Souvenir Henry Hill Hickman Centenary Exhibition : 1830-1930, at the Wellcome Historical Medical Museum.

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HICKMAN

CENTENARY EXHIBITION

1930

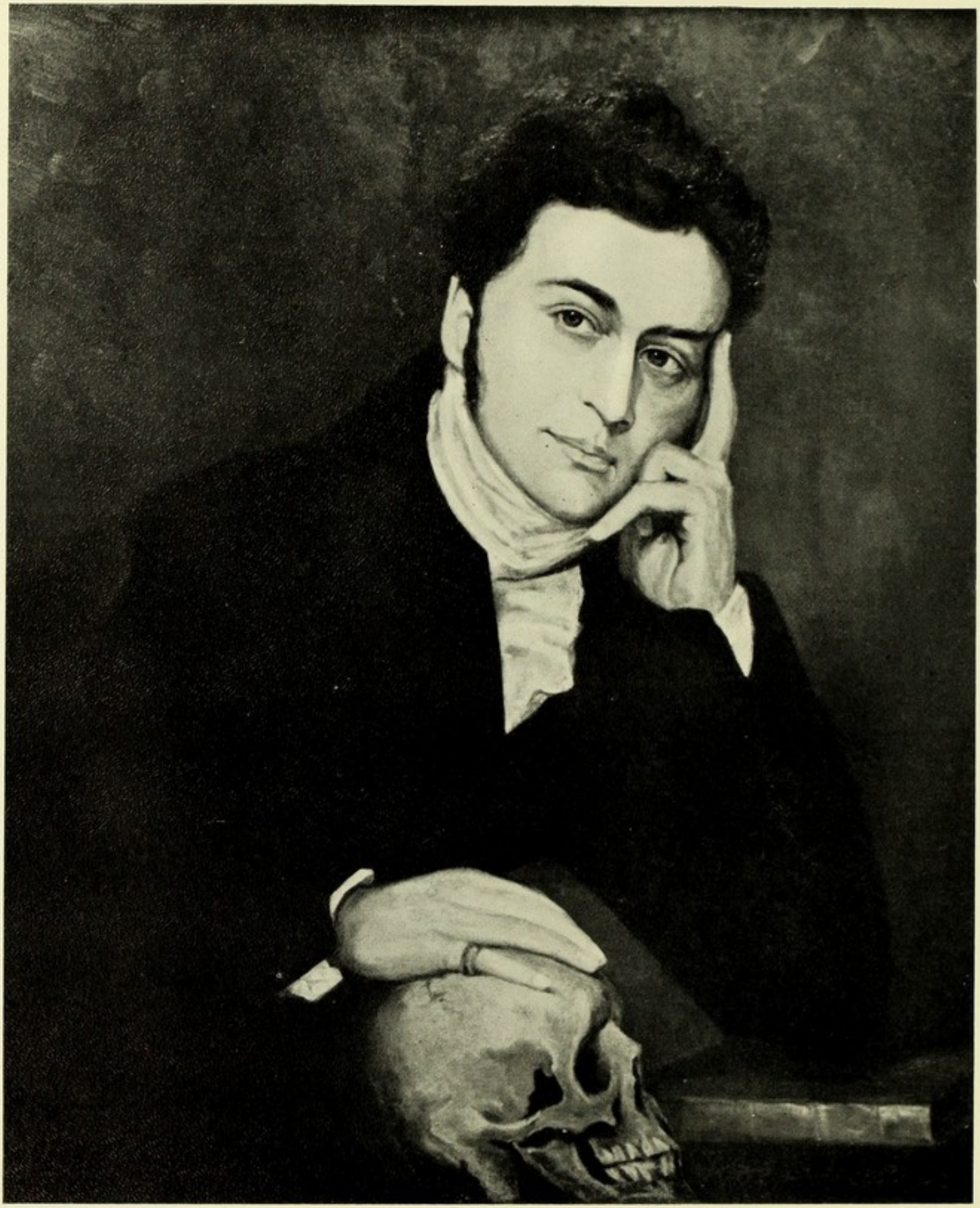
THE WELLCOME
HISTORICAL MEDICAL
MUSEUM
LONDON

HICKMAN

CENTENARY EXHIBITION

LONDON

1930



HENRY HILL HICKMAN, M.R.C.S.

From an Oil Painting in The Wellcome Historical Medical Museum

SOUVENIR

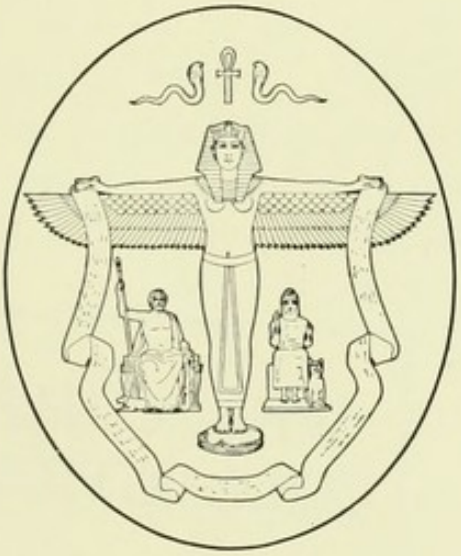
HENRY HILL HICKMAN CENTENARY EXHIBITION

1830—1930

AT

THE WELLCOME HISTORICAL MEDICAL MUSEUM

54, WIGMORE STREET, LONDON, W.1



HENRY S. WELLCOME, LL.D., F.S.A.
DIRECTOR

L. W. G. MALCOLM, M.SC. (Cantab.), F.R.S.E.
CONSERVATOR

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PREFACE

The Wellcome Historical Medical Museum resulted from the researches of Dr. Henry S. Wellcome, over many years, into the development of the healing art. It was formally opened in August, 1913, as an historical medical exhibition organised in connection with the Section of the History of Medicine at the XVIIth International Congress of Medicine held in London.

In the preparation of this Museum, Dr. Wellcome made special researches for evidences of agents employed by mankind throughout the ages to lull and numb the senses, and to alleviate pain and suffering.

These investigations into the History of Anæsthesia revealed amongst other things, certain unrecorded documents relating to Hickman's part in the History of Anæsthesia. Documents dealing with the investigations of Henry Hill Hickman were found among official archives in Paris, and others were obtained from members of Hickman's family in England.

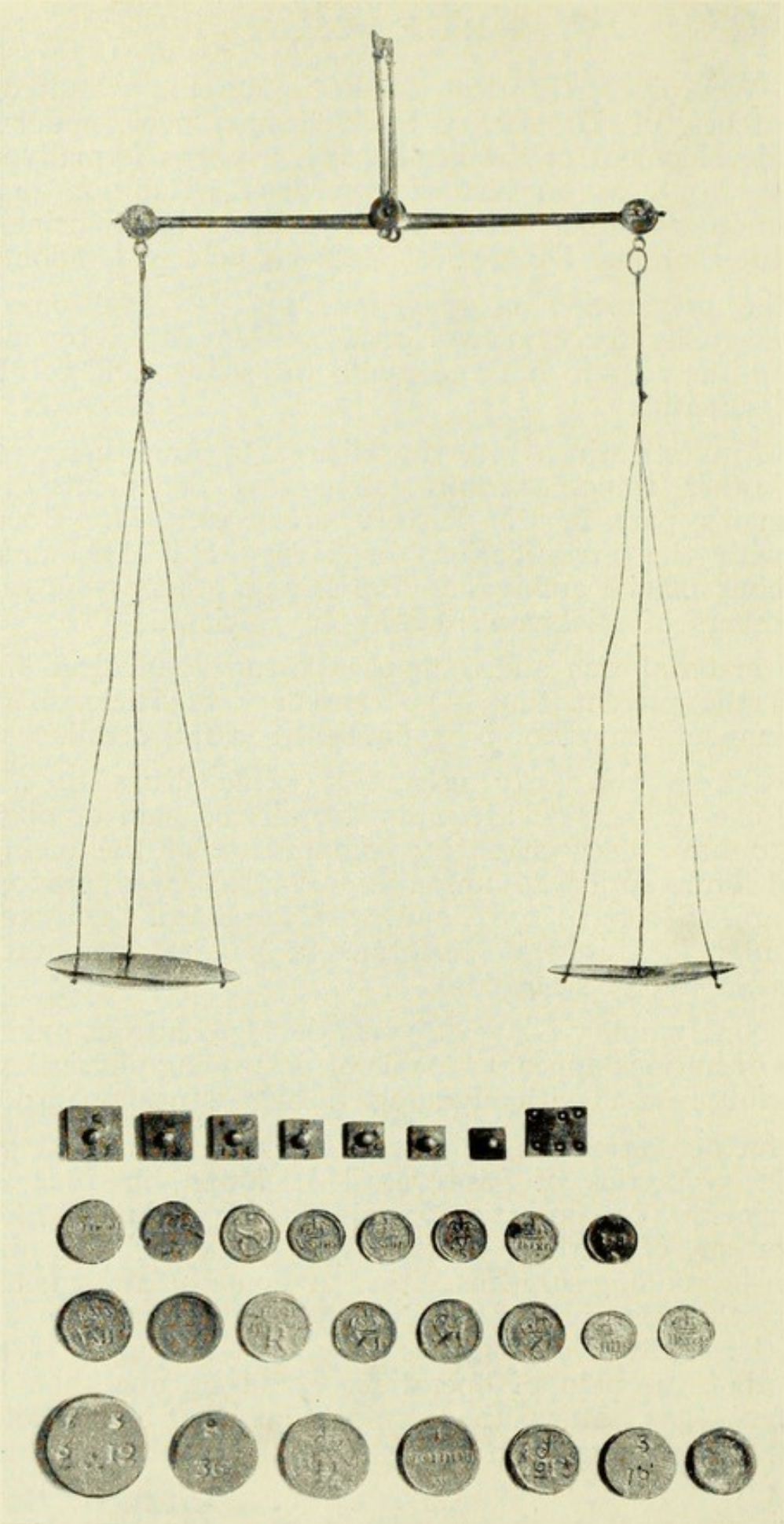
This material was added to the Historical Medical Museum, but until the present time—the centenary of Hickman's death —the documents have not been published in full detail.

Apart from the early use of soporific drugs to alleviate suffering, one of the first attempts to dull the pain of operations appears to have been made by compression of the main nerve trunks of limbs prior to amputation. This was proposed by by Dr. James Moore in 1784, and, with the aid of "compressors," John Hunter in this year performed a painless amputation of the leg in St. George's Hospital.

In 1800, Humphry Davy *suggested* that "as nitrous oxide in its extensive operations appears capable of destroying physical pain, it may probably be used with advantage during surgical operations."

No further attention appears to have been paid to the anæsthetic properties of gases until Hickman, in 1824, carried out experiments by operating painlessly (on animals) after the administration of carbon dioxide gas. Although he did not succeed in persuading surgeons, either at home or abroad, to allow him to try this gas as an anæsthetic on their patients, he at least deserves the credit of having been the first, so far as is known, to prove that the pain of operations could be abolished by the inhalation of a gas. It is perhaps unfortunate that he did not follow Humphry Davy's suggestion in regard to using nitrous oxide.

JOHN D. COMRIE.



