A cataract knife of excellent shape and proportion devised a century and a half ago, by Dr. Thomas Young, of Edinburgh, and the knives which preceded it / by Alvin A. Hubbell.

(11.)

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Dr. Alvin A. Hubbell

A Cataract Knife of Excellent Shape and Proportion Devised a Century and a Half Ago, by Dr. Thomas Young, of Edinburgh, and the Knives which Preceded it.

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ILLUSTRATED.

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A CATARACT KNIFE OF EXCELLENT SHAPE AND PROPORTION DEVISED A CENTURY AND A HALF AGO, BY DR. THOMAS YOUNG, OF EDINBURGH, AND THE KNIVES WHICH PRECEDED IT.

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As is well known, Jacques Daviel, of Paris, in 1752, demonstrated before the Royal Academy of Surgery of Paris, the advantages and practicability of the extraction of the crystalline lens in the treatment of cataract, and described an operation by which it could be done. In this operation, he made a corneal flap downwards by first puncturing the cornea at its lower margin with a semi-curved, triangular knife or as he termed it a lancet-shaped "needle," and then enlarging the opening on each side first by a semi-curved, blunt-pointed knife ("needle"), and afterwards completing the section by scissors (*Mémoires de l'Académie de Chirurgie Royale*, 1753, tome II, page 337 Surgeons throughout Europe were deeply moved by the "invention" of Daviel, and there were some who at once endorsed his principles, but sought to improve upon his method by diminishing the number of instruments.

George de la Faye, a distinguished surgeon of Paris and a member and officer of the Royal Academy of Surgery of Paris, was, perhaps, the first to suggest a single instrument with which to make the corneal incision. In a paper which was published in the "Mémoires" of the Academy, in 1753, tome II, page 563, he says that he had been led by various considerations to devise this instrument which he "had the honor of presenting last winter (November, 1752) to the Academy." He describes it in this paper as "a species of small bistoury, fixed in its handle, its blade very thin, a little convex on its flat, and twenty to twenty-one lines long and two lines wide at its greatest width. It is edged only on one side, except at its point where the back is also edged, but only for about two lines. The point

and the whole edge have the fineness of the point and edge of a lancet. * * * *

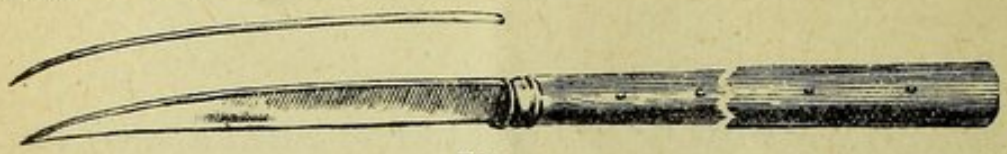

Fig. 1.

The knife of de la Faye. The upper line shows the "convexity" of the blade on its flat. From *Mémoires de l'Acad. de Chir.* 1753, tome II.

The handle is three inches and nine lines long by four lines in diameter" (see figure 1). Referring to the blade in another place he says: "The edge is very fine so as to cut the cornea cleanly; the blade is slightly curved on its flat so as to keep the point away from the iris in traversing the anterior chamber; finally, the bistoury has a back, because if it were edged on both sides in all its extent, it might wound the upper lid during the operation." In making the incision, the concavity of the blade evidently faced the cornea.

De la Faye actually used his instrument for the first time on the living in June, 1753, as the following quotation shows: "As the season (winter) did not allow me to practice the operation for cataract, but as the students should not be left in ignorance of anything which may contribute to the perfection of the art, in the month of March, 1753, during the course on operations which I am in the habit of delivering in the amphitheatre (of the 'College of Surgery'), I demonstrated the two instruments (knife and cystitome) which are in question, and experimented with them successfully on the cadaver. * * * It was on June 11, 1753, that I performed this operation on six persons." This was done at the Hôtel Royal des Invalides before several noted physicians and surgeons.

