Jacques Daviel and the beginnings of the modern operation of extraction of cataract / Alvin A. Hubble.

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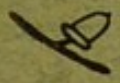
JACQUES DAVIEL AND THE BEGINNINGS OF THE MODERN OPERATION OF EXTRACTION OF CATARACT



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JACQUES DAVIEL AND THE BEGINNINGS OF THE MODERN OPERATION OF EXTRACTION OF CATARACT.

AN ADDRESS COMMEMORATIVE OF THE THIRD SEMI-CENTENNIAL ANNIVERSARY OF THE PUBLICATION OF THE FIRST DESCRIPTION OF THE OPERATION.*

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The year 1902 marks the third semi-centennial anniversary of the occasion on which Jacques Daviel promulgated to the world, through the Royal Academy of Surgery of Paris, "A New Method of Curing Cataract by Extracting the Crystalline Lens." It is most fitting that the ophthalmologists of the United States, and, indeed, of the civilized world, recognize the event and pay tribute to the genius of the author. Daviel bequeathed to surgery one of its richest acquisitions and to humanity one of its most beneficent legacies. But I fear that both he and his benefaction are too slightingly remembered.

In my studies of his life during the past few years I have been surprised that so little has been said about him, even by his contemporaries, and that the memory of him has been permitted to lapse to such an extent

* Read at the Fifty-third Annual Meeting of the American Medical Association, in the Section on Ophthalmology, and approved for publication by the Executive Committee: Drs. Casey A. Wood, H. V. Würdemann and J. A. Lippincott.

as it has. Even his writings, although not numerous, have never been brought together and published for the edification and profit of our profession.

It becomes, therefore, a double pleasure to me to accept the honor of the invitation of the chairman of the Section of Ophthalmology of the American Medical Association to deliver an address on Jacques Daviel at this time, that I may both revive the memory of one of the great heroes in medicine and recall something of the beginnings of an operation which is one of the greatest achievements of modern times.

Jacques Daviel was, like many of the greatest men of France, a native of Normandy. He was born in La Barre, a small village about sixty miles from Rouen. The exact day of his birth is not known, but the church records of La Barre show that he was baptized Aug. 11, 1693. In those days the rite of baptism was administered by the Roman Catholic church from one to three days after birth, and presuming that he was baptized when he was two days old, his birth took place on Aug. 9, 1693. His father was Pierre Daviel, and he was royal tabellion* under King Louis XIV. His mother was Elizabeth Nicolas. They were people of humble station in life, industrious, and loyal to their king and to their church. Other children were born to them besides Jacques, the descendants of whom are still living in different places in France.

Daviel was born at the close of a century which had been made memorable, not only for what the grand monarch of the age, Louis XIV, with his great cardinals, had achieved in conquest, in authority, in social display and in religious supremacy, but for what he had accomplished in the advancement of literature, art and science, by encouraging letters, fostering painting, sculpture and architecture, instituting academies and

* A tabellion was an officer akin to that of royal notary.

promoting science. Although the glory of his reign had passed its zenith before the last decade of the seventeenth century, yet its wane was not then fully realized, and the majesty of the age seemed to be transmitted to the sons of France born at that time. It was at this period that those men first saw the light who, with Daviel, were destined to put France in the lead of all Europe in surgical knowledge and progress during the eighteenth century.

It was at this time that a revolution had just begun in surgical practice and surgical instruction, and this period also marks the beginnings of the scientific study of ophthalmology. Before that time vague notions had prevailed in regard to the pathology of the eye, and opthalmic practice was principally in the hands of empirics who held, oftentimes, the most absurd views of ocular therapeutics. Cataract, then as now, was the most alluring object in the field of practice, and yet its pathology had been but slightly investigated, and the oculists and medical profession at large still held to the belief, which had scarcely been disturbed for more than two thousand years, that the crystalline lens was the seat of vision, and that cataract was, in the words of the learned French surgeon, Dionis,[1] written in 1707: "A foreign substance which is amassed and thickened imperceptibly into a small pellicle between the cornea and the crystalline lens in the aqueous humor in front of the opening of the uvea." This "pellicular body" which constituted cataract in nearly all minds, was believed by some to be in front of the iris, and by others behind it. It is true that John Kepler, in 1604, had demonstrated that the lens was only a refracting body, and that the retina, on which the refracting structures of the eye pictured the image of an external object, was the primary seat of visual perception. It is also true

1. Cours d'Operations de Chirurgie, Paris, 1740, p. 547.

that François Quarré and Rémi Lasnier, surgeons of Paris at about 1650, and after them Pierre Gassendi, Werner Rolfink, Pierre Borrelli, Stephen Blancard, Jacques Rohault and others, taught explicitly that cataract was seated in the crystalline lens and was due to the loss of transparency of that structure. But in spite of these authorities there was an unyielding adherence to the ancient doctrines, and it remained for M. Antoine, afterward known as Maître-Jean, a surgeon of Méry-sur-Seine, and to Pierre Brisseau, the son, surgeon of Tournay, to demonstrate by scientific methods and repeated observations their falsity. Maître-Jean was the first to study the pathology of cataract scientifically, and to make postmortem examinations, although Brisseau preceded him by one year in publication. Maître-Jean began his observations, clinically, in 1682, and examined one cataractous eye postmortem shortly afterward (date not given), and again two others in 1691. He published his observations in his Traité des Maladies de Œil, Troy, 1707, page 112. Brisseau began his investigations in 1705, making his first postmortem examination in April of that year. He reported this case to the Royal Academy of Sciences on Nov. 18, 1705, and published it in pamphlet form in 1706. In 1708 he published a second case, and in 1709 other cases in a small volume entitled "Traité de la Cataracte et du Glaucome."

It would be untimely for me now to recount the details of the incidents attending these scientific investigations, or to follow the controversies which their publication aroused, or even to mention the numerous investigators who became imbued with the scientific spirit which the example of Maître-Jean and Brisseau had inspired. Suffice it to say, that Daviel began life when the foundations of scientific ophthalmology, as well as those of scientific surgery, were being laid. And it was upon both of these that his career of greatness was built.

I will now proceed to trace briefly some of the most marked and important lines of Daviel's career. His early life remains in great obscurity. But he was evidently given a fair education, after the custom of the time and place in which he lived, and in due time he was apprenticed to his uncle, a surgeon at Rouen. Who that uncle was history does not enlighten us. In 1713, when he was twenty years old, he was attached to the army as student-surgeon, and served under different surgeons and in various army hospitals for several years. For some time, also, previous to the autumn of 1720, he continued his studies in Paris at the Hôtel-Dieu.