HICKMAN'S SCALES AND WEIGHTS

Reproduced from the originals in The Wellcome Historical Medical Museum

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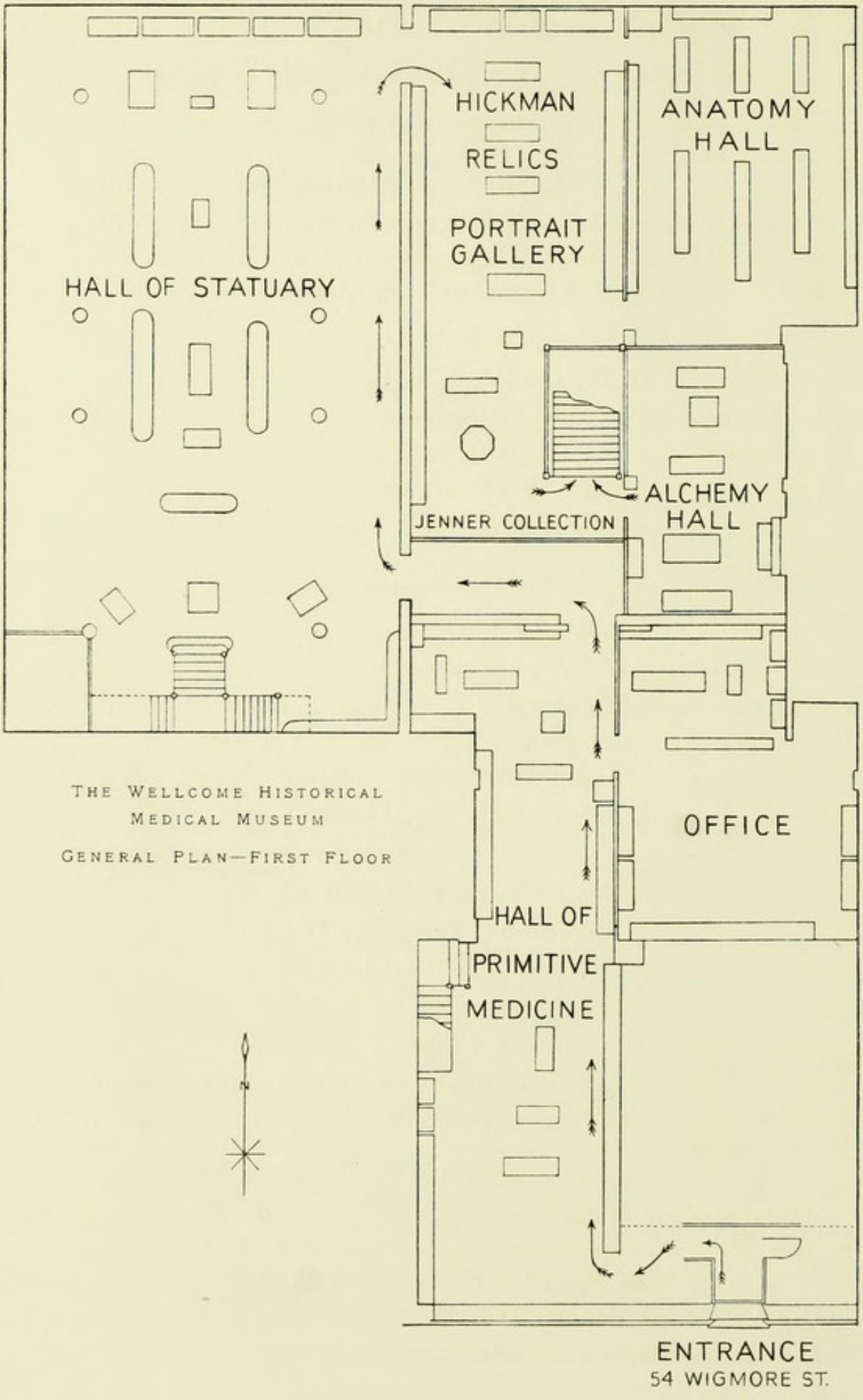


THE WELLCOME HISTORICAL
MEDICAL MUSEUM

GENERAL PLAN—FIRST FLOOR

HICKMAN CENTENARY EXHIBITION

THE WELLCOME HISTORICAL MEDICAL MUSEUM

An Exhibition of Hickman Relics has been arranged at The Wellcome Historical Medical Museum in connection with the centenary of his death. It includes the authentic records of Hickman's experiments and demonstrations, his portrait, personal relics, memorabilia, etc. This Collection is shown in cases in the Portrait Gallery *(see Plan on opposite page)*.

EXHIBITS

MS. Holograph letter to T. A. Knight, dated February 21, 1824.

MS. Description of Experiments made by Hickman on Animals under Carbon Dioxide, 1824.

Pamphlet. Published by Hickman in 1824.

MS. Holograph letter to Mrs. Hickman, dated April 21, 1828.

MS. Memorial to King Charles X, with Hickman's Autograph, dated 1828.

Facsimile. Copy from the Register of the Direction des Etablissements d'Utilité publique au Ministère de l'Intérieur.

Facsimile. Nomination of a Commission deputed by the Medical Section of the Académie Royale de Médecine, Paris, to examine Hickman's claims. Dated September 28, 1828.

MSS. Holograph letters from Dr. Dudley to Mrs. Hickman.

MSS. Copies from Medical Journals relating to Hickman's work.

Scales and Weights used by Hickman.

Door Plate from Hickman's Professional Residence.

Notice Card from Hickman's Consulting Room.

Visiting Card used by Hickman in Paris.

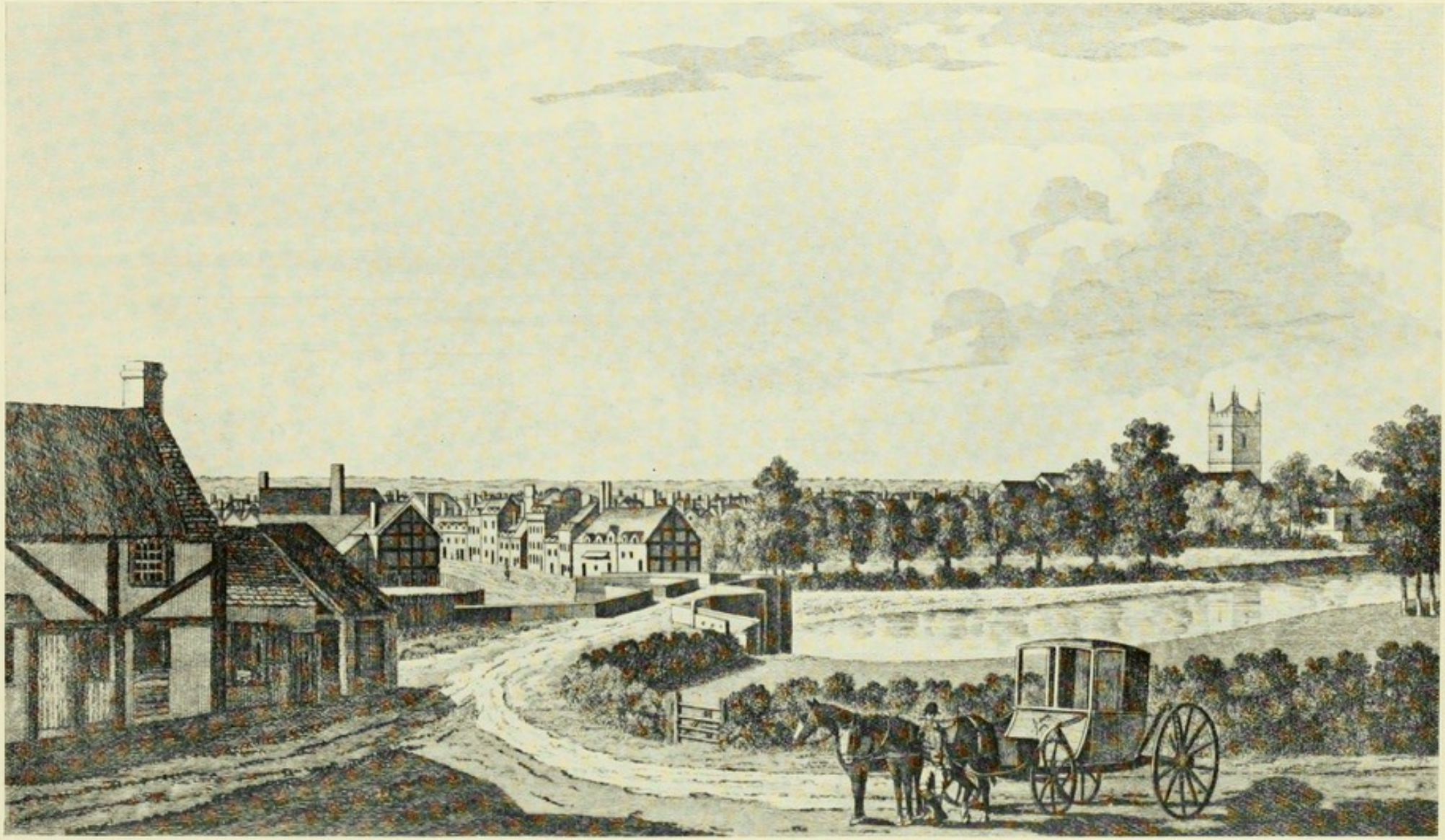
Flowered-Silk Waistcoat worn by Hickman.

Portrait. Henry Hill Hickman. Replica from the original.

Oil Painting. Hickman experimenting with anæsthesia on animals.

ACKNOWLEDGMENTS

The Director wishes to express his thanks for the help he has received from all quarters; and especially to Mrs. Bettridge, of Tenbury, and Miss Blanche E. Thompson, M.P.S., of Birmingham, granddaughters of Henry Hill Hickman, who have contributed, by presentation or loan, valuable material.



TENBURY
From an Old Engraving

FOREWORD

BY

DUDLEY WILMOT BUXTON, M.D., B.S., M.R.C.P.

Late President of the Society of Anæsthetists; President of the Sections of Anæsthetics, British Medical Association, 1913, and the XVIIth International Medical Congress, London, 1913; etc.

IT is extremely difficult to appraise justly the work of Henry Hill Hickman, even to evaluate the man himself. Undoubtedly was it the great Principle—anæsthesia—for which his propaganda stood, as it was the developments of this Principle which made for the aftermath—Anæsthesia as we know it to-day. Hickman is the central figure, around him gradually have become grouped those things which have grown into modern anæsthesia.

It is not possible to estimate what were the influences at work culminating by slow degrees into an underlying science, that which is now called Anæsthesia, and the overlying Art, an art which has opened the way to the advances of surgery undreamed of by the surgical giants who lived in those times —Robert Liston, Astley Cooper and the rest.

During three decades, 1800—1829, Hickman had lived his life, had demonstrated a Principle which was to revolutionise the outlook of the science of medicine and the art of surgery. To some it might seem, and no doubt in those days did seem, that Hickman was a dreamer of dreams, a blind seeker for light. However, when we trace his footprints in the scanty sands of his brief life we find how much he accomplished, and we recognise how courageous was the man who in total self-abnegation was able to leave an indelible impress on the science of all time, and to

establish a Principle such as those who followed could accept for their guidance and control.

To appreciate what Hickman, an unknown village doctor, did accomplish in five brief years, we must take stock of the standard of knowledge among the leaders of thought in the medical world of his day; we must ascertain the current ideas, the shibboleths and the accepted dogmas of the teachers. Had they learnt the little that they could be taught and accepted their limitations, and did their minds remain sufficiently alert to receive new facts such as those which Hickman imparted?

The current literature of the days when Hickman lived reveals the fact that although vigorous search was being made in the medical world for drugs which could assuage the sufferings of disease, but little advance, if any, had been attained in the direction of surgical anæsthesia. Poignant suffering appeared to be accepted as the natural and indeed inevitable accompaniment of the surgeon's work. Hence surgery in those days was restricted within very narrow limits. The surgeon was called upon in emergencies, to remove such diseased structures as were removable; but his skill to explore the hidden places of the body or his ability to repair what needed repair was limited by his lack of an anæsthetic and the necessity of great rapidity in operating, lest "the blood be spilt."

With the rapid increase made in the knowledge of the chemistry of the gases by Lavoisier, Priestley, Davy and Faraday, came Hickman's inspiration. The chemists and the physicists, possibly with the exception of Davy, exploited pneumatic chemistry for the treatment of respiratory and pulmonary diseases, but never as an adjuvant of the surgeon's craft.

Dr. Beddoes, with the Pneumatic Institute, at Clifton, Bristol, enjoyed a great vogue. The teaching of Davy and of Faraday familiarised men's minds with the respiratory system as a means

for treatment, and no doubt Hickman knew all there was to be known upon the subject, but from him alone came the application of inhalation to produce anæsthesia.