Although de la Faye was, perhaps, the first to suggest making the corneal incision with a single instrument, a London surgeon preceded him by about two months, in actually practicing such a method on the living. This surgeon was the distinguished Samuel Sharp, Surgeon to Guy's Hospital, and at one time a pupil of the celebrated William Cheselden. Sharp was a man who was alive to the surgical advances of his time and was in touch with the continental surgeons. Later he was even a foreign member of the Royal Academy of Surgery of Paris. Scarcely had Daviel's operation been made public when Sharp, recognizing its merits, set himself to work to simplify it. He was without doubt in communication with Morand, the perpetual

secretary of the Academy, and it is possible that through him he had learned of the suggestion of de la Faye. Be this as it may, he devised a delicate knife, straight on its flat, somewhat convex on its back, slightly concave on its edge, a little less than an inch long, and at its heel about one-eighth of an inch wide, tapering gradually to a fine point. With this he performed his first operation, April 7, 1753. Between this date and October 22, 1753, he performed nineteen extractions. The incision was made downwards and included one-half of the cornea. His operation is described in papers which he read before the Royal Society of London on April 12, 1753, and November 12, 1753, and which were published in volume forty-eight of the *Philosophical Transactions*, 1754, pages 161 and 322.

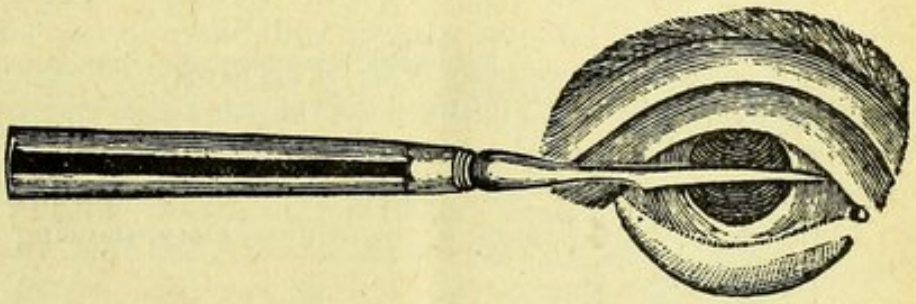

Fig. 2.

Sharp's knife, from original cut accompanying his first paper.

Fig. 3.

Another illustration of Sharp's knife, from tome II of *Mémoires de l'Académie de Chirurgie Royale*, 1753.

His knife is shown in figure 2, which is a reproduction of his original illustration, and also in figure 3.

During the same year, 1753, another knife, straight on its flat, was suggested by Poyet, a young Parisian surgeon (*Mémoires de l'Académie de Chirurgie Royale*, tome II, page 353). It was a double-edged instrument about two inches long, two lines wide at its heel, narrowing slightly towards its point, which was triangular. Near its point it was pierced by an opening for the reception of a thread. Poyet, in operating, made the puncture and counter-puncture with the knife threaded. After the counter-puncture was made,

he disengaged the thread from the knife, and with the thread thus looped into the cornea and held upwards, he steadied the eye while completing the corneal incision downwards. The first two operations which he made convinced him of the "inconvenience" of the thread and he abandoned it. But he continued to urge that with a straight knife like his the iris was less exposed to injury. Poyet's first operations were performed at the same time and place as were those of de la Faye. His instrument is illustrated by figure 4.

Fig. 4.

Poyet's knife, from *Mémoires de l'Académie de Chirurgie*, 1753, tome II.

Joseph Warner, of London, surgeon with Sharp to Guy's Hospital, sought to improve the cataract knife of his associate by constructing a blade which was straight, both on the edge and flat, and less convex on its back than Sharp's except near its end, where it became more sharply curved, thus making the point comparatively obtuse. Figure 5 is a reproduction of the original plate, showing the instrument in position.

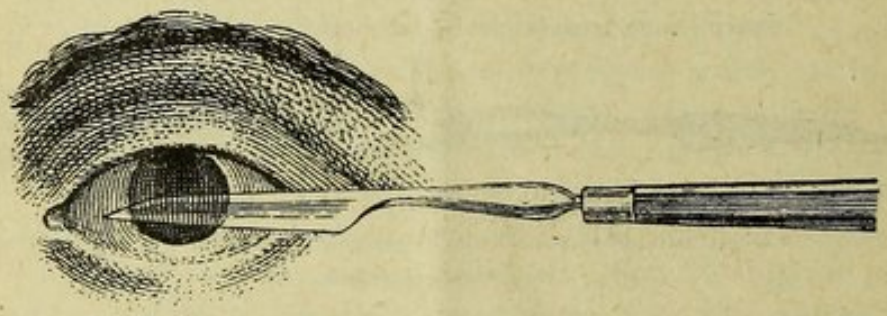

Fig. 5.

Warner's knife, from his *Cases in Surgery*.

Warner's operation was first published in his *Cases in Surgery*, edition of 1754, page 30.