In May, 1720, the plague broke out in southern France, and the great distress and loss of life caused by it led to a call for assistance. Physicians and surgeons were especially needed. In the autumn of 1720 a circular was posted in the hospitals and medical schools of Paris and other cities of France, asking for volunteers to go to the relief of the stricken provinces. Daviel was one of the first, among twenty student-surgeons, to offer his services. On Oct. 25, 1720, he was examined by La Fosse, surgeon ordinary to the King, and on October 28 was commissioned to go to the relief of the plague-stricken sufferers. From a letter written by Daviel at Digne on March 17, 1721, we learn that he departed from Paris on Oct. 28, 1720, and arrived at Digne on the 16th of the following November. From thence he went to Toulon, Arles, Salon and Marseilles, reaching the latter city May 4, 1722. At each of these places he was faithful to his mission and attentive to the sick of the community, even in the face of fearful dangers, many of his comrades falling by his side, and surrounded as he was by the most discouraging conditions and heart-rending scenes.

It was at Salon, however, that his services received special recognition. Here he was thrown into close rela-

tion with the family of a prominent surgeon of the place, Joseph Felix, members of which were sick with the plague, the younger daughter, Marie, dying from it on

Jacques Daviel (1693-1762), originator of the operation of extraction of cataract—1752.

Sept. 23, 1721. Daviel cared for her at the Saint-Roch Infirmary with such faithfulness and solicitude that he became the object of very friendly regard by the whole

family. This feeling of friendship soon developed into passionate affection between Daviel and the remaining daughter, Annette, who was then twenty-one years of age, and on April 19, 1722, his devotion was rewarded by her giving to him her hand in marriage.

The plague had subsided in southern France, and the young couple were in the full enjoyment of their honeymoon, when the alarm was again sounded that the devastating disease had reappeared in Marseilles, and on May 4, the fifteenth day after their marriage, Daviel and his young wife departed for that city, where he rendered the same faithful services as in other places. Fortunately, the recurrence was of short duration. During the whole epidemic every member of the medical corps devoted himself, body and soul, to the relief of the afflicted. Many of the physicians succumbed in the combat, others fought until the end, and no one deserted his post. Some of the leading physicians were rewarded by pensions and ennobled, and to the subordinates, among them Daviel, the King made generous gifts, beside presenting to each of them the cross of the Knight of Saint-Roch, bearing on one side the inscription, "propter fugatum pestem Massiliensem," and on the other, "Lud. XV institut.," with permission to wear it—an honor which was highly esteemed.

Daviel remained at Marseilles and made that city his abode for nearly twenty-five years and there established a surgical practice and acquired a surgical experience and skill which were the foundations of his future fame.

When Daviel came to Marseilles he had never been admitted to the mastership in surgery, and only masters had the right to practice independently. Not wishing to submit to the usual examination for admission, termed the "chef-d'œuvre," he availed himself of a royal ordinance of 1676, which gave the aldermen of the city power to grant letters of mastership to student surgeons who had served in the plague. On application

he and three other plague surgeons were accordingly made master surgeons by the aldermen on Aug. 13, 1722. The master surgeons of the city, however, refused to recognize the letters of the aldermen and to admit the recipients into their ranks, and prohibited them from opening "shops of surgery." The aldermen intervened in the prohibition, and brought the case before parliament on May 29, 1723, and on June 25, following, parliament condemned the action of the master surgeons and ordered that the masterships granted by the aldermen be recognized and that the plague surgeons be admitted into the corporation of master surgeons without examination.

Daviel's career as a master surgeon was now begun. Being a man of intelligence, of an inquiring mind and also being energetic and ambitious, he at once set himself resolutely to work. He had already won the support of the aldermen of Marseilles, as shown by their granting him letters of mastership in surgery and defending him in the action brought by the master surgeons against him in Parliament, and again their favor was solicited and he was appointed, on Oct. 30, 1723, one of the surgeons of the Hôtel-Dieu of that city. This was an honor that he coveted, not only for the prestige that it gave him in the community, but also for the opportunity which the position afforded him of prosecuting the anatomic and surgical studies of which he was so extremely fond. No sooner was he installed in the service of the Hôtel-Dieu than he sought to avail himself of the provisions of the ordinances of 1724, creating royal demonstrators of anatomy and surgery, and at once he became a candidate for that office in the hospital to which he was now attached. Heretofore there had never been official teaching of anatomy and surgery in the hospitals of Marseilles, and Daviel felt that this neglect should no longer continue. He not only had proved himself a man of ability and energy, but had also distinguished

himself for his courage and self-sacrifice during the epidemic of the plague. He soon had the confidence of the physicians and surgeons of the King, and through the recommendation of Georges Marechal, the first surgeon of the King, he was one of the first to be named royal demonstrator of anatomy. From the first year of his hospital service he gave regular courses of instruction in anatomy and surgery. His instruction was appreciated by those who followed him, and on May 4, 1728, he received official appointment by a decree of the aldermen and lieutenants general. Ten years later, through the influence of La Peyronie, who was then acting first surgeon to the King under Marechal, he received royal approbation, and Louis XV appointed him "royal demonstrator of surgery and anatomy."

In 1738, then, Daviel's position as demonstrator became a royal appointment, and he was, in the meantime, given unusual privileges in regard to cadavers. Besides using them for public demonstrations, he put them to his own profit in the study of anatomy and in perfecting himself in the use of surgical instruments and in the maneuvers of surgical operations.

That Daviel was an enthusiastic student and teacher of anatomy is shown by a statement of Monsieur de Joyeuse, a contemporary and friend of his and physician-in-chief of the galleys, in which he says: "That Daviel never has enough cadavers." Daviel's work as a teacher was not fruitless, for many of his students became distinguished practitioners.

Besides being made surgeon to the Hôtel-Dieu and being admitted to the body of master surgeons, he was, at about the same time, appointed surgeon-major to a galley at Marseilles, and in the exercise of the functions of this office his practice and experience were enlarged, much to his surgical and personal advantage.

It was in this service that he performed his first operation for cataract, using the method of depression, which

was the only one then known. The result was successful, and it so fixed public attention on him that his services as an oculist at once began to be in demand.

Says Dr. Chavernac of Aix-en-Provence: "From that moment hard, incessant work created for him a new existence. All changed face. The first half of his life disappeared and was eclipsed by the second. Daviel, the humble anatomist, became an oculist of the first order."