Hickman recognised that vapours introduced into the lungs and thence into the circulation of the blood should provide a means of ensuring sleep for the sufferers who had to face the surgeon's knife. He grasped the principle—the method was to follow. We must appreciate in Hickman the true scientist. He set about to prove the Principle by adopting the correct methods of research. His experiments are remarkable, when we envisage the days in which he lived; also they are accurate, so far as the physiology of his day could make them. He sought for a means whereby he could produce anæsthesia in animals by inhalation, and he adopted recognised gases as a means of arriving at this end. Further, he believed that his methods would not only lead him to the discovery of anæsthesia, but would also enable him to prevent hemorrhage. Unfortunately, his protocols do not supply all the details of the experiments, though we are led to believe that true anæsthesia rather than asphyxia was one of the lines along which his investigations were conducted. His work with carbon dioxide was certainly along a correct path, and was a long way ahead of his times.

It is quite clear that Hickman was deeply imbued with the Principle which he set out to establish. He was convinced that in that Principle lay the key which would unlock the mysteries of anæsthesia. The methods would follow as a matter of course. Hence was it that he proclaimed his discovery to the world and published it for those whom he regarded as fellow scientists, seeking their aid to work out all the details.

Hickman was sure of himself, and of the accuracy of his experiments. He needed, however, the confirmation of his experiments by their extension to human patients, and so he turned to his professional brethren and sought their aid, never doubting that they would accept his work and show themselves as keen as

he was to acclaim the dawn of one of the two greatest discoveries in medical science which would prove a boon to suffering humanity. He asked for no guerdon, he sought no reward; the man of science gave freely and without stint.

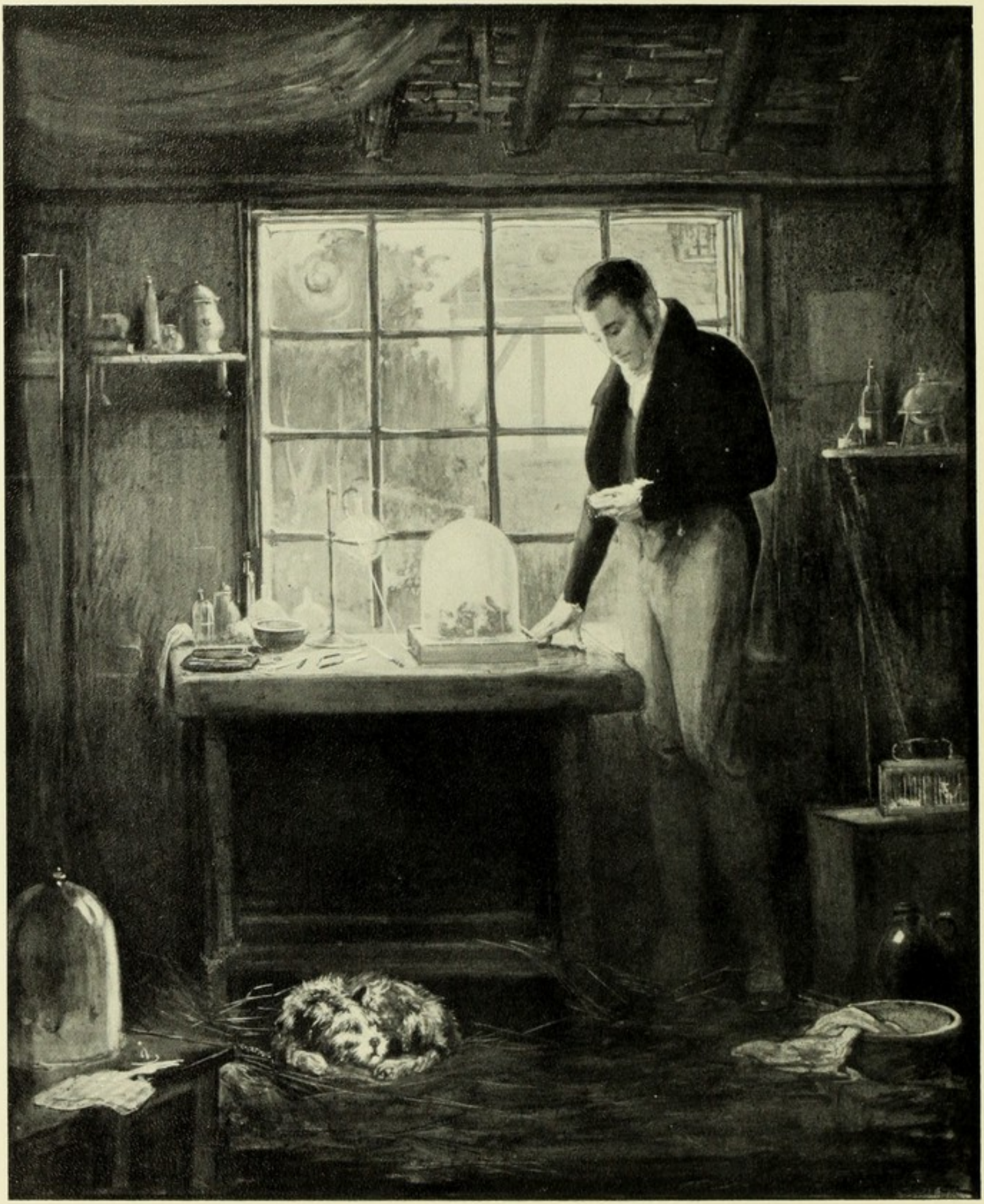
It seems to us now almost incredible that so few of the scientists of that day should have recognised and accepted as at least worthy of examination the work which Hickman spread before them. Sir Humphry Davy was President of the Royal Society, and although Hickman's friend, Mr. T. A. Knight, was asked to bring the work before the Society, we can discover no record of his paper being read or being received into the archives of that emporium of learning. Even in the Royal Academy of Medicine of France which held the premier rank in that day in the world of learning we can trace only a derelict report, received but never accepted until many years after Hickman's death; in this report the learned doctors of France once again referred to the English doctor, but gave his discovery unhonoured, if decent, burial, in the coffers of the Academy. Hickman's hands were clean. His claim for recognition was the guerdon of one who lived before his time.

There is another and a pleasanter aspect of the man whose centenary is now being celebrated, and that is the story of Hickman's work and aspirations. It would appear that Hickman was practising medicine alone, first at Ludlow, then at Shiffnal, and outside the routine of a country doctor's labours he had the preoccupation of how to alleviate the pangs of surgery. He it is who assures us that he is "the servant of the public"; he sought no self-adulation, and would obtain relief for human suffering, and hoped to do so by operating upon animals in a torpor. His principle of suspended animation or, as we term it, anæsthesia, was subjected by him to the rigid test of experiment with members of the lower animals. His successes seemed to warrant its application to human beings, and so he sought his surgical confrères' aid, and begged them to protect their patients from the ordeal of the knife. He published his letter to the public, and with it he described his experiments. Now these are truly remarkable, and their description calls for careful study. He selected carbonic acid gas—a gas which had been known as a soporific

but not as an anæsthetic. He anæsthetised mice and puppies and an adult dog, and obtained not asphyxiation, but true anæsthesia; and, further, he recognised the importance of maintaining the constant flow of the blood and of being prepared to meet and deal with circulatory collapse. It would appear that Hickman's work stands out as the first successful attempt which was made to experiment upon the lower animals in order to test the reasoning involved in the research under investigation. So he dealt with the discovery of Anæsthesia. The use of all the other anæsthetics was subsequently made known by accidental circumstances, *e.g.*, nitrous oxide with Horace Wells, Crawford W. Long with ether, Simpson with chloroform, and the rest. Thus it is a remarkable tribute to Hickman's ability that he should adopt the experimental method, for we must remember that he was not a physiologist, but one whose knowledge was, even if crude, at least acquired by himself, with precision and forethought. Anæsthesia was no doubt his aim, but he knew, being a surgeon, that the obvious way of obtaining stupor was by asphyxia; at the same time, he also recognised that asphyxia was the handmaiden of death, a peril, not an assistance, to the work of the surgeon. Hickman primarily sought anæsthesia, for that discovery, he recognised, would open wide the door to an improved and enlarged domain for surgery, but he kept a watchful eye upon the environment of the subject. He was not content with suspended animation as an adjuvant to surgery, for, as his experiments indicated, he wished to avoid all asphyxial complication, and so prevent hemorrhage. Indeed we know that this loss of blood was one of the worst dangers and difficulties of those days. As we look back through the vista of years, we are struck by the genius of Henry Hill Hickman, by his courage, by his width of outlook, and his scientific acumen. His was a voice calling from the unknown generations to come, and what was clear to him was a dream, even a fairy tale, to his contemporaries. Let us do honour to this man: he sought no praise, he asked for no worldly honour, enough for him that he had lived for the benefit of his day and for all time.

BRASS DOOR PLATE FROM HICKMAN'S SURGERY
Reproduced from original in The Wellcome Historical Medical Museum

HICKMAN'S HOUSE IN TEME STREET, TENBURY
as it appears at the present time



HICKMAN EXPERIMENTING WITH ANÆSTHESIA ON ANIMALS

From an Oil Painting in The Wellcome Historical Medical Museum

The success which he attained after numerous experiments convinced him that similar experiments on human beings by his methods would be of inestimable value to mankind by making all surgical operations painless. He enlisted the interest of his friend, Mr. T. A. Knight, of Downton Castle, near Ludlow, whom he addressed as a President of the Royal Society*; and in a letter to him, dated February 21, 1824, he gave a full account of his investigations :—

Dear Sir,

The object of the operating surgeon is generally considered to be the relief of his patient by cutting some portion of the human body whereby parts are severed from each other altogether or relieving Cavities of the aggravating cause of disease. There is not an individual who does not shudder at the idea of an operation, however skilful the surgeon or urgent the case, knowing the great pain that the patient must endure, and I have frequently lamented, when performing my own duties as a Surgeon that something has not been thought of whereby the fears may be tranquilised and suffering relieved. Above all, from the many experiments on suspended Animation I have wondered that some hint has not been thrown out, of its probable utility, and noticed by Surgeons, and, consequently, I have been induced to make experiments on Animals, endeavouring to ascertain the practicability of such treatment on the human subject, and by particular attention to each individual experiment, I have witnessed results which show that it may be applied to the animal world, and ultimately I think will be found used with perfect safety and success in Surgical operations. I have never known a case of a person dying after inhaling Carbonic Acid Gas, if proper means were taken to restore the animal powers, and I have no hesitation in saying that suspended animation may be continued a sufficient time

* T. A. Knight was elected a Fellow of the Royal Society in 1805. He was a personal friend of Sir Humphry Davy, who was President of the Royal Society from 1820 to 1827. Knight was never one of the Presidents of the Royal Society. A search in the records of the Royal Society has not revealed the existence of any reference to Hickman's work.

Carbonic Acid Gas, if proper means were taken
to restore the animal powers and I have no hesi-
-tation in saying that suspended animation
may be continued a sufficient time for
any surgical operation providing the Surgeon
acts with skill and promptitude, and I think
it would be found particularly advisable in
Cases where haemorrhage is likely to be dangerous
or the Surgeon is apprehensive of Gangrene
taking place after the operation as it is
well known that carbon has a most pow-
-erful antiputrescent quality. It will be
found if the means for suspending animation are
slow and gradual the return of the powers of
life will be in the same proportion, if the means
of suspension are sudden it generally happens
by the application of certain agents that the
return of life is quickly so and I think it very
probable, if the Galvanic Fluid could have
been applied in Cases that have proved fatal
the persons may have been saved. —
From a number of others I have selected the
experiments now sent, each is correctly noted
in as few words as possible, & which I think
will prove a vast object, with great respect
I am Sir, Yours Obt. St.

Ludlow Feby. 21-1824 H.H. Hickman

T.A. Knight Esqr.

