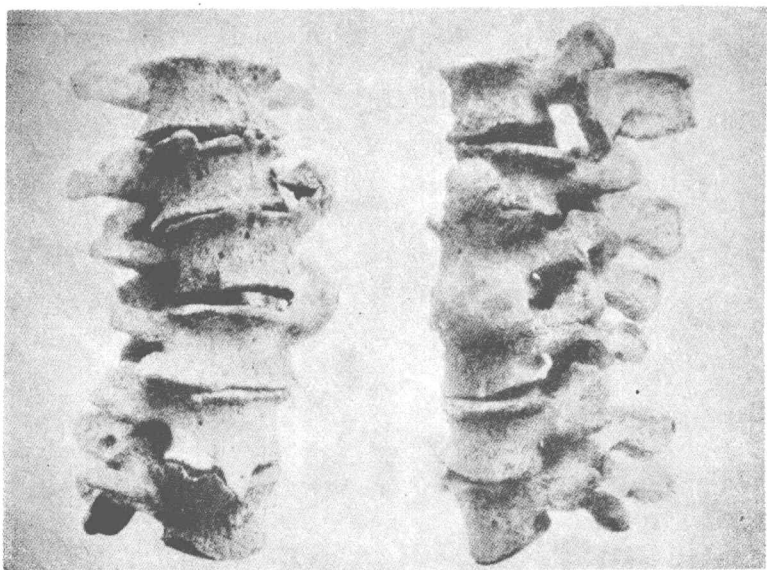


FIG. 8. A photogravure print of a tabetic spine, from the *Nouvelle Inconographie de la Salpêtrière*. 1900.



FIG. 9. A bladder calculus photographed through an operating cystoscope by reflected flash, from Nitze's *Atlas*. 1894.

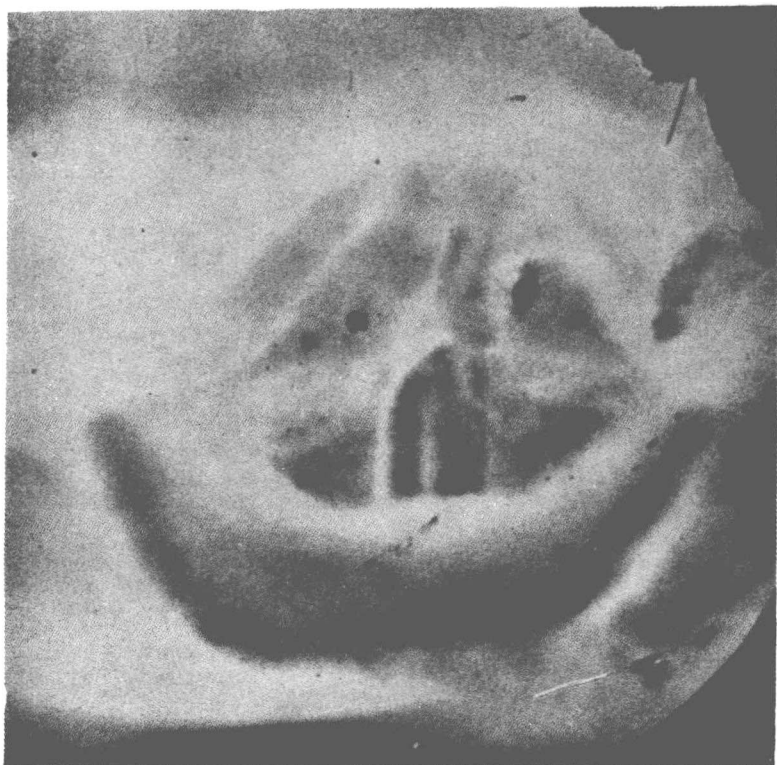


FIG. 10. Laryngeal photograph, by reflected sunlight, made by George Brainerd and Thomas French. 1884. (Courtesy Brooklyn Museum.)

cedures so much simpler. Even today the artist finds it no easy task to record an impression in the short time available (Barber, 1955), and new and improved endoscopic equipment aims constantly at pushing more and more light down deeper and narrower apertures (Stanford, 1955). It is well therefore, to remember that Nitze produced flash pictures through a cystoscope in 1894 (Fig. 9) and that Brainerd photographed the larynx by reflected sunlight (Fig. 10) in 1884, French's paper describing these experiments being entitled *On a perfected method of photographing the larynx*. Lennox Browne, in London, had tried a year before Brainerd but had given up. While direct endoscopic photography becomes more widely employed, it is probably true that mirror photography of the larynx remains one of the most difficult clinical procedures.