One of his contemporary biographers, d'Apples of Lousanne, says that it was at about 1730 that Daviel performed one of his earliest operations for depression of cataract. It was on a respectable Swiss porter of Madame d'Orleans. He had been treated by another skilful surgeon unsuccessfully, but after Daviel's operation he had vision, even to an advanced age, sufficient to attend to his affairs and to read the smallest characters with a magnifying lens.

The success which attended Daviel's first operations on the eye deepened his interest in the diseases of that organ. He energetically availed himself of the anatomic material which was at his disposal, supplementing his work on the eyes of the living with experiments and operations on those of the dead. He acquired much skill as a surgeon-oculist, and soon gave himself up exclusively to ophthalmic practice. As early as 1736 his reputation as an oculist had become so great that he was called to Lisbon, the capital of Portugal, to operate.

During the eighteenth century, as well as in other centuries, men of genius and reputation were attracted to Paris, and Daviel was no exception. In 1746 he removed to Paris, arriving there November 7 of that year, and thereafter made that great medical center of the world, at that time, his abode. He was then fifty-three years old and was at the zenith of his activity. His reputation was already extended. According to the

records of the Royal Academy of Surgery,[2] he was elected a corresponding associate member of that body in 1740 and was stated to be master in arts, surgeon at Marseilles, surgeon maintained on the galleys, member of the Society of Sciences of Toulouse, member of the Academy and Institute of Sciences of Bologne, and royal professor and demonstrator of surgery at Marseilles. His being appointed to these positions alone proves that he had distinguished himself long before he left Marseilles. But at Paris his fame greatly increased, undoubtedly in part on account of his merits, but in part, also, through the influence of his professional friends of the court. Louis XV appointed him his surgeon-oculist by "the reversion of M. de Luze" in 1749. He had already been made councilor and surgeon-ordinary to the King.

According to a notice, undoubtedly inspired by Daviel, published in the Mercure de France of July, 1749, it is shown that, while he had lived in Paris since 1746, his family arrived there on May 8, 1749; that he had been honored by an appointment as oculist to the King on Jan. 1, 1749; that he used his house as a sort of a private hospital, and that he there gave instruction on diseases of the eyes.

Soon after Daviel established himself in Paris he began to publish some of his experiences and conclusions, mostly in the form of letters, and in a few instances as "memoirs." The first letter[3] was to his friend, de Joyeuse, and was dated Sept. 30, 1748. From this time on his views were given more frequent publicity, and while he showed himself attentive to ocular diseases generally, it became manifest that he was most zealous in the study of cataract and in devising better means of curing it. This first letter to de Joyeuse fully indi-

2. Mémoires de l'Académie Royale de Chirurgie, Tome i, Paris, 1743, p. 36.

3. Mercure de France, September, 1748, p. 198.

cates the trend of his mind, and in it is shown especially his dissatisfaction with the old method of depressing cataract. He then attributed much of the difficulty and

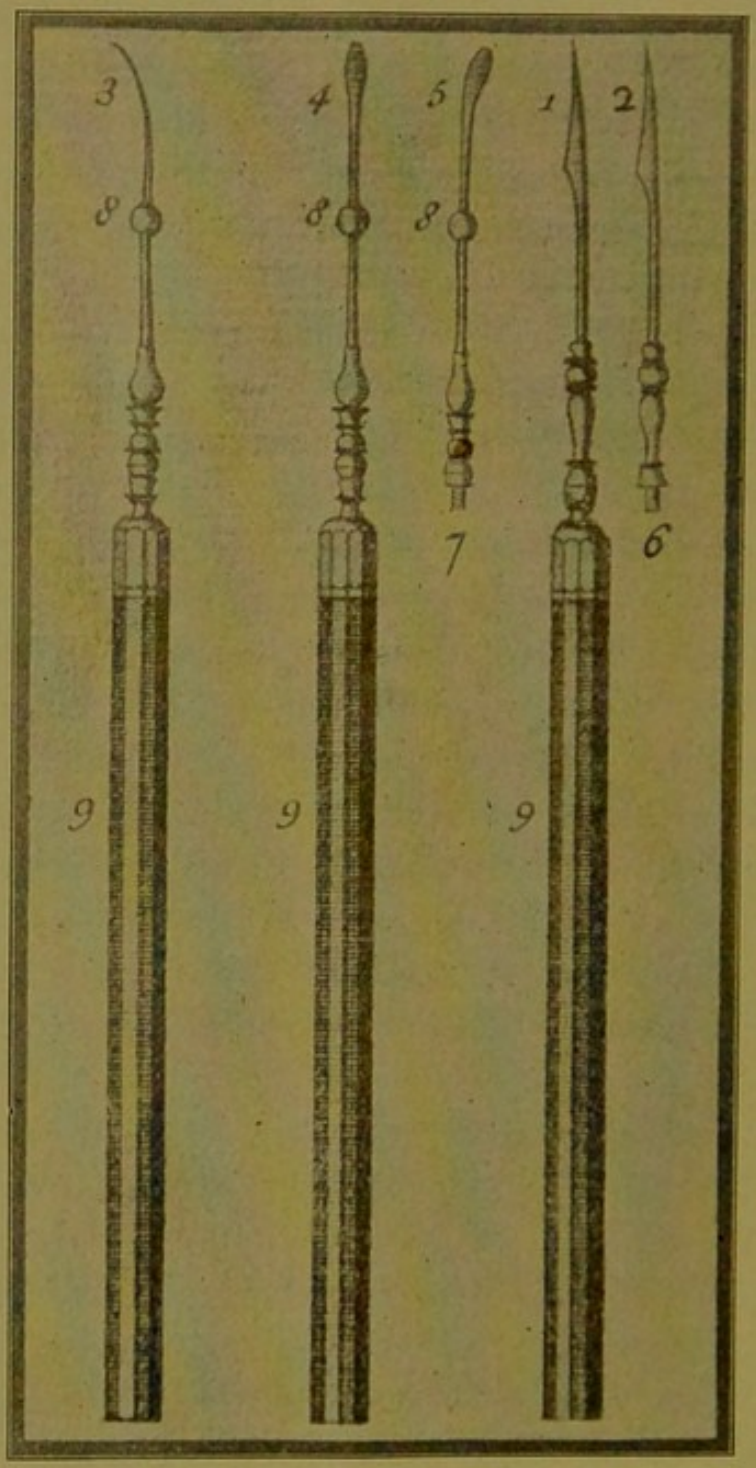


Plate I.—Daviel's improved instruments for depressing cataract (1745-1748).

many of the bad results to the use of sharp-pointed and sharp-edged "needles." He said that this operation for cataract "has always seemed to me to be very doubtful.