HICKMAN'S LETTER TO KNIGHT, FEBRUARY 21, 1824. PAGE 2

Facsimile reproduction of original in The Wellcome Historical Medical Museum

for any surgical operation providing the Surgeon acts with skill and promptitude; and I think it would be found particularly advisable in Cases where hemorrhage would be dangerous or the Surgeon is apprehensive of Gangrene taking place after the operation, as it is well known that carbon has a most powerful antiputrescent quality. It will be found, if the means for suspending animation are slow and gradual, the return of the powers of life will be in the same proportion; if the means of suspension are sudden, it generally happens by the application of certain agents that the return of life is equally so; and I think it very probable, if the Galvanic Fluid could have been applied in Cases that have proved fatal, the persons may have been saved. From a number of others I have selected the experiments now sent; each is correctly noted in as few words as possible, which I think will prove a vast object. With great respect

I am Dr. Sir Your Obt. St.

(signed) H. H. HICKMAN.

Ludlow, Feby. 21st, 1824
T. A. Knight, Esqr.

Experiment 1st.

March 20th.

I took a puppy a month old and placed it on a piece of wood surrounded by water over which I put a glass cover so as to prevent the access of atmospheric air; in ten minutes he showed great marks of uneasiness, in 12 respiration became difficult, and in 17 minutes ceased altogether, at 18 minutes I took off one of the Ears, which was not followed by hemorrhage, respiration soon returned and the animal did not appear to be the least sensible of pain; in three days the ear was perfectly healed.

2nd.

Four days after the same puppy was exposed to a decomposition of the carbonate of lime by sulphuric acid. In one minute respiration ceased. I cut off the other Ear

Experiment 1st

March 20th. Took a puppy a month old and placed it on a piece of wood surrounded by water over which I put a glass cover so as to prevent the access of atmospheric air; in ten minutes he showed great marks of uneasiness in 12 respiration became difficult and in 17 minutes ceased altogether, at 18 minutes I took off one of the Ears which was not followed by hemorrhage, respiration soon returned and the animal did not appear to be the least sensible of pain, in three days the Ear was perfectly healed.

2nd

Four days after the same puppy was exposed to a decomposition of the carbonate of lime by sulphuric acid. In 1 minute respiration ceased, I cut off the other Ear which was followed by very trifling hemorrhage and as before did not appear to suffer any pain, in four days the wound healed. The day after the operation he seemed to require an additional quantity of food which induced me to weigh him, and found he gained 9oz 1dr & 2½ grains in 7 days.

3rd April 6th

Took the same puppy and proceeded as in Exp. 1st and respiration was acted on in much the same manner. I cut off the tail and made an incision over the muscles of the loins through which I passed a ligature and made it tight. No appearance of uneasiness until the day following when inflammation came on and subsequent suppuration. The ligature came away on the 7th day, wound healed on 10th, and the dog is remarkably increased in size and now perfectly well.

HICKMAN'S MANUSCRIPT RECORD OF EXPERIMENTS, 1824. PAGE 1

Facsimile reproduction of original in The Wellcome Historical Medical Museum

which was followed by very trifling hemorrhage, and, as before, did not appear to suffer any pain, in four days the wound healed. The day after the operation he seemed to require an additional quantity of food, which induced me to weigh him, and I found he gained 9 oz. 1 dr. and 24 grains in 9 days.

3rd. April 6th.

I took the same puppy and proceeded as in Expt. 1st, and respiration was acted on in much the same manner. I cut off the tail and made an incision over the muscles of the loins through which I passed a ligature and made it tight. No appearance of uneasiness until the day following, when inflammation came on and subsequent Suppuration. The ligature came away on the 7th day, wound healed on 12th, and the dog is remarkably increased in size and now perfectly well.

Exp. 4th.

A Mouse was confined under a Glass, surrounded by Water by means of a small tube a foot long. I passed carbonic acid Gas very slowly prepared into the glass, respiration ceased in three minutes, I cut all its legs off at the first joint, and plunged it into a basin of cold water, the Animal immediately recovered and ran about the table apparently without pain; the stumps soon healed and I kept it a fortnight, after which I gave it liberty.

Exp. 5th.

I took an adult dog and exposed him to carbonic acid Gas quickly prepared and in large quantity; life appeared to be extinct in about 12 seconds. Animation was suspended for 17 minutes, allowing respiration occasionally to intervene by the application of inflating instruments. I amputated a leg without the slightest appearance of pain to the animal. There was no hemorrhage from the smaller vessels. The ligature that secured the main Artery came away on the fourth day and the dog recovered without expressing any material uneasiness.

Exp. 4th.

A Mouse was confined under a Glass surrounded by Water. By means of a small tube a foot long I passed carbonic Acid Gas very slowly prepared into the Glass, respiration ceased in three minutes. I cut all its legs off at the first joint and plunged it into a basin of cold water the Animal immediately recovered and ran about the table apparently without pain, the stumps soon healed and I kept it a fortnight when it was given its liberty.

Exp. 5th.

I took a small dog and exposed him to carbonic Acid Gas quickly prepared and in large quantity, life appeared to be extinct in about 12 seconds. Animation was suspended for 17 minutes allowing respiration occasionally to intervene by the application of inflating instruments. I amputated a leg without the slightest appearance of pain to the animal. There was no hemorrhage from the smaller vessels. The ligature that secured the main artery came away on the fourth day & the dog recovered without experiencing any material uneasiness.

Exp. 6th.

Exposed a Rabbit to the same Gas as Exp. 5th. I cut off both Ears and experienced a similar Result.

Exp. 7th.

I filled a glass globe with the Gas exhaled from my own lungs, into it I put a Kitten. In 20 seconds I took off its Ears and tail, there was very little hemorrhage, and no appearance of pain to the Animal.

HICKMAN'S MANUSCRIPT RECORD OF EXPERIMENTS, 1824. PAGE 2

Facsimile reproduction of original in The Wellcome Historical Medical Museum

Exp. 6th.

I exposed a Rabbit to the same Gas as Exp. 5th, and cut off both Ears and I experienced a similar result.

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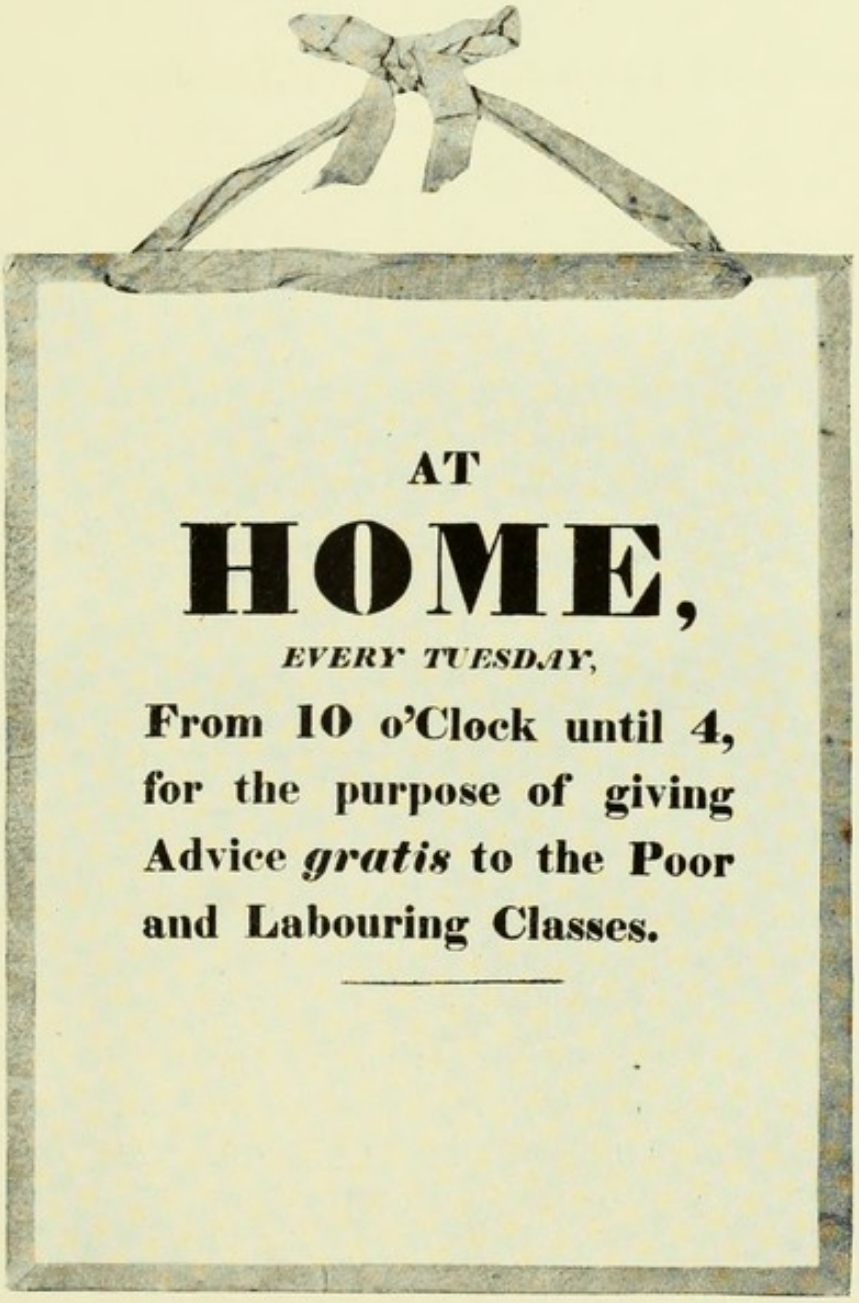
I filled a glass globe with the Gas exhaled from my own lungs; into it I put a Kitten. In 20 seconds I took off its Ears and tail; there was very little hemorrhage, and no appearance of pain to the Animal.



NOTICE CARD FROM HICKMAN'S SURGERY
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A

LETTER

ON

SUSPENDED ANIMATION,

CONTAINING

EXPERIMENTS

Shewing that it may be safely employed during

OPERATIONS ON ANIMALS,

With the View of ascertaining

ITS PROBABLE UTILITY IN SURGICAL OPERATIONS ON THE

Human Subject,

Addressed to

T. A. KNIGHT, ESQ. OF DOWNTON CASTLE,
Herefordshire,

ONE OF THE PRESIDENTS OF THE ROYAL SOCIETY,

[illegible]

BY DR. H. HICKMAN,
OF SHIFFNAL;

Member of the Royal Medical Societies of Edinburgh, and of the Royal College of Surgeons, London.

IRONBRIDGE: Printed at the Office of W. Smith.
1824.

HICKMAN'S PAMPHLET—TITLE PAGE
Facsimile reproduction of original in The Wellcome Historical Medical Museum

Hickman's Pamphlet

In the same year (1824) Hickman published his famous pamphlet, which is given here in full :— Hickman's Pamphlet

A Letter on Suspended Animation, containing Experiments showing that it may be safely employed during Operations on Animals, with the view of ascertaining its probable utility in surgical operations on the Human Subject, addressed to T. A. Knight, Esq., of Downton Castle, Herefordshire, one of the Presidents of the Royal Society.

TO THE PUBLIC

At the particular request of gentlemen of the first rate talent, and who rank high in the scientific world, it is, that the author of the following letter is induced to lay it before the public generally, but more particularly his medical brethren ; in the hope that some one or other, may be more fortunate in reducing the object of it beyond a possibility of doubt. It may be said, and with truth, that publications are too frequently the vehicles of self-adulation, and as such, suffer greatly from the lash of severe criticism ; but the author begs to assure his readers, that his views are totally different, merely considering it a duty incumbent on him (as a medical practitioner, and servant to the public), to make known any thing which has not been tried, and which ultimately may add something towards the relief of human suffering, arising from acute disease. The only method of obtaining this end is, in the author's opinion, candid discussion, and liberality of sentiment, which, too commonly is a deficient ingredient in the welfare of so important a profession, productive of serious consequences, not only to the parties themselves, but to the patient whose life is entrusted to their care. The duty and object, however, of the Physician and Surgeon, is

generally considered to be the relief of a fellow-creature, by applying certain remedies to the cure of internal affections, or cutting some portion of the body, whereby parts are severed from each other altogether, or relieving cavities of the aggravating cause of disease. There is not an individual, he believes, who does not shudder at the idea of an operation, however skilful the Surgeon, or urgent the case, knowing the great pain that must necessarily be endured ; and it is frequently lamented by the operator himself, that something has not been done to tranquilise fear, and diminish the agony of the patient. With this view of the subject then, it is, that he submits his observations and experiments to the public in the brief form of a letter to a private gentleman of the highest talent as a man of science, who with others, thought them worthy to be laid before the Royal Society ; and if one grain of knowledge can be added to the general fund, to obtain a means for the relief of pain, the labours of the author will be amply rewarded.