Another corneal knife was devised by Bérenger, of Paris, the first description of which, according to A. Stoeber, of Nancy, France, was published in 1755, in the *Mémoires de l'Académie des Sciences*, tome III, 1755, page 29 (*Description du Procédé Quasi-Linéaire Simple ou Composé*, Paris, 1877, page 137). He also read a paper before the Royal Academy of Surgery in 1757, describing his opera-

tion, and as the reference to the first paper cannot be verified, I quote from the second, which de Wecker republished in *Archives d'Ophalmologie*, in 1893. In this Bérenger speaks of his instrument as "a scalpel, the edge of which is an inch long, and describes a semi-circle of three lines radius. The edge terminates at one end by a very acute point and at the other by a long shank of eight lines, and is mounted on a handle. Besides, the blade is slightly convex on one of its faces and plane on the other." It is "a little wider than the semi-diameter of the cornea," the diameter of the cornea being, as he says, "four to five lines." In operating, Bérenger says that the knife is introduced with its convex face towards the cornea, "serving thus very naturally to direct its edge towards the lower semi-circumference of this part." See figure 6.

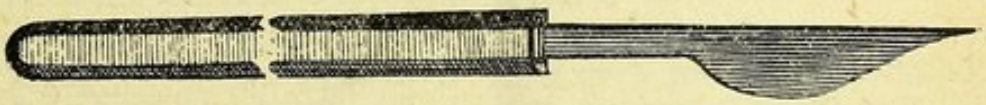

Fig. 6.

Bérenger's knife, from Wenzel's *Manuel d'Oculistique*, 1808.

Such were the forms of cataract knives that had been suggested from 1752 to 1755. In 1756 still another knife was offered which was scarcely noticed at the time, and which has been almost entirely forgotten, although in many respects it was superior to any other that had preceded it. This knife was devised by Dr. Thomas Young, of Edinburgh. Dr. Young was a man of high repute in the medical profession of Scotland, and was for a long time previous to his death, in 1783, professor of midwifery in the University of Edinburgh. He not only distinguished himself in this capacity and as a "man-midwife" of his city, but he also practiced surgery "for a considerable time with much reputation," according to the testimony of Dr. Benjamin Bell, a contemporary of Dr. Young, who published an excellent *System of Surgery* in 1787 (see vol. II, American edition of his work, page 352).

The instruments of de la Faye, Sharp, and Bérenger were frequently spoken of during the first thirty or forty years after Daviel described his operation, but that of Young was seldom if ever mentioned. We look in vain for it in the works of Wenzel (*Traité de la Cataracte*, 1786, or *Manuel d'Oculistique*, 1808), or of Pellier de Quengsy, *Cours d'Opérations sur la Chirurgie des Yeux*, 1789), or of Richter (*Treatise on Cataract*, English edition, 1791), all of whom

were supposed to be familiar with the ocular surgery of Great Britain of that period. Neither is it referred to by Ware in his translation of Wenzel's work on cataract, or later by Adams (*Practical Inquiry into the Causes of the Frequent Failure of the Operations of Depression and of the Extraction of the Cataract, as Usually Performed*, 1817), and yet both of these gentlemen were London practitioners and writers of note. Ens refers to it in 1803 (*Historia Extractionis Cataractae*, page 43), and Sprengel, a few years later (*Histoire de la Médicine*, French edition, 1815, tome VII, page 64), and so also does A. Stoeber in 1877 (work above cited, page 13). But most writers on cataract from 1756 to the present time are silent in regard to it.

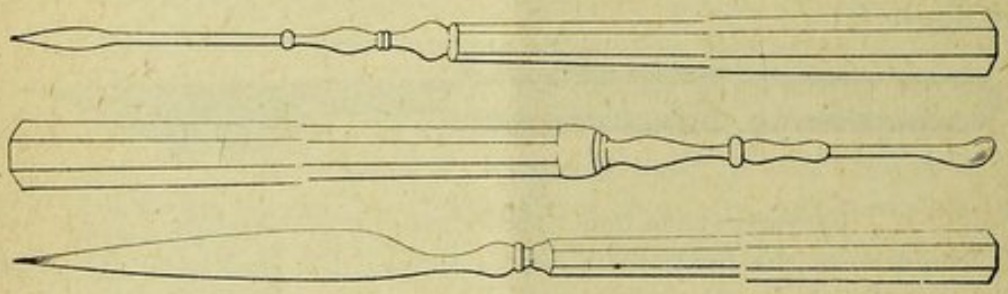

Fig. 7.