* * * It is only after many experiments performed on the eyes of cadavers and a large number of operations on those of the living, with the view of perfecting the method of depressing cataract, that I have learned all the dangers and all the points of doubt which one can have in this matter. In multiplying my experiences and observations I have been forced to recognize, at last, that it is far from being a fact that this operation is as certain and as easy as many people have believed, and as I believed, myself, when I began to practice it. I owe this confession to the truth, although it seems, at first, to do some wrong to the art to which I have been entirely devoted for about eighteen years, and which I have resolved to practice exclusively the rest of my life." Daviel was fully confirmed in the opinion that there was nothing more dangerous than to carry a pointed and sharp-edged instrument into the eye, and proceeded to show the advantages of the instruments which he had devised for the operation of depression, and which are shown in the accompanying plate (Plate 1) taken from Mercure de France, April, 1750, page 26 (Figures 1, 2, kind of a small bistoury in handle and unmounted, used to incise the membrane of the eye; 3, 4, 5, blunt and plano-convex instrument, with which, introduced through the opening, the operation is finished, shown in profile at 3, full size at 4, unmounted at 5, screw to enter handle 6, 7, sort of buttons at 8, 8, 8, and the handles at 9, 9, 9). In this letter, also, Daviel says that he devised his "flat needle with a blunt end" in 1745, while he was at Marseilles, on account of the trouble he had in the case of Brother Felix, a hermit of Aiguille, on April 8 of that year, with the sharp needle. He adds that on Oct. 18, 1745, he operated on the seventh patient by his new method, whose cure "did him so much honor." For some time afterward Daviel continued to depress cataract by his new method, which he says he brought to a "point of certainty by continu-

ing to make experiments daily on the eyes of cadavers." It consisted in making an incision in the lower margin of the cornea with a small bistoury, and then passing a blunt "needle" through this opening on to the anterior surface of the lens, and depressing it into the vitreous humor in the usual manner. This first letter also refers to numerous other operations on the eye and its appendages which he performed, showing the variety of his ophthalmic practice. And it does more; it describes the first case recorded in modern times of extraction of cataract from the "posterior chamber" of the eye. This case was that of Monsieur Garion, a master wigmaker of Paris. Having done his best to depress the cataract, but failing, Daviel decided to open the lower part of the cornea. This he did, although it "presented great difficulties on account of the cornea having become much relaxed and almost collapsed from the outflow of the aqueous humor, half of which had passed out through the first puncture which had been made to depress the cataract." The exact manner in which he opened the cornea on this occasion he does not describe. After making the opening he held it apart by lifting the corneal flap with a small forceps, and with the "needle" introduced into the "posterior chamber of the eye" the lens was brought out, followed by a small portion of vitreous humor.

The patient at once distinguished objects and recognized several persons who were pointed out to him. The operation was so successful that no pain followed. The corneal wound cicatrized perfectly, the eye regained its natural form, and although the pupil was slightly oblong, this was perceptible only to the eyes of members of the profession, and the patient could see to read distinctly with a cataract glass. Such is the description of the case nearly in Daviel's own words. He regarded it as an operation without precedent and as being one of too great interest to the public to pass over in silence.

The result was so successful that it gave him, as he says in the letter, "great ideas in regard to the extraction of cataract."

Daviel, in this letter, in referring to the case of Brother Felix, does not tell us that he extracted even a part of the lens through the corneal incision. On the contrary, he says that by means of a "needle without point or edge," he succeeded in depressing the cataract of the poor hermit, upon whom "he had labored vainly for nearly half an hour." In 1752, however, he speaks of this case again, and tells us that in the operation on Felix, in 1745, he "enlarged the first opening of the cornea with small, curved scissors, and by this means all that was in the anterior chamber (portions of broken lens and blood) was evacuated."

It is probable that after withdrawing the blood and some of the lens substance from the eye, he then depressed the remainder of the cataract (the nucleus) in the usual way, leaving the pupil, as he says, clear and enabling the patient to distinguish objects. The eye, however, was lost by subsequent suppuration. The case of Brother Felix should therefore be classed with those of depression.

These two cases impressed Daviel deeply, and reflections upon them, as he admits later, led him soon to make further trials of extraction as a definite means of treating cataract.

Daviel had, long before this, acquainted himself with the experiments of Maître-Jean, Brisseau and of those who followed them, and he had studied the writings of Pourfour du Petit, Woolhouse, Heister, Taylor and others. He knew that both Charles St. Yves and Jean Louis Petit had, in 1707 and 1708, each extracted a lens through an incision in the cornea which had become dislocated, accidentally, into the anterior chamber. In short, he was familiar with the true nature and varieties of cataract and the methods of treating it

known and practiced by his predecessors, and from personal experience he understood the difficulties and dangers attending the standard operation of depression. His experience, therefore, with Brother Felix in 1745, and with Monsieur Garion in 1747, led him to ask the question whether the bad consequences of depression, with which he was only too familiar, could not be averted by extracting the cataract through a cornéal opening. He set himself to work to answer this question. He had clear judgment, his mind was richly stored with anatomic knowledge and his hand was trained to dextrous manipulation. The failure from which he believed he might have escaped in the case of Brother Felix had he performed a premeditated extraction, and the success in the extraction following the unsuccessful attempt at depression in the case of Garion, were sufficient to encourage him to seek comparisons between extraction and depression.

Soon after the Garion case an opportunity was afforded him to put to the test the new treatment which his experience had suggested to him and to perform his first predetermined and prearranged extraction. The case was that of a woman whose name, age or condition he does not mention. He opened the cornea with a small knife and then enlarged the incision with small curved scissors, as he had done on Felix and Garion. He then passed a small spatula to the upper part of the cataract and "detached it," and with this instrument drew it out in small pieces. The pupil appeared clear, there was not the slightest accident, and in fifteen days the patient was well. Subsequently, in four other cases, the new method was successful. Further trials gave him more and more assurance of its superiority over the old operation of depression, and finally, in 1750, he had sufficient experience to cause him to resolve, thereafter, not to operate except by extraction. His cases grew more and more numerous, and he was called to various estates

and cities to operate. At Rheims, in September and October, 1751, he performed forty-three operations, assisted by the young surgeon Caqué. These operations were reported to the Royal Academy of Surgery of Paris soon afterward and created great excitement. A