A LETTER, ETC.

Sir,

The facility of suspending animation by carbonic acid gas, and other means, without permanent injury to the subject, having been long known, it appears to me rather singular that no experiments have hitherto been made with the object of ascertaining whether operations could be successfully performed upon animals whilst in a torpid state ; and whether wounds inflicted upon them in such a state would be found to heal with greater or less facility than similar wounds inflicted on the same animals whilst in possession of all their powers of feeling and suffering. Several circumstances led me to suspect that wounds made on animals whilst in a torpid state, would be found, in many cases, to heal most readily ; and the results of some experiments which I have made lead me to think that these conjectures are well founded, and to hope that you will think the results sufficiently interesting to induce you to do me the honour to lay them before the Royal Society. The experiments were necessarily made

upon living animals, but they were confined to animals previously condemned to death; and as their lives were preserved, and their suffering very slight, (certainly not so great as they would have sustained if their lives had been taken away by any of the ordinary methods of killing such animals) I venture to hope that they, in the aggregate, rather received benefit than injury. Subjects of different species were employed, chiefly puppies of a few weeks or months old, and the experiments were often repeated, but as the results were all uniform, and as my chief object is to attract the attention of other medical men to the subject, I wish to do little more than state the general results.

Experiment 1st. Dogs of about a month old were placed under a glass cover, surrounded by water, so as to prevent the ingress of atmospheric air, where their respiration in a short time ceased, and a part of one ear of each was then taken off; there was no hemorrhage, and the wounds were healed at the end of the third day, without any inflammation having taken place, or the Animals having apparently suffered any pain or inconvenience from the operation.

Experiment 2nd. After the same animals had fully recovered their powers of feeling, a similar part of the other ear of each was taken off; a good deal of blood now flowed from the wounds, and some degree of inflammation followed, and the wounds did not heal till the fifth day.

Experiment 3rd. An experiment was made similar to No. 1, in every respect, except that the suspension of animation was much more suddenly brought on by the agency of sulphuric acid and carbonate of Lime. The results in this case were not so satisfactory; some blood escaped from the wounds, and a slight degree of inflammation followed, and the wounds did not heal so rapidly as the first experiment.

Experiment 4th. Mice, having been confined in a glass tube of a foot long, were rendered insensible by carbonic acid gas slowly introduced in small quantities, and one foot from each was taken off; no hemorrhage took place upon

the return of sensation, and the wounds appeared quite healed on the third day, without the animals having apparently suffered pain, when they were given their liberty.

Experiment 5th. An adult dog was rendered insensible by means similar to the preceding, and the muscles and blood vessels of one of its legs were divided. There was no hemorrhage from the smaller vessels; a ligature which secured the main artery came away on the fourth day, and the animal recovered without having at any period shown any material symptom of uneasiness. In this experiment animation was suspended during seventeen minutes, allowing respiration occasionally to intervene by means of inflating instruments.

Experiment 6th. A dog was rendered insensible by the means employed in experiment first, and an incision was made through the muscles of the loin, through which a ligature was passed, and made tight; no appearance whatever of suffering occurred upon the return of animation, nor till the following day, when inflammation came on with subsequent suppuration. The ligature came away on the seventh day, and on the twelfth the wound was healed.

As the recital of such experiments as those preceding must be as little agreeable to you, as the repetition of them has been to myself, I shall not give a detail of any others, but shall only state the opinions which the aggregate results have led me to entertain. I feel perfectly satisfied that any surgical operation might be performed with quite as much safety upon a subject in an insensible state as in a sensible state, and that a patient might be kept with perfect safety long enough in an insensible state, for the performance of the most tedious operation. My own experience has also satisfied me that in very many cases the best effects would be produced by the patient's mind being relieved from the anticipation of suffering, and his body from the actual suffering of a severe operation; and I believe that there are few, if any Surgeons, who could not operate more skilfully when they were conscious they were not inflicting pain.

There are also many cases in which it would be important to prevent any considerable hemorrhage, and in which the surgeon would feel the advantages of a diminished flow of blood during an operation. I have reason to believe that no injurious consequence would follow if the necessity of the case should call for more than one suspension of animation; for a young growing dog was several times rendered insensible by carbonic acid gas, with intervals of about twenty-four or forty-eight hours, without sustaining, apparently, the slightest injury. Its appetite continued perfectly good, and I ascertained, by weighing it, that it gained weight rapidly. I am not, at present, aware of any source of danger to a patient, from an operation performed during a state of insensibility, which would not operate to the same extent upon a patient in full possession of his powers of suffering, particularly if he were rendered insensible by being simply subjected to respire confined air. I used inflating instruments in one experiment only, and therefore am not prepared to say to what extent such may be used with advantage; but I think it probable that those and the Galvanic fluid would operate in restoring animation in some cases. I was prepared to employ the Galvanic fluid if any case had occurred to render the operation of any stimulant necessary, but all the subjects recovered by being simply exposed to the open air; and I feel so confident that animation in the human subject could be safely suspended by proper means, carefully employed, that, (although I could not conscientiously recommend a patient to risk his life in the experiment) I certainly should not hesitate a moment to become the subject of it, if I were under the necessity of suffering any long or severe operation.

I remain, Sir,

Your obedient Servant,

H. H. HICKMAN.

Shiffnal, Aug. 14th, 1824.

To His Most Christian Majesty Charles X
King of France

Sire,

In addressing Your Majesty upon a scientific subject of great importance to mankind, I feel a properly humble, but a firm confidence in Your Majesty's universally known disposition to countenance valuable discoveries: this relieves me from all apprehension of being considered presumptuous.

Permit me Sire, to state that I am a British Physician, Member of the Royal College of Surgeons London, who has visited Paris in part for the purpose of bringing to completion a discovery, to which I have been led by a course of observations and experiments on suspended Animation.

This object has engaged my practical attention during several years: - It appears demonstrable that the hitherto most agonizing, dangerous and delicate surgical operations, may now be performed, with perfect safety, and exemption from pain, on brute animals in a state of suspended animation. Hence it is to be strongly inferred, by analogy, that the same salutary effects may be produced on the human frame, when rendered insensible by means of the inhalation of certain gases into the lungs: - I have discovered a number of facts connected with this important subject; and I wish to bestow them on Society.

Paris, the great Metropolis of Continental Europe is the place above all others, where the profound studies of Humanity in, with the utmost facility, carried to their highest extent and perfection: and, Sire, I feel confident that I do not say be much with a due regard for the scientific distinctions of my own Country, in avowing that these facilities, no where else to be found, and their most admirable results have deservedly conferred on Your Majesty's Chief City, and its illustrious Schools of practical Philosophy, the eminent title of the Centre of Science to the Civilized World.

world

HICKMAN'S APPEAL TO KING CHARLES X OF FRANCE. PAGE 1
Facsimile reproduction of original in The Wellcome Historical Medical Museum

Hickman's Appeal to King Charles X of France

Hickman's work was ignored by the medical men of his own country, and his failures to obtain a hearing from his compatriots led him to turn his thoughts to Paris. In April, 1828, he went to Paris, and while there presented the following memorial to King Charles X :— Memorial to King Charles X

TO HIS MOST CHRISTIAN MAJESTY

CHARLES X

King of France

Sire,

In addressing Your Majesty upon a scientific subject of great importance to mankind, I feel a properly humble, but a firm confidence in Your Majesty's universally known disposition to countenance valuable discoveries ;—this relieves me from all apprehension of being considered presumptuous.

Permit me, Sire, to state that I am a British Physician, Member of the Royal College of Surgeons, London, who has visited Paris in part for the purpose of bringing to completion a discovery, to which I have been led by a course of observations and experiments on suspended Animation.

This object has engaged my practical attention during several years :—It appears demonstrable that the hitherto most agonising, dangerous and delicate surgical operations, may now be performed, with perfect safety, and exemption from pain, on brute animals in a state of suspended animation. Hence it is to be strongly inferred, by analogy, that the same salutary effects may be produced on the human frame, when

Presuming thus Sire, to attract Your Majesty's thoughts to this interesting subject, I have resorted to The French Capital for the completion of my discovery, hopeing to have the honour of placing it under Your Majesty's Royal and gracious auspices. In this manner I would pay to Your Majesty Kingly and paternal zeal for the promotion of every branch of useful knowledge that tributary homage which I am sure Sire, it would be unjust, on a suitable occasion, to withhold from an Enlightened Monarch, who is surrounded by the wise and the learned, the philanthropic and celebrated in all the Arts and Sciences which benefit ameliorate, ornament and dignify the condition of mankind.

It is upon purposes of this nature Sire, that Your Majesty daily deigns and delights to smile with enlightened, constant and the most effectual and condescending encouragement. Your Majesty invites the Philosophical from all Lands, and they are certain of protection.

It must have occured to Your Majesty's magnanimous mind, that our species rise in the scale of moral and intellectual greatness, in proportion as our efforts are directed to the diminution of the sum of human misery, and physical evil: This was the elevated and virtuous aim of the Sages and the best of Kings of Antiquity; and this grand purpose is yet more conspicuous in modern times:—

Under this grave and powerful impression, I have ventured on the liberty of praying Your Majesty to be pleased, by an express intimation, or command, on the subject, to permit me to develope my ideas on operations in a state of suspended animation, in the presence of Your Majesty's Medical and Surgical schools, That I may have the benefit of their eminent and assembled talent, and emulous cooperation.

It is also my desire, at a fit opportunity, to solicit the honour of presenting to Your Majesty, in person, if Your Majesty will condescend to receive it, a Book containing an account of my discovery which as far as I know or can learn, has entirely originated with myself; and should my labours meet with the approbation of Charles The Tenth, I shall ever enjoy the grateful satisfaction of believing that I have devoted myself to my profession to a distinguished and to a happy end.

end

[concluded on page 40

rendered insensible by means of the introduction of certain gases into the lungs :—I have discovered a number of facts connected with this important subject ; and I wish to bestow them on society.

Paris, the great Metropolis of Continental Europe, is the place above all others, where the profound studies of Humanity are, with the utmost facility, carried to their highest extent and perfection ; and, Sire, I feel confident that I do not say too much, with a due regard for the scientific distinctions of my own Country, in avowing that these facilities, nowhere else to be found, and their most admirable results, have deservedly conferred on Your Majesty's Chief City, and its illustrious Schools of practical Philosophy, the eminent title of the Centre of Science to the Civilised World.