Instruments of Young, the knife being at the lower part of the illustration. From the original plate (VII.) published with his papers.

The knife of Dr. Young, as will be seen by figure 7, had a blade whose length was about one and one-half inches (four centimeters), and whose width at the heel was two and one-half lines (five millimeters). From the heel it tapered by very gentle convexities of the back and edge to a very acute point. It was straight on its flat, and its back was blunt. It was mounted on a suitable handle by means of a constricted shank of about one-half inch (twelve millimeters) in length.

This blade was of excellent form, and deserves a better position, historically, than it has occupied, and it is in the hope of restoring it, in part at least, to the recognition of the profession, that I am led to bring it forward at this time. In doing this I venture also to reproduce Dr. Young's original paper, as well as the illustrations which accompany it. I am able to do this through the generous assistance of Dr. William George Sym, a prominent ophthalmologist of Edinburgh and the editor of the Ophthalmic Review, who has most kindly

copied them for me. The following is a transcript of the paper, and it is found in volume II, page 324, of "*Essays and Observations, Physical and Literary, Read before a Society in Edinburgh, and Published by Them:*"

"Some Observations on the new Method of Curing the Cataract by Extracting the Crystalline Humor. By Thomas Young, Surgeon in Edinburgh.

"To restore lost sight, is recovering one of the most useful of all the senses, and the couching of the cataract, would be one of the most valuable operations, could it always be done with safety; but the bad success, and the dreadful consequences which often attend it, have deterred many good surgeons from performing this operation, and thrown it much into the hands of empyrics.

"I have couched but few in the old way, and those with such bad success, that I was fully determined to operate no more on the eyes; nor did the success of the new method performed by the ingenious *M. Daviel*, alter my resolution for a considerable time, till, at the importunity of some of my best friends, I consented to try this new operation. Six cataracts luckily cast up last summer in the Royal Infirmary at Edinburgh, which I extracted in the following manner:

"The patient being seated in a chair, with an assistant at his back, to support his head, and keep up his eye-lid, as in the old operation, the operator may stand or sit in a chair, as he finds most convenient. He should keep down the under eye-lid with two fingers of the one hand, while with the other, he takes the small knife (see figure 7) with which he pierces the transparent cornea at the external angle of the eye, near to where the cornea joins with the sclerotica, taking great care not to wound the iris. Run the knife in a horizontal direction across the anterior chamber, and bring it out about the same distance from the white of the eye, as where it entered; then cut that part of the cornea which lies between the two orifices, as much in the form of a crescent as possible; this makes the incision larger, and keeps the cicatrix more off the sight; lift up the flap of the cut cornea with the scoop (see figure 7) or any other convenient instrument; introduce at the same time a common couching needle (see also figure 7), through the pupil, to open the capsula of the crystalline lens, that the latter may come the more easily out. A small aperture generally serves for this purpose; if the lens is of a firm consistence, it often sticks to the point of the needle, so that when the instrument

is withdrawn the crystalline comes along with it; if it does not, a very gentle pressure upon the eye forces it out. The operation may be frequently performed with the knife alone, the capsula of the crystalline being sometimes so thin, that, after the cornea is cut, a small pressure on the eye makes the lens come away.

"This method of operating is much the same with that practiced by M. Daviel, which you'll find at large in the *Memoirs of the Academy of Surgery*, vol. ii, p. 337. I have followed the example of the famous Mr. Sharp, and shunned the great multiplicity of instruments M. Daviel makes use of, which renders this operation more simple, less tedious, and less dangerous.

"I shall next mention the success of each operation in the order they were performed.

"1. Robert Laurie, aged about 30 years, was admitted into the Royal Infirmary with a cataract in both eyes.

"I operated on the left eye the 23d of July, 1755.

"As soon as I had passed the knife into the anterior chamber, he turned his eye so much upwards, that the cornea was quite out of sight; I waited till the eye returned to its former position, when I found the point of the instrument in the iris, which I immediately disengaged, and finished the operation without any other accident. I expected a great inflammation from the iris being touched, but was agreeably disappointed, finding the man recover with little pain, no fever, and the inflammation inconsiderable.

"About three weeks after the operation, he could distinguish colors, and large objects tolerably well; but could not bear much light. His eye continued weak and watery for about three weeks more, when he could easily see a pin in the sleeve of his own coat; his eye was clear, but the pupil not quite round, which was certainly owing to the iris being hurt.