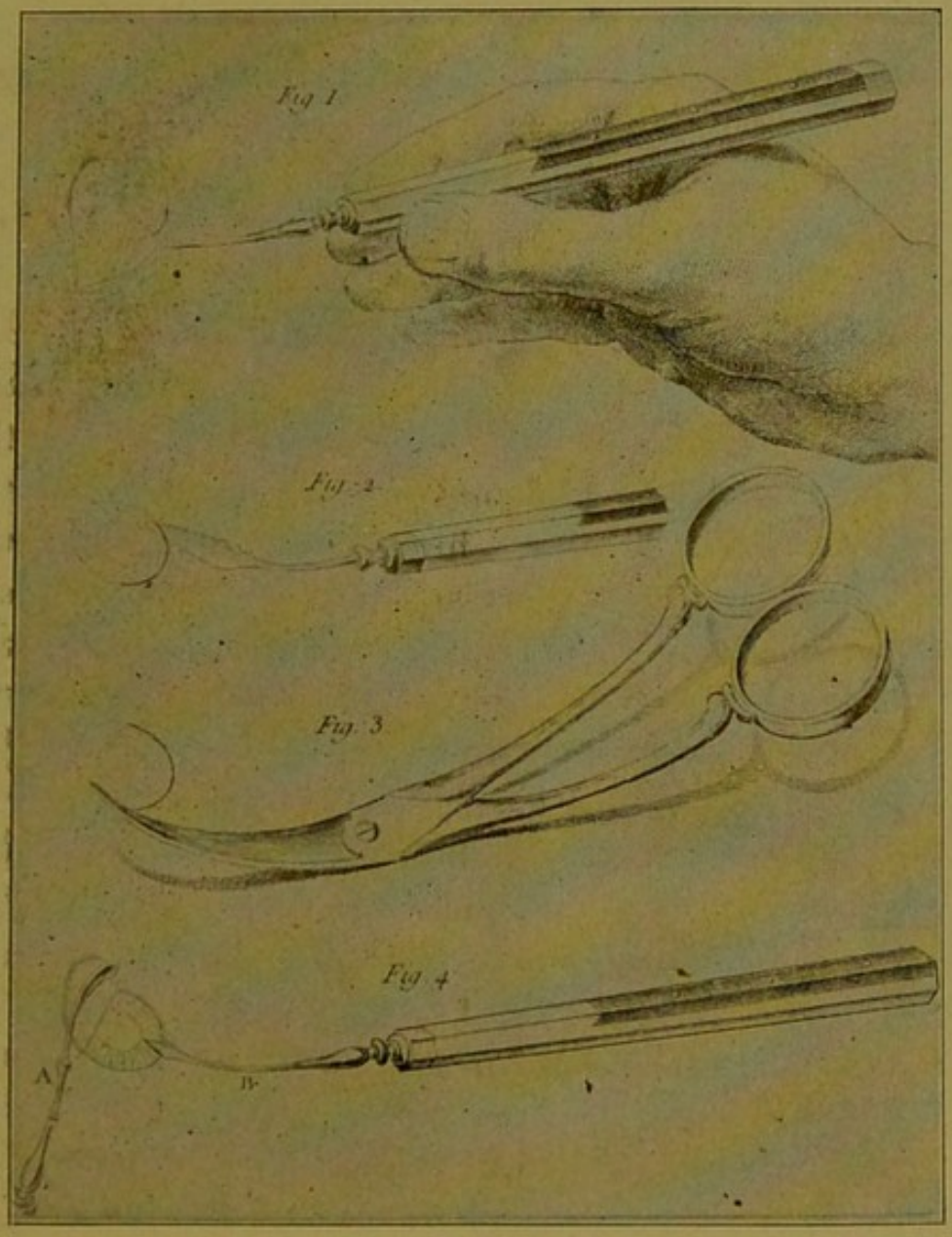


Plate II.—Daviel's operation of extraction (1752).

few indorsed the new method and many opposed it. But Daviel held firmly to it, and in 1752, the year we now commemorate, he considered it sufficiently perfected and sufficiently fortified by good results to submit it to the world. This he did through that learned and discrim-

inating body, the Royal Academy of Surgery of Paris, in a memoir read twice, according to the rules of the Academy, the first time on April 13, 1752, and the second time on November 16, the same year. It was published in 1753.[4] While Daviel had been performing his operation for several years, while many physicians and surgeons had witnessed it, while J. B. Thurand, one of his pupils, had already described it in a thesis sustained one month before Daviel's memoir was first read before the Academy, and while several surgeons had spoken of it more or less publicly, yet his memoir was the first detailed presentation of the new operation by the author himself.

The operation which he had invented and now made public consisted in incising the lower part of the cornea exactly at its junction with the sclera. He first made an opening into the anterior chamber at the extreme lower margin of the cornea with a myrtiform or triangular-shaped knife, and then, after withdrawing this, he enlarged the incision on both sides with a narrow, blunt-pointed, double-edged knife as far as he could easily, and finally when the cornea became too much relaxed to continue the incision he completed it to the extent desired with delicate scissors, which were so curved on the flat and edge as to correspond to the curve of the corneo-scleral line. These, of course, were made right and left, and the blade to be introduced into the anterior chamber was blunt pointed. According to this memoir the incision was of equal extent on both sides of the cornea, and was carried to a point on each side "a little above the pupil." Having completed the incision he gently lifted up the corneal flap with a small spatula and incised the anterior capsule of the lens with a sharp-edged needle.

After doing this he carried the spatula between the

4. Mémoires de l'Académie Royale de la Chirurgie, Tome ii, Paris, 1753, p. 337.

lens and the iris "so as to entirely loosen the cataract and facilitate its issue." After the cataract was delivered the corneal flap was then allowed to fall into place. If the cataract happened to be soft and "glairy" or broken into pieces, the remnants were removed with a curette. The pupil might sometimes be disarranged by the passage of the lens, especially if it was large and hard, and it should then be readjusted. The corneal