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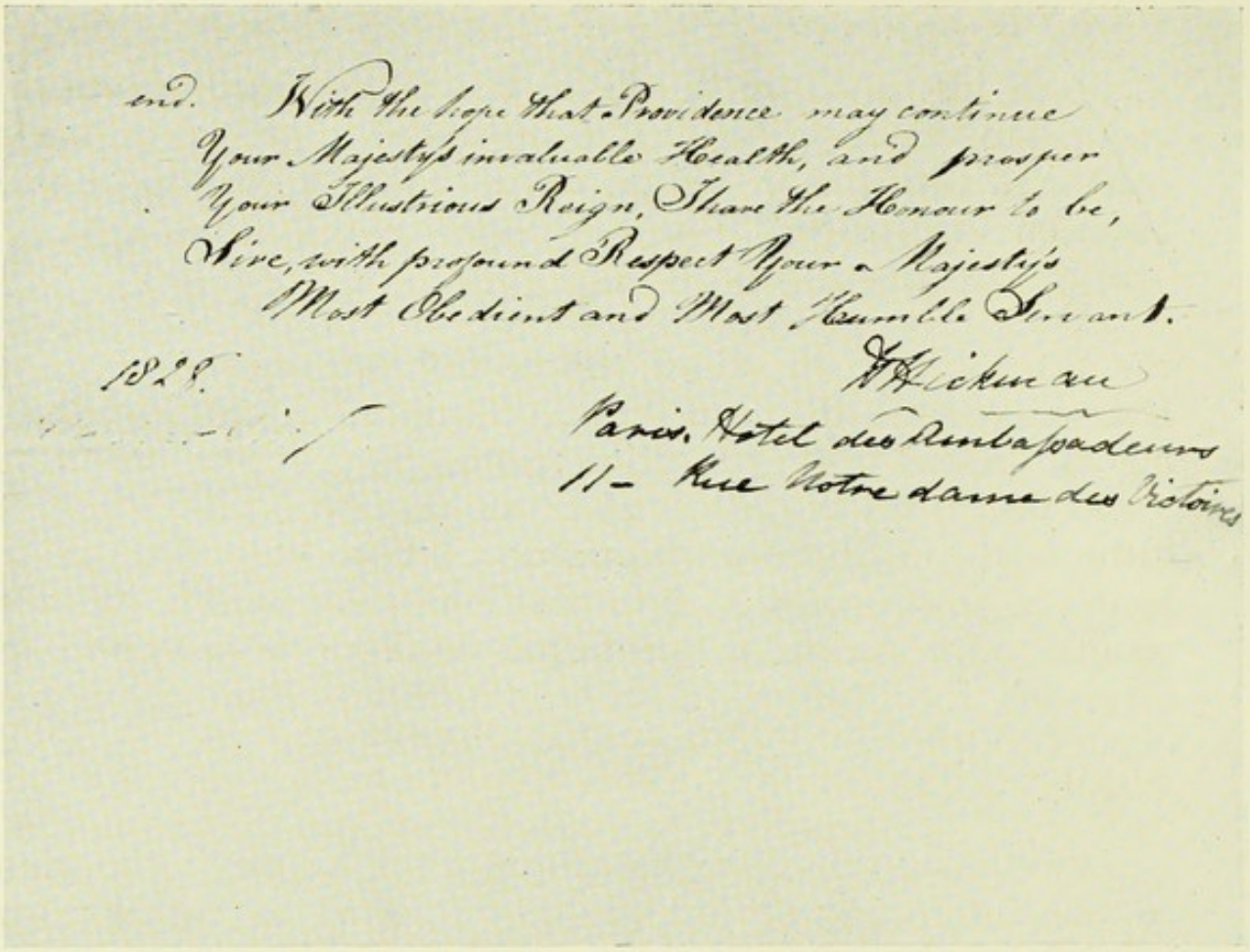


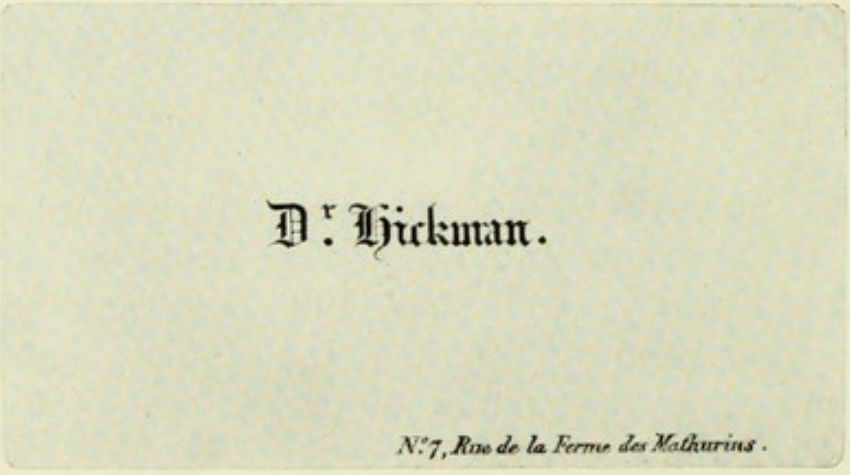
end. With the hope that Providence may continue
Your Majesty's invaluable Health, and prosper
Your Illustrious Reign, I have the Honour to be,
Sire, with profound Respect Your Majesty's
Most Obedient and Most Humble Servant.

1829. D. Hickman

Paris. Hotel des Ambassadeurs
11 – Rue Notre dame des Victoires

HICKMAN'S APPEAL TO KING CHARLES X OF FRANCE. PAGE 3

Facsimile reproduction of original in The Wellcome Historical Medical Museum



HICKMAN'S VISITING CARD AS USED IN PARIS

Reproduced from original in The Wellcome Historical Medical Museum

greatness, in proportion as our efforts are directed to the diminution of the sum of human misery, and physical evil. This was the elevated and virtuous aim of the Sages, and the best of Kings of Antiquity; and this grand purpose is yet more conspicuous in modern times:—

Under this grave and powerful impression, I have ventured on the liberty of praying Your Majesty to be pleased, by an express intimation, or command, on the subject, to permit me to develop my ideas on operations in a state of suspended animation, in the presence of Your Majesty's Medical and Surgical schools, that I may have the benefit of their eminent and assembled talent, and emulous co-operation.

It is also my desire, at a fit opportunity, to solicit the honour of presenting to Your Majesty, in person, if Your Majesty will condescend to receive it, a Book containing an account of my discovery which, as far as I know or can learn, has entirely originated with myself; and should my labours meet with the approbation of Charles The Tenth, I shall ever enjoy the grateful satisfaction of believing that I have devoted myself to my profession to a distinguished and to a happy end.

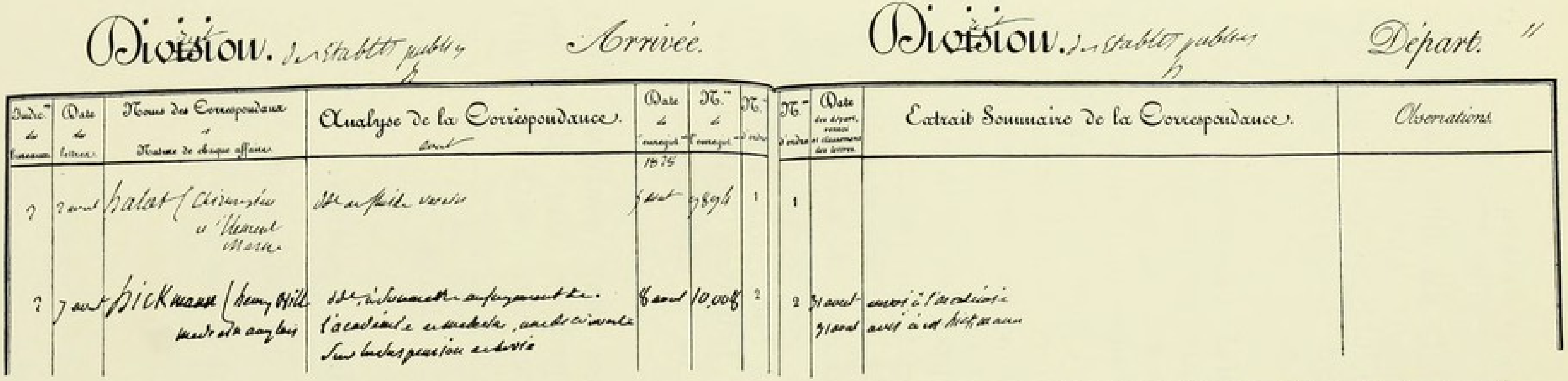
With the hope that Providence may continue Your Majesty's invaluable Health, and prosper Your Illustrious Reign, I have the Honour to be, Sire, with profound Respect, Your Majesty's

Most Obedient and Most Humble Servant,

H. HICKMAN.

Paris, Hotel des Ambassadeurs,

1828. 11, Rue Notre Dame des Victoires.



Division. Arrivée. | Division. Départ.

Indic. du bureau	Date des lettres	Noms des Correspondants et Nature de chaque affaire	Analyse de la Correspondance.	Date de l'enregist.	N.° de l'enregist.	N.° d'ordre	N.° d'ordre	Date des départ, renvoi et classement des lettres	Extrait Sommaire de la Correspondance.	Observations
2	2 août	Malat ([illegible])	[illegible]	1875 7 août	9894	1	1			
2	7 août	Hickmann (Henry Hill) [illegible]	[illegible]	8 août	10,008	2	2	31 août / 31 août	[illegible]	

FACSIMILE REPRODUCTION OF EXTRACT FROM THE REGISTER OF THE DIRECTION DES ETABLISSEMENTS D'UTILITÉ PUBLIQUE AU MINISTÈRE DE L'INTÉRIEUR, DATED AUGUST 7, 1828

DIRECTION of Public Establishments — RECEIVED. — DIRECTION of Public Establishments — DESPATCHED.

Office Marks	Dates of Letters	Names of Correspondents and Nature of each business	Analysis of Correspondence Avert.	Date of Registration	No. of Registration	No. of Order	No. of Order	Date of despatch, return and classification of letters	Summary of Correspondence	Observations
2	2 Aug.	Malat (Surgeon at .... Marne)	Asks for liquid vaccine.	1875 7 August	9,894	1	1			
2	7 Aug.	Hickmann (Henry Hill) English Doctor	Wishes to submit to the judgment of the Academy of Medicine a discovery on the suspension of animation.	8 August	10,008	2	2	31 August 31 August	Sent to the Academy Advised Mr. Hickman	

TRANSLATED TRANSCRIPT OF ABOVE

In the Register of the Direction des Etablissements d'Utilité publique au Ministère de l'Intérieur (F^{prél} 1631, lettre H, fol. 10vo–11) dated August 7, 1828, the receipt of this memorial is recorded as follows :— Records of Receipt of Memorial

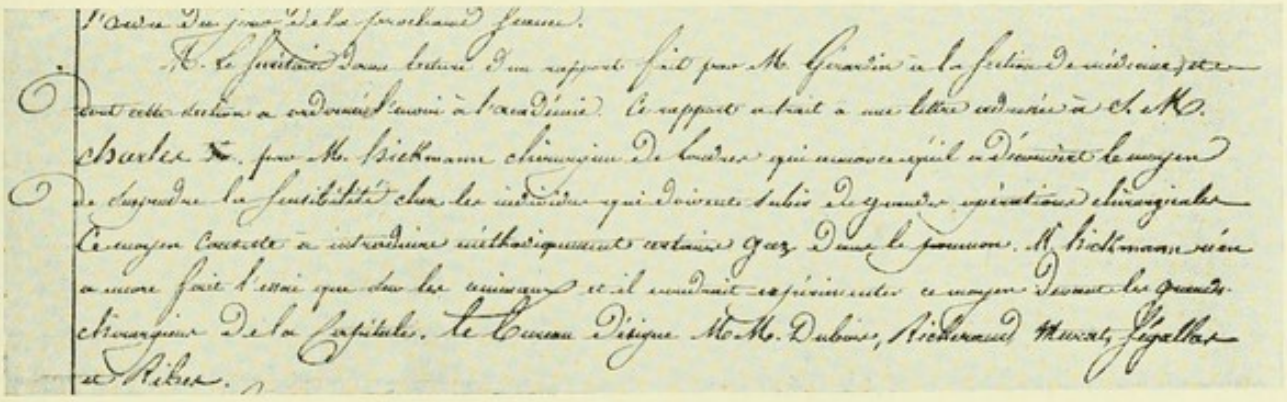
" Hickmann (Henri-Hill), médecin anglais, demande à soumettre au jugement de l'Académie de Médecine une découverte sur la suspension de la vie."

Translation

Hickmann (Henry Hill) (*sic*), English Physician, wishes to submit to the judgment of the Academy of Medicine a discovery on the suspension of animation.

On August 31 the memorial was forwarded to the Académie Royale de Médecine, and Hickman was notified. At this time he was apparently living at No. 7 Rue de la Ferme des Mathurins.