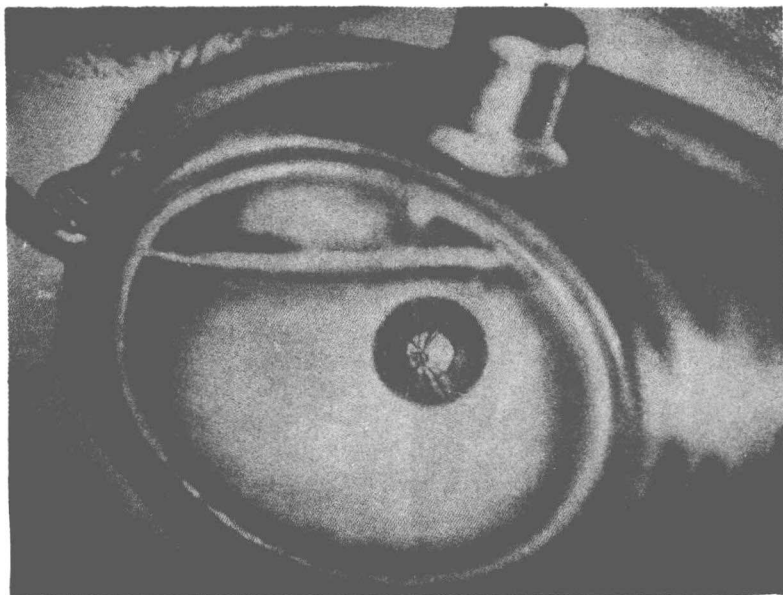


FIG. 11. Gerloff's original retinal photograph. 1891. (*Courtesy Peter Hansell.*)

Ophthalmologists, perhaps because they work in an atmosphere of optics, evinced early interest in the possibilities of the camera, though, as Hansell (1953) has pointed out, they were slow to realize that photography of the external eye demanded close-ups. Records of retinal appearances seem to have attracted them more, and the technical hazards were overcome by Gerloff in 1891 (Fig. 11). He used an immersion system, which gave way to the more complex apparatus of Dimmer, who actually described his system in 1889 but who did not publish results till 1899. His work remains the basis of modern retinal camera such as the Zeiss-Nordenson and Bausch and Lomb.

The discovery of x-rays by Roentgen in 1895 made yet further demands on the photographic process (Fig. 12), for without this it is not possible to retain any permanent record of the appearances. The early sets were of low power, and the single-coated glass plate was not ideal, nor were there any intensifying screens, yet some of the results are worth presenting. Fig. 13 was made in 1898 of the hand of the patient shown in Fig. 19. It is notable that the equipment of the period could not penetrate the even more striking mass on his





FIG. 12. The original radiograph. Frau Roentgen's hand, with her ring. (1895.)



FIG. 13. Radiograph of chondromata of the hand. 1898. (Daylight print from the case notes of the patient shown in Fig. 19.)

shoulder. The inconvenience of the glass plate led to all radiographs of that period being presented as positive prints on paper; double-coated film, intensifying screens, fluorography and other advances were not to appear for many years.

Stereoscopy became very popular in the Victorian drawing room, where box-albums and the Brewster instrument were a sign of the progressive family. Not unnaturally this equipment was used by doctors, though they did not realize (as indeed many today do not realize) that mere '3-D' is of no real value, and that stereoscopy to be of scientific significance must be accurately controlled. Neisser (1894) published a stereoscopic atlas and the Pathological Institute in Vienna produced admirable records on glass of the temporal bone. The well-known Edinburgh Atlas is another example which may still be found in most anatomy departments (Fig. 14).

I have left motion picture almost to the end, for though it is a fascinating subject its history in medicine is involved deeply with the history of cinematography itself. I shall mention only a few milestones; for detail reference should be made to the exhaustive survey of Keys and Julin (1950). The French physiologist Marey is probably the father of the motion picture, though his work was not