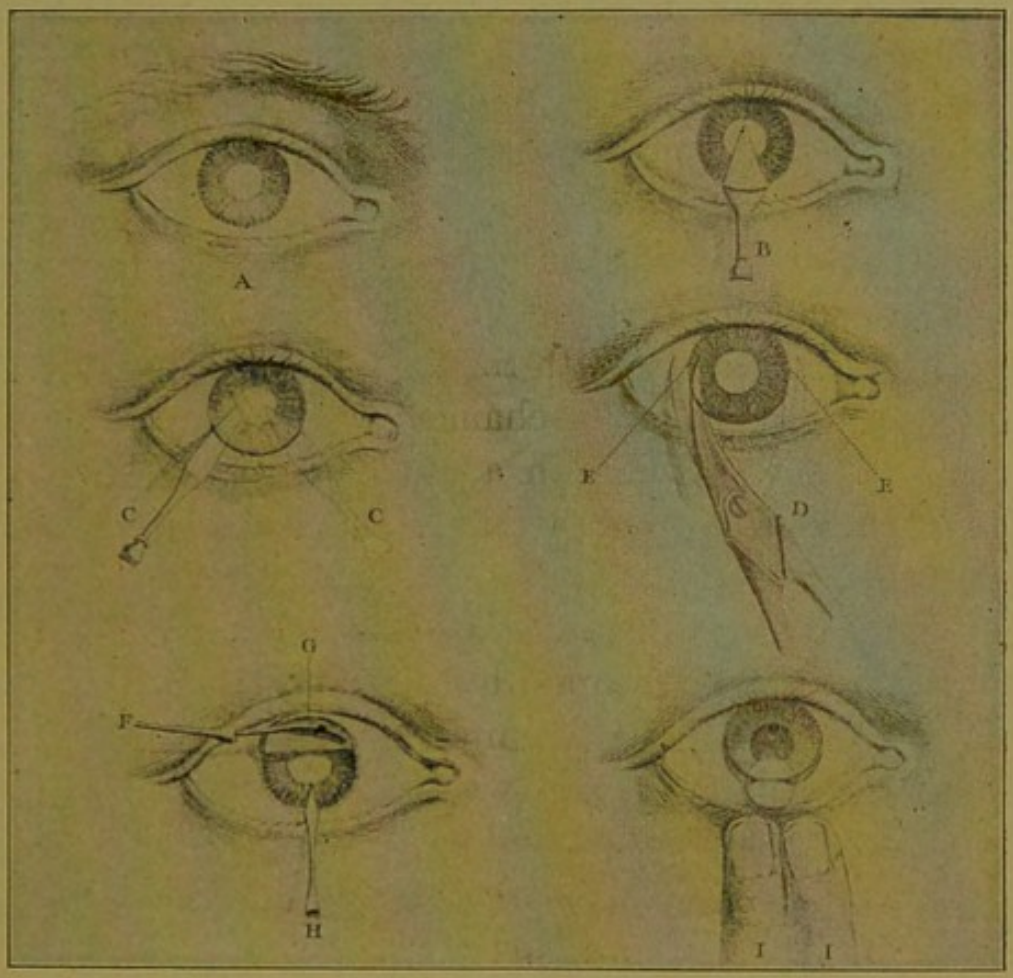


Plate III.—Daviel's operation of extraction (1752).

flap being accurately replaced, the eye was gently cleansed and covered with a small compress, over which plasters were applied and the whole was kept in place by a bandage without much pressure. Some cases required strong pressure to deliver the cataract. Adhesions of the lens to the iris were to be broken up with a small spatula. There might be hemorrhage into the aqueous chamber from wounding the iris, but the blood was

easily removed through the incision and did not interfere with the operation. The escape of the aqueous humor during the operation was of no consequence, but if the first knife be withdrawn too quickly in beginning the corneal incision, the iris might follow and be caught between the lips of the wound, when it could be easily disengaged by opening the wound with a spatula, if it did not become replaced by the natural movements of the eye. In the course of healing the iris might pass through the wound and cause staphyloma, and it should be replaced. Such protrusion could almost certainly be avoided by being careful to dress the eye without compressing it with the bandage. The escape of vitreous humor was not considered to be a serious accident. Such, then, was Daviel's operation, omitting the directions as to the position of the patient, surgeon and assistant during the operation and some minor details.

In his original operation he made his incision so as to include considerably more than one-half of the circumference of the cornea. Although this has been denied by Dr. de Wecker, it is proved beyond question to be a fact by statements of his contemporaries, by his own description that it was carried "a little above the pupil" on each side, and by the plates accompanying his memoir at the time of its publication, of which the figures hereby shown are photographic copies. (Plates 2 and 3.) He did, however, shorten the incision afterward, even before the expiration of 1752, so as to include only the lower half of the cornea.

Evidently the capsule and iris made trouble for Daviel, occasionally, the same as they do for us to-day. but he was always ready with means to overcome it. A dense thick capsule was treated by excising a central piece of it before extraction. A prolapsed iris was to be cut off, if it could not be returned, no harm coming from the incision. In case the sphincter of the iris was tight and unyielding, he divided it with scissors, a pro-

cedure which Dr. Chavernac of Aix (in Provence) has recently favored as a valuable accessory to the simple operation. He also, later in his practice, performed iridectomy in some cases in the course of the operation, as is shown by his own words in a letter to the celebrated von Haller, dated Sept. 30, 1761. In speaking of the case which von Haller had sent him for operation he said: "I took away one-half of this membrane (the iris) in order to form an artificial pupil, since the natural one had been almost entirely obliterated and destroyed. * * * * This is not the onlv time that I have been obliged to take away the iris or to make a section of it, and without having seen the least accident follow. I have some great observations to give on this subject." Unfortunately, Daviel did not live to publish them.

In the last years of his life Daviel tried a modification of the incision, making a triangular flap instead of a semi-circular one. This he did by cutting with a small bistoury from below and inward in a direction upward and outward across the cornea to a point on a level with the horizontal meridian of the eye, and then, from this point cutting upward and inward across the cornea with a slender pair of scissors, and thus completing the other side of the triangle. He had also experimented with the triangular flap with its base upward. (See Figs. 1 and 2.) This method required fewer instruments to execute it, and he claimed some advantages for it. But he did not live to give it an extended trial, and nothing more came of his suggestion.