At the Meeting of the Académie Royale de Médecine on September 28, 1828, the memorial was considered and the report is as follows :—



EXTRACT FROM REPORT OF A MEETING OF THE ACADÉMIE ROYALE DE MÉDECINE SEPTEMBER 28, 1828

" M. le Secrétaire donne lecture d'un rapport fait par M. Gérardin à la Section de médecine, et dont cette section a ordonné l'envoi à l'Académie. Ce rapport a trait à une lettre adressée à S. M. Charles X, par M. Hickman chirurgien Report of Meeting of the Academy

de Londres qui annonce qu'il a découvert le moyen de suspendre la sensibilité chez les individus qui doivent subir de graves opérations chirurgicales. Ce moyen consiste à introduire méthodiquemment certaines gaz dans le poumon. M. Hickman n'en a encore fait l'essai que sur les animaux et il voudrait expérimenter ce moyen devant les grands chirurgiens de la Capitale. Le Bureau désigne MM. Dubois, Richerand, Merat, Segallas et Ribas."

Translation

The Secretary read a report by M. Gérardin of the medical section, whom this section has appointed as the Academy's representative. This report relates to a letter addressed to Charles X by Mr. Hickman, a London surgeon, which states that he has discovered a means of producing unconsciousness in individuals who must submit to major surgical operations. The method consists in systematically introducing certain gases into the lungs. Mr. Hickman has already tried the method on animals, and he wishes to carry out the experiment before the celebrated surgeons of the capital. The bureau nominates MM. Dubois, Richerand, Merat, Segallas and Ribas.

Record of Meeting of the Royal Academy of Medicine

In the Bulletin de l'Académie Royale de Médecine, Vol. XII, année 11ème, Paris, 1846–1847, *pages* 418 *and* 419, there appears an account of a Meeting on March 2, 1847, when Monsieur Gérardin presented to the Academicians the proceedings of September 28, 1828 :—

"M. Gérardin rend compte d'une lettre écrite en anglais et adressée à S. M. Charles X, par M. Hickmann (*sic*), chirurgien de Londres, et dans laquelle ce chirurgien met sous la protection de ce souverain une découverte qu'il a faite, et qui consiste à pratiquer les opérations les plus délicates chez les individus forcés de les subir. Selon M. Hickmann (*sic*), par l'introduction méthodique de certains gaz dans le poumon, on peut suspendre la faculté de sentir : il en a fait l'épreuve sur des animaux vivants, et désire la coopération des grands médecins et chirurgiens

de Paris pour en faire l'essai sur l'homme. M. Gérardin propose, et la section ordonne la communication de cette lettre à l'Académie." (Séance du 28 septembre 1828).

Translation

M. Gérardin reports on a letter written in English and addressed to His Majesty Charles X by Mr. Hickman, a London surgeon, in which this surgeon places under the auspices of this sovereign a discovery he has made, and which consists of performing the most difficult operations on those persons who are forced to undergo them. According to Mr. Hickman, insensibility can be produced by the methodical introduction of certain gases into the lungs; he has made experiments on living animals, and is desirous of obtaining the co-operation of the leading physicians and surgeons of Paris, in order to make the same experiments on the human subject. M. Gérardin proposes, and the section resolves that this letter be communicated to the Academy. September 28, 1828.

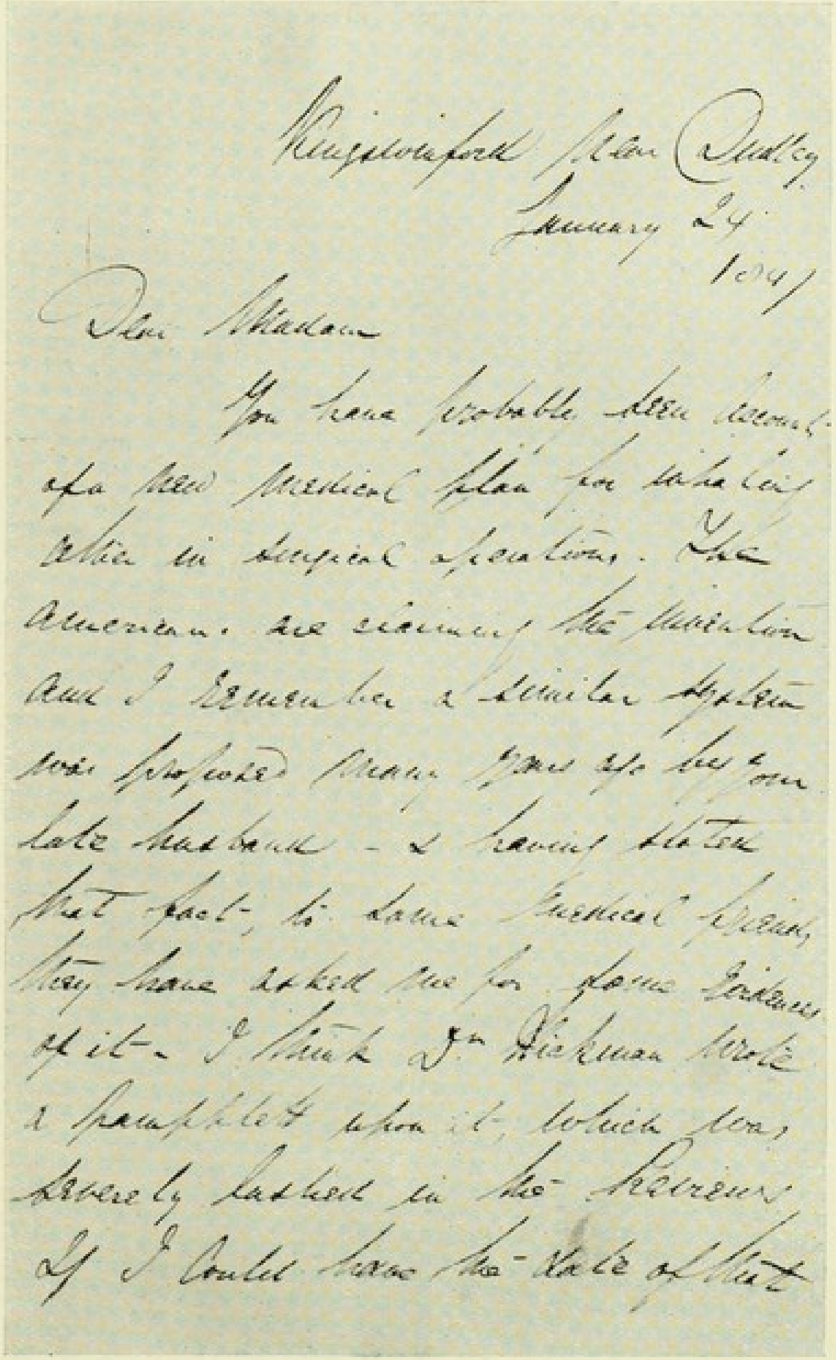
A similar account is recorded in the Archives Générales de Médecine, Paris, Vol. XVIII, First Series, *page* 453.

Results of Hickman's Appeal to Charles X.

Unfortunately, a search of the documents in the library of the Académie de Médecine in Paris has not yet brought to light the report of the Commission nominated by the Bureau, and consequently the final account of Hickman's memorial cannot be furnished. Nevertheless, there is sufficient evidence to show that the matter was not further considered.

Baron Larrey

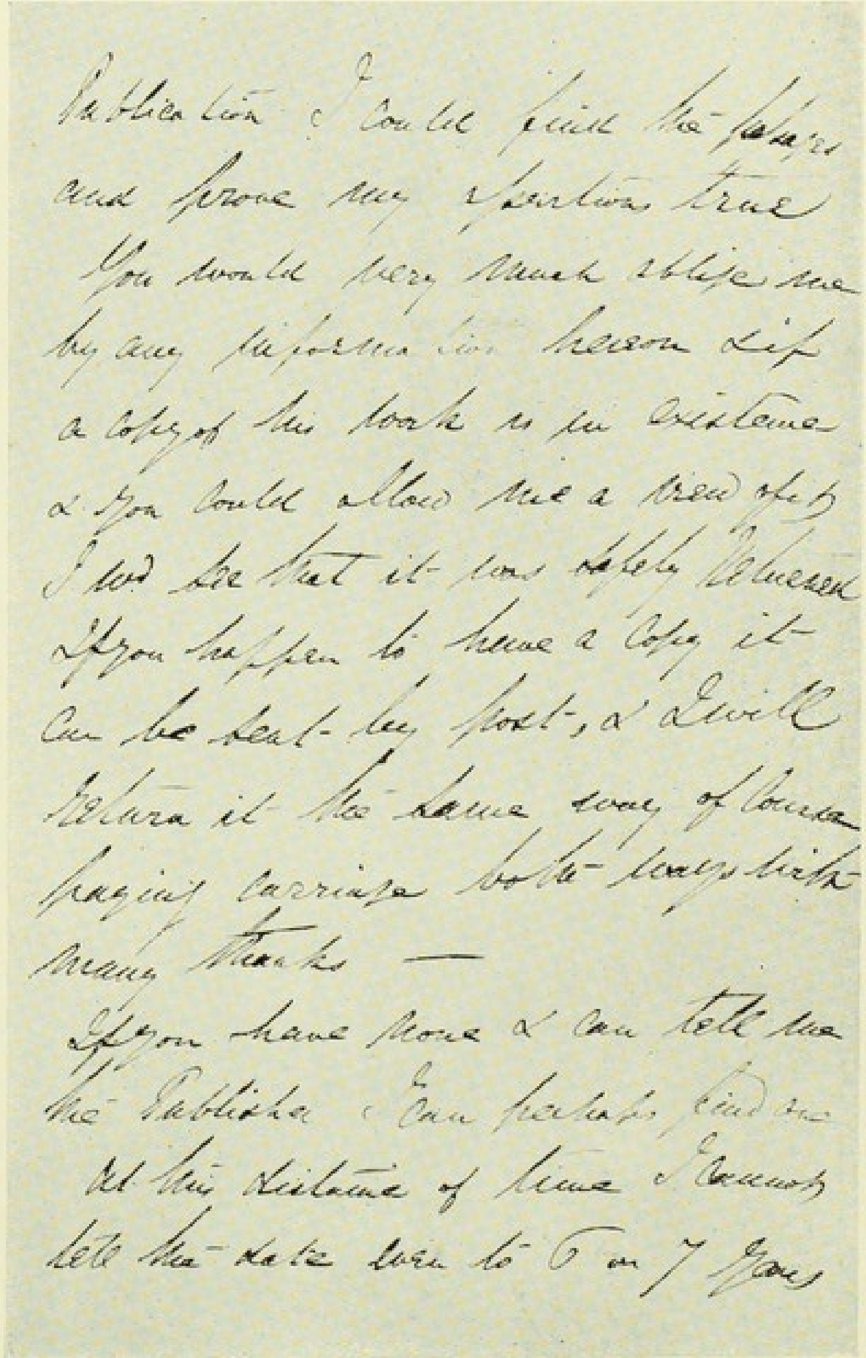
Although the account of Hickman's investigations was received with interest, it had but one defender in France, namely, Baron Larrey, formerly the Emperor Napoleon's Surgeon-General. Finding that his researches were coldly received by the French as well as the English medical profession, Hickman returned to England a disappointed man, where he died a short time afterwards. He passed away at the early age of thirty years, and was buried at Bromfield on April 5, 1830.