"2. * * * * was admitted into the Royal Infirmary about the middle of September, with a cataract in the one eye, and the cornea of the other quite opaque.

"The pupil of the cataracted eye was contracted to above the size of a large pin head, but quite immovable.

"He was visited by several surgeons in town, who were of opinion that the disease was incurable, and that the bottom of the eye was affected, as well as the crystalline lens.

"I proposed trying the new operation, before he should be dismissed incurable: to which they very readily consented.

"I performed it without any accident, and the man recovered in a few days, without any fever, pain, or inflammation. He was dismissed from the house about a fortnight after the operation, when his eye was quite clear, but the pupil still immovable; and he could only perceive a glimmering of light, which is more than was expected from the appearance of the pupil before the operation.

"3 and 4. John Craig, aged about 40 years, was admitted into the Royal Infirmary with a cataract in both eyes, which had much of the milky appearance.

"I operated on both eyes the 28th of September, 1755, and nothing extraordinary occurred during the operation, only upon dividing the capsula of the crystalline, a sort of milky liquor came out, and the lens was of a dark brown color. He had a very speedy recovery; six days after the operation, I uncovered his eye; he was capable of distinguishing colors. I looked again into his eyes on the 13th day, when I found his sight still better, and his eyes more able to look at small objects, without complaining.

"He was dismissed from the house the 10th of November, when he could read without the assistance of glasses.

"5. Robert Laurie, whom I have already mentioned, had the operation performed on the right eye the 12th of October, when nothing extraordinary happened; he had a very good recovery, with scarcely any pain or inflammation; he was dismissed from the house the 19th of November, when he saw very distinctly with both eyes.

"6. Agnes Barrowman, aged about 30 years, was admitted into the Royal Infirmary, with cataracts in both eyes.

"I operated on the left eye the 26th of October, 1755.

"The space betwixt her eye-lids, when raised up, was so small, that I could with difficulty see all the cornea, which, in this patient, was remarkably flat.

"As soon as I had passed the knife into the anterior chamber, she was seized with a fit of coughing, which obliged me to cut the cornea in a very great hurry. The opening in the cornea was but small, which gave me more difficulty in extracting the crystalline, than I had in any of the former.

"Notwithstanding this unlucky accident, she had a tolerably good

recovery; her eye was pained, and somewhat inflamed, for some time after the operation, but never violently. She was dismissed from the house about six weeks after the operation, being then able to distinguish very small objects.

"N. B.—Some eyes are more proper for this operation than others; the larger the eye, and the more convex the cornea, the operation will be the easier. This woman had a remarkably bad eye in this respect; it was small, the cornea flat, and the distance between the eye-lids, when open, was very little; perhaps the speculum oculi would be of use to help all these faults while the cornea is cutting, but no longer, for fear of pressing out the vitreous humour.

"There was nothing particular in the treatment of these patients after the operation: it consisted chiefly in bleeding, spare diet, now and then a gentle laxative, and cloths dipt in vinegar and water applied frequently to the eyes; they were not confined to their beds above a day or two, and none of them required fomentations.

"I do not pretend, from the above cases, to make a comparison betwixt the success of couching, and the new method; this requires more cases than I have had occasion to see.

"According to the trials made by some of the French surgeons, which you'll find in the memoirs of the Academy of Surgery, vol. ii, p. 578, the couching was the most successful.

"Mr. Morand couched six patients.

"3 of them saw distinctly. 3 of the catarcts rose again.

"M. le Faye extracted six cataracts in the new way.

"2 of the patients saw distinctly. 2 of them saw less distinctly. 2 of them were quite blind.

"M. Poyet extracted seven cataracts after the new method.

"2 of his patients saw distinctly. 2 of them less distinctly. 1 could distinguish light. 2 of them were quite blind.

"Were I to judge from my own experience in both operations, the new method certainly claims the preference; since I have only operated upon six cataracts, and all of them have succeeded, though some were not very promising.

"This, I hope, will excite others to make further trials and improvements in this operation. March 4, 1756."

Thus it will be seen that, while Jacques Daviel, a Frenchman, was

the first to "invent" the modern operation for the extraction of cataract, Samuel Sharp, an Englishman, was the first to perform "simple extraction," much as it is done today, incising the cornea at its junction with the sclera by a single instrument, carrying the incision downwards, however, instead of upwards, and Thomas Young, a Scotchman, was the first to give to the profession a commendable knife with which to make this incision.