The operation of 1752, with the incision lessened in extent before the year expired so as to include only one-half the circumference of the cornea, remains, therefore, the model which Daviel handed down to posterity. He had given the best years of his life, for he was then fifty-nine years old, and his best thought and study to developing and perfecting it. He admitted that acci-

dents might attend the operation, but he said, "they are very slight in comparison to those which may happen after the ordinary operation" (that of depression), and its advantages were many. Other surgeons afterward proposed the use of knives of various kinds in making the corneal incision with the view to lessening the number of instruments and saving time in the performance of the operation, but with all the fervor of a true Frenchman, he opposed them vigorously and defended his own method as being safe, easy of execution and successful. His own words were: "My method is simple in all respects. The eye should be free when it is operated upon, especially if one desires to operate artis-

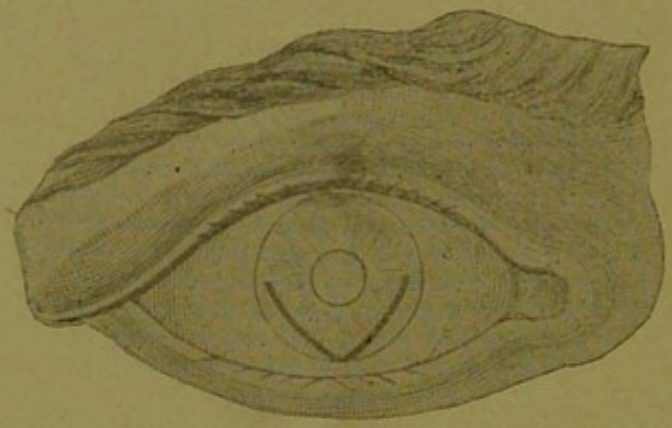


Fig. 1.—Daviel's triangular flap of 1761 [redacted] (de Wecker).

tically. Forceps, hooks, the *speculum oculi* and narrow or broad knives are dangerous instruments, capable of exciting spasm of the eye, of tearing the iris, of expelling all the vitreous humor."

Daviel's operations were smooth and artistic, and their successes far outnumbered, proportionately, those by the old method. At different times reports were made of the number of his operations and their results. In November, 1750, his friend, Vermale, stated that he had then extracted twenty-three cataracts without a failure. Daviel said in his memoir of 1752 that he had then operated 206 times with 182 successes. In a letter addressed to "Journal des Savants," dated Jan. 12, 1756, he said: "I think no one doubts the excellence of

so good a method, for out of 354 persons that I have operated on, 305 were perfectly successful." Again, in a letter to J. L. Hoin, surgeon at Dijon, dated Dec. 12, 1756, he stated that he had, during the preceding six months, extracted 80 cataracts with only one failure. Adding this number to the total reported six months before, and it would make the whole number of Daviel's operations up to the close of 1756, 434, with 50 failures. How many operations he performed between the end of 1756 and the time of his fatal illness in September, 1762, is not known. The number must have been larger, however, than during the time preceding the close of 1756, when he made his last report.

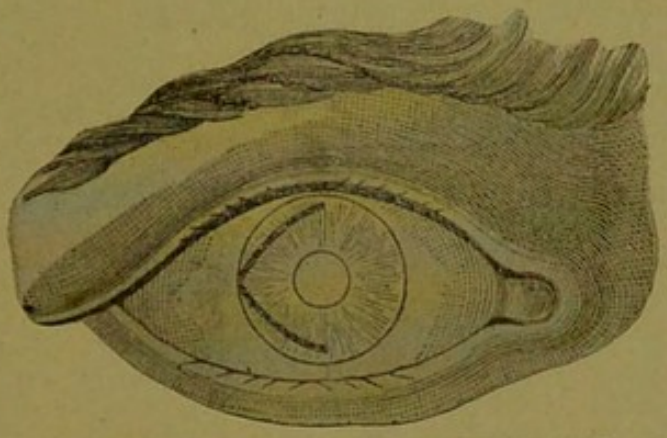


Fig. 2.—Daviel's triangular flap of [illegible] 1762 (de Wecker).

Of course, better results are obtained now with our antiseptic methods, but his results were remarkable in view of the new and untried method, and they grew better with his increased experience.

It is true that Daviel made his incision downward, but there is much that could be said in its favor. It is within the memory of many now living that the simple flap extraction with incision downward was practiced by the most eminent operators of the world. Even to-day so eminent an ophthalmologist and operator as Dr. Schweigger[5] of Berlin is practicing it.

The review given above shows that Daviel continued

5. Archives of Ophthalmology, vol. xxvii, 1898, p. 255.

that same active life in Paris which he had manifested in Marseilles. His position as oculist to the King and his close and friendly relations to the most distinguished surgeons and physicians, not only of Paris, but of all France, gave him a clientele from 1750 to 1762 which probably has never been equaled in number or celebrity by any other oculist for a similiar period of time. His practice was exceedingly large in Paris, and he was called to all parts of Europe to operate. Not only did he treat the rich, but he served the poor as well, and with a devotion and generosity that has seldom been outdone. The learned Diderot, who was acquainted with him and who had seen him operate, exclaimed, "who has not known the famous Daviel or heard him spoken of?" Again he says: "The beneficence of Daviel brought patients to his laboratory from all the provinces of the kingdom who came imploring his help. His reputation attracted an assemblage both curious, learned and numerous."[6]

As I have said, Daviel's contributions to ophthalmic literature were not numerous. He wrote a few letters to professional friends, some of which were explanatory of his work and methods of operation, and some were controversial. The earlier ones referred especially to his improved method of depressing cataract, and later to his new operation of extraction. Among the later ones of especial interest were those written to the renowned von Haller. Beside the celebrated memoir of 1752, he read other memoirs before the Royal Academy of Surgery, one in 1756, defending his method and instrumentation, and another in 1762, describing his modified, triangular incision. Another memoir on "Congential Cataract" was published in one of the French medical journals in 1762. In 1755 he presented a paper to the Royal Society of London on "Cancer of the Eyelids," and in 1759 one on "Two Adherent Cat-

6. Diderot: Addition à la lettre sur les Aveugles.

aracts" to the Academy of Sciences of Stockholm. His correspondence and papers are of supreme interest, but it is impossible for me to draw from them further at this time.

Daviel was recognized as a man of science and professional distinction, and was elected to membership to nearly all the scientific bodies and academies of Europe. Not only was he honored by scientific bodies, but poetry paid tribute to his genius and art personified his career in an allegorical design, leaving us, in the meantime, the only original portrait of him now in existence.

Daviel had three sons and several daughters. The eldest son, Henri, became a surgeon and was his father's assistant for several years. In 1757 he sustained a thesis on cataract, and in it defended the method of operating devised by his father, even the use of the scissors. He entered the army, serving there as surgeon-major to a regiment of cavalry, and was untimely cut off by a malignant fever at Zell, Hanover, in 1758. The other two sons were afterward spoken of as cadets in the army, and it is believed that one of them became a surgeon. Otherwise, both they and their sisters have been lost to history.

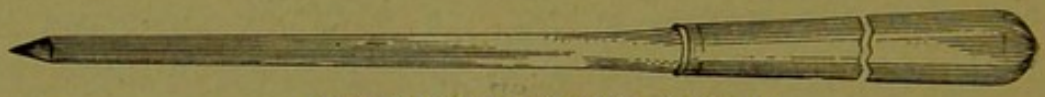
Early in 1761 Daviel began to develop symptoms of throat trouble. According to one of his friends, who saw him in August and September of that year, he complained of "a derangement of his tongue which impeded his speech somewhat," this impediment being attributed to the "viscousness of the saliva." At the meeting of the Royal Academy of Surgery on April 22, 1762, when he presented his memoir describing the triangular incision in the operation of extraction of cataract, he was unable to read it, because of "the results of a paralysis," and Morand read it for him, "while he indicated the manual of it on a figurative chart."

Daviel left Paris about Easter time, in 1762, and

spent the following summer in different parts of France, hoping to become improved in health. He arrived at Lyons early in September, and from there he went to Geneva, to consult the celebrated physician,

KNIFE OF DE LA FAY (1753)

KNIFE OF SHARP (1753)



KNIFE OF POYET (1753)

KNIFE OF BERANGER (1756)

KNIFE OF TENON (1757)

KNIFE OF PAMARD (1759)

Plate IV.—First knives used in cataract extraction.

Tronchin. Without the knowledge of his physician he took a violent purgative. This was followed by a "colliquative" diarrhea and fever, and he became rapidly worse, and died at 6 o'clock a. m. on Sept. 30, 1762.

being then 69 years of age. Tronchin had the body opened, and it was found that "the whole mass of blood was impoverished, and the muscles of the pharynx and larynx were affected with paralysis." Those who have studied the case in recent years believe that the disease was cancer of the larynx with an invasion finally of the esophagus (Haltenhoff). The Hôtel de la Balance, at Place de Bel-Air, Geneva, where Daviel died, still exists. He died alone in a foreign land and left a wife, two sons and several daughters at home to mourn his loss. He was buried in the Roman Catholic cemetery at Grand Sacconex, near Geneva. The Swiss oculists, in 1885, erected there a monument to his memory. Following their example, monuments have been erected at La Barre and Bernay, in Normandy, and busts of him have been placed in the Hôtel-Dieu of Marseilles, and in the General Hospital at Montpellier. The city of Rouen is perpetuating his memory by naming one of its streets after him. These are rather tardy recognitions, but they are deserved, and may better come late than never.

There is much in Daviel's life and work on which it is impossible even to touch within the limits of an address. His operation of cataract extraction was his great achievement. Having demonstrated the value of it to the satisfaction of all "open minds," his method was immediately taken up, experimented with, verified and simplified. As I have stated in another paper,[7] his surgical colleague Georges de la Faye was the first (Nov. 11, 1752) to suggest a single knife with which to make the corneal incision, but Samuel Sharp of London was the first to put such an instrument to actual use on the living (April 7, 1753). From that time henceforward the single knife, modified in different ways by Poyet of Paris (1753), Joseph Warner of London (1754), Louis Béranger of Bordeaux (1756), Jacques Réné Tenon of Paris (1757), Pierre-François-Benezet

7. Ophthalmic Record, November, 1900.

Pamard of Avignon (1759) and by others in rapid succession, soon became the powerful rival of Daviel's knives and scissors, and finally, long before the eighteenth century closed, it superseded them entirely. To follow the variations which were made, and to note the auxiliaries used to separate the lids, to steady the eyeball, to incise the capsule of the lens, etc., would be impossible on this occasion. It is sufficient to remark that the narrow knives of de la Faye, Sharp and Tenon were the forerunners of all subsequent ones, even those of to-day. Those of Béranger and Pamard became the example of Beer and his followers, while a medium ground was taken between the narrow and broad knives by Wenzel, Richter and many others (see Plate 4). It was not long after Daviel died that his instrumentation had no champion, but his downward incision was practiced for a century. Pamard was the first to make an upward incision on a patient, Aug. 13, 1784, and he reported it to the Royal Academy of Surgery, Paris, in a letter dated August 17 of the same year; but his example was not followed till later in the eighteenth or commencement of the nineteenth century, and then only by a few.

Such, then, were the actual beginnings of the modern operation of the extraction of cataract. The way had been prepared by Maître-Jean, Brisseau and their followers, who demonstrated beyond question the true nature of cataract. The two cases of Jean Méry, in each of which a cataract had been dislocated into the anterior chamber of the eye and was extracted by St. Yves and Petit, respectively, through a corneal incision, with the recovery of the patients, proved the possibility of removing the lens from the eye without the loss of that organ. It therefore remained only for a man of courage, intelligence and foresight like Daviel to utilize the observations made before him and to join them to his own experience, and out of both to devise a method by which,

as a regular procedure, a clouded lens might be taken out of the eye and yield better results than by displacing it into the vitreous humor.

One hundred and fifty years have now passed since Daviel first handed over to the public this product of his genius. During that time his operation has been the subject of the closest attention and study by ophthalmologists and surgeons throughout the world, and it has undergone an infinite number of modifications and shadows of modifications, and yet to-day, substituting for Daviel's knives and scissors the modified knife of Tenon, of 1757, as represented in the von Graefe knife, and changing the incision from downward to upward, the classic operation of Daviel continues to be, essentially, the ideal one as exemplified, I believe, in the practice of de Wecker, Panas, Webster, Knapp and many others.

This altogether too hasty glance at the career of Daviel brings before us a man of great energy, enlightment, wisdom and genius. He knew how to assimilate the experiences of others with his own, and how to make both contribute to the overcoming of the obstacles which were ever presenting themselves to him. He was always studying for improvements, and was sincerely desirious of doing all in his power to relieve suffering. He had great love for the applause of the world, but he never lost sight of the amenities and duties of his profession or of its philanthropy. He availed himself of every opportunity for acquiring and also imparting knowledge, and sought every laudable means of advancement. He courageously faced every difficulty and never flinched in combat. But in all his endeavors, in all his victories, nothing has so marked his genius as the "invention" which we celebrate to-day. The world may forget that he had the courage and patriotism to battle against a devastating disease from which 40,000 fell, that he was a distinguished and benevolent surgeon and

oculist, that he was greatly honored by learned bodies, by the court and by his King, but it will never forget that he bequeathed to it a surgical operation which, in its far-reaching and beneficent results, is comparable, it seems to me, only to the surgical heritage, laparatomy, transmitted to us by our own countryman, Ephraim McDowell.

Let us never cease to admire the genius and courage of this man, or to emulate his example of patient industry, experimential study and practical application of means to ends. Let us inscribe him on our memories as one of the great benefactors of mankind and one of the mighty heroes in medicine.