Kingswinford near Dudley
January 24
1847

Dear Madam

You have probably seen accounts
of a new medical plan for inhaling
ether in surgical operations. The
Americans are claiming the invention
and I remember a similar system
was proposed many years ago by your
late husband - & having stated
that fact, to some medical friends,
they have asked me for some evidence
of it - I think Dr Hickman wrote
a pamphlet upon it, which was
severely lashed in the Reviews
If I could have the date of that



publication I could find the passages
and prove my assertions true
You would very much oblige me
by any information - whether
a copy of his book is in existence
& you could allow me a view of it
I wd see that it was safely returned
If you happen to have a copy it
can be sent by post, & I will
return it the same way of course
paying carriage both ways with
many thanks —
If you have none & can tell me
the Publisher I can perhaps find one
At this distance of time I cannot
tell the date even to 6 or 7 years

[concluded on page 48

DUDLEY'S LETTER TO MRS. HICKMAN, JANUARY 24, 1847
Facsimile reproduction of original in The Wellcome Historical Medical Museum

Later Developments

As far as Hickman's experiments were concerned, nothing further was heard until 1847, when the rival claims of Morton, Wells and Jackson were being debated. Dr. Thomas Dudley, of Kingswinford, near Dudley, wrote to Mr. Hickman's widow for information regarding her late husband's investigations.

Kingswinford, near Dudley.

January 24, 1847.

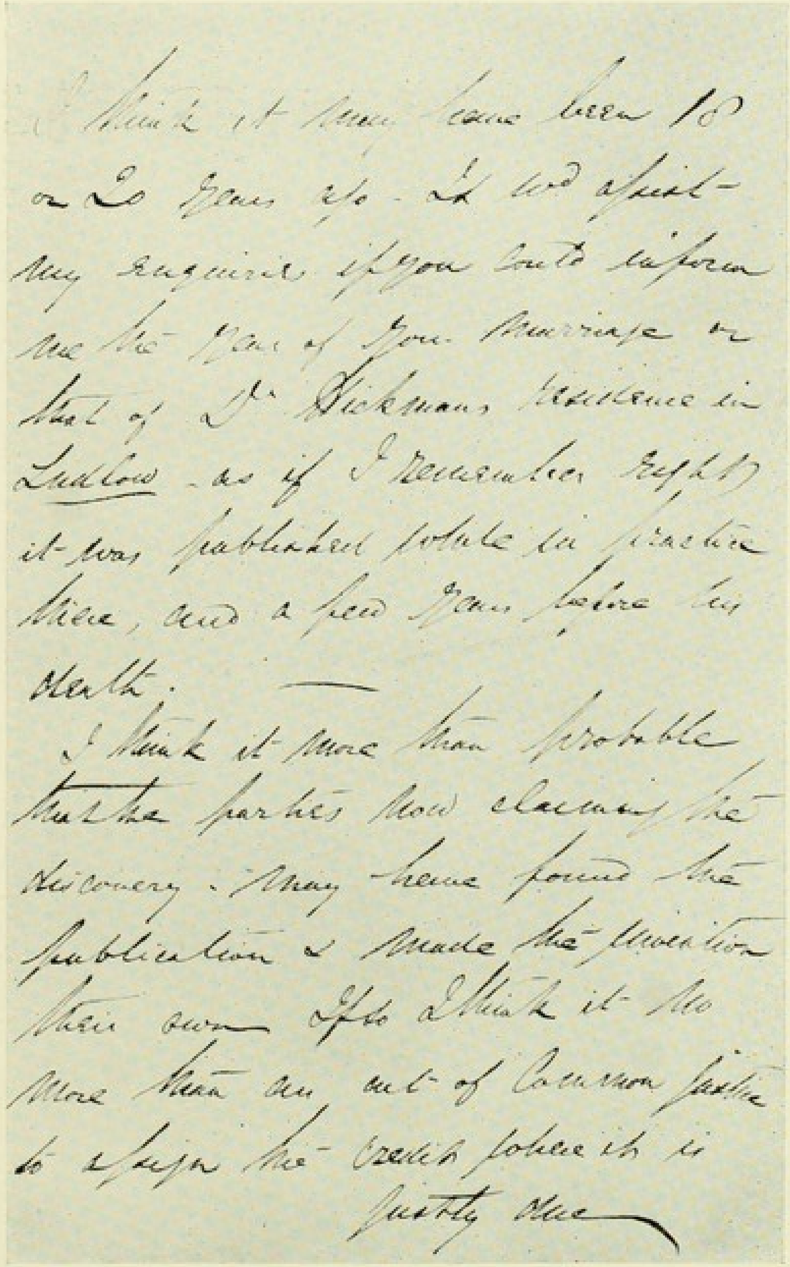
Dear Madam,

Dr. Dudley's Letter to Mrs. Hickman

You have probably seen Accounts of a new medical plan for inhaling aether in surgical operations. The Americans are claiming the invention, and I remember a similar system was proposed many years ago by your late husband—and having stated that fact to some medical friends, they have asked me for some evidences of it. I think Dr. Hickman wrote a pamphlet upon it, which was severely lashed in the Reviews. If I could have the date of that Publication I could find the passages and prove my assertions true.

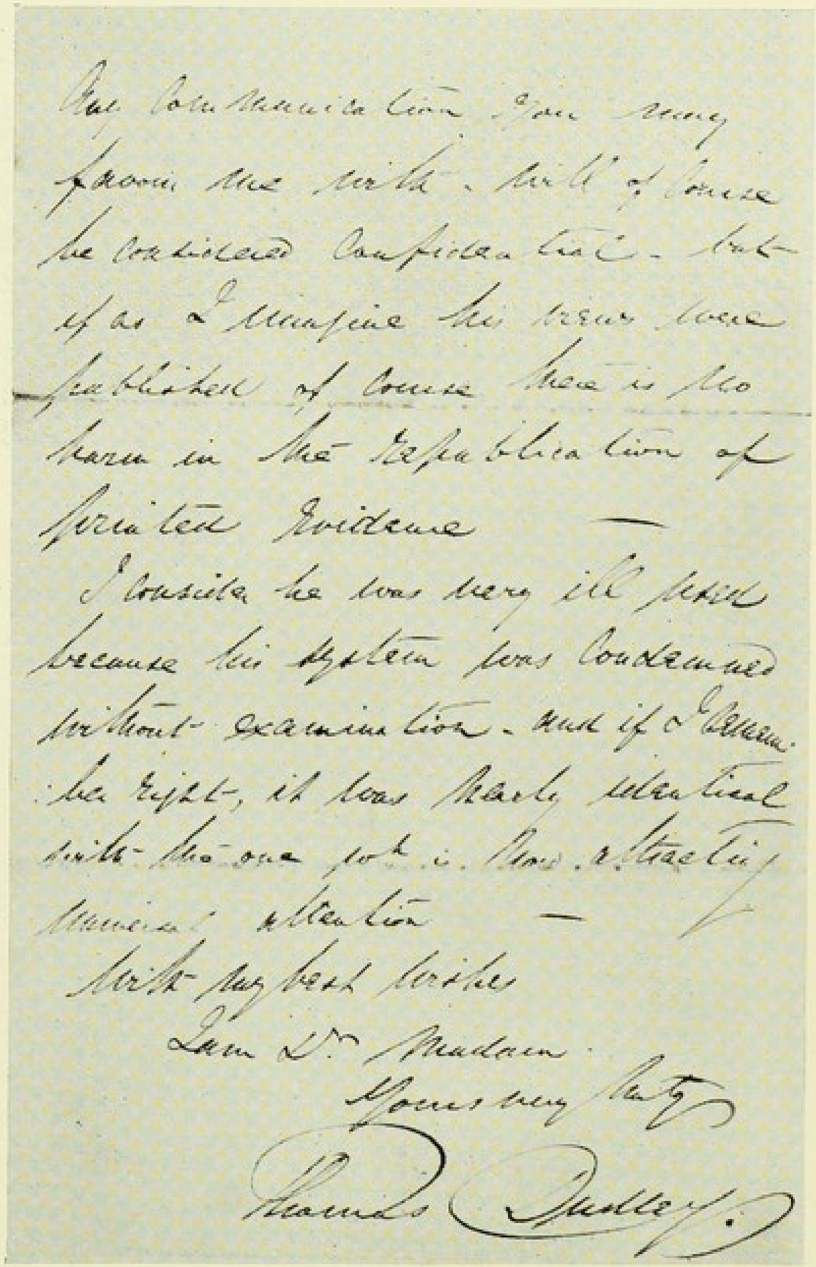
You would very much oblige me by any information hereon and if a copy of his work is in existence and you could allow me a view of it I wd. see that it was safely returned. If you happen to have a copy it can be sent by post, and I will return it the same way of course paying carriage both ways with many thanks.

If you have none and can tell me the Publisher I can perhaps find one. At this distance of time I cannot tell the date even to 6 or 7 years. I think it may have been 18 or 20



Page 3

I think it may have been 18
or 20 years ago – I had [illegible] –
my enquiries if you could inform
me the year of your marriage or
that of Dr Hickmans residence in
Ludlow – as if I remember rightly
it was published while in practice
there, and a few years before his
death. —
I think it more than probable
that the parties now claiming the
discovery – may have found the
publication & made the invention
their own – if so I think it no
more than an act of common justice
to assign the credit where it is
justly due —



Page 4

Any communication you may
favour me with – will of course
be considered confidential – but
if as I imagine his views were
published of course there is no
harm in the republication of
printed evidence —
I consider he was very ill used
because his system was condemned
without examination – and if I remem-
ber right, it was nearly identical
with the one wh. is now attracting
universal attention —
With my best wishes
I am Dr Madam
Yours very truly
Thomas Dudley.

DUDLEY'S LETTER TO MRS. HICKMAN, JANUARY 24, 1847
Facsimile reproduction of original in The Wellcome Historical Medical Museum

years ago. It wd. assist my enquiries if you could inform me the year of your marriage or that of Dr. Hickman's residence in *Ludlow*—as if I remember right it was published while in practice there, and a few years before his death.

I think it was more than probable that the parties now claiming the discovery may have found the publication and made the invention their own. If so, I think it no more than an act of common justice to assign the credit where it is justly due. Any communication you may favour me with will of course be considered confidential—but if as I imagine his views were published of course there is no harm in the republication of printed evidence.

I consider he was very ill used because his system was condemned without examination—and if I remember right, it was nearly identical with the one wh. is now attracting universal attention.

With my best wishes

I am, Dr. Madam,

Yours very truly,

THOMAS DUDLEY.

To ensure adequate publicity, Dr. Dudley wrote the following letter to *The Lancet*, dated February 6, 1847 :—

Sir,

Dr. Dudley's Letter to *The Lancet*

Permit me to make a few observations in your journal respecting the system of inhaling the sulphuretted ether for the purpose of causing insensibility during surgical operations. It is, I believe, considered to be an entirely new invention, and the authorship of "the discovery" will no doubt be claimed by various parties; but I am in a position to prove that a

similar system was brought before the public nearly twenty years ago, by a Dr. Hickman, then residing at Shiffnal, and previously at Ludlow, where he successfully performed various experiments with it upon animals. I am not prepared to state whether the inhaling system discovered by him was identical with the one now exciting such universal attention, but he most assuredly was the propounder of a system to produce insensibility to pain under operations by the inhalation of some species of gas. So far as I am aware, no discovery has been claimed by others within the last few weeks. Dr. H. commenced his experiments at Ludlow previous to the year 1824; after which he resided at Shiffnal for three years, and went to Paris in 1828, in which year he presented a memorial to the King of France, Charles X, praying for permission to perform his experiments before the medical officers of that metropolis. A copy of his memorial is now before me, and also a letter from the widow of the memorialist, which was supplied to me with the above memoranda.

I am by no means prepared to dispute that some one of the present claimants may have discovered this medical agent to be a new method to *him*, inasmuch as it is quite possible for two philosophical minds to fall upon a hidden truth, but unless they can prove that their discoveries were made anterior to the year 1828, the claim of priority must be awarded to the late Dr. Hickman.

I have never heard the result of the memorial, but the prosecution of his inquiries was cut short soon after his decease, previous to which he published an account of his invention, either in a pamphlet, or in the form of an essay in the medical publications of the day. I well remember that the system was treated with very great severity in the medical reviews, and was generally condemned as a wild and visionary theory, which was deemed practically useless, if not dangerous and impossible.

I am making inquiries in Ludlow and Shiffnal, and may very probably be able to procure further evidences of his

claims. A reference to the medical periodicals of 1828–1829, or perhaps a few years earlier, as I am not sure of the date of his publication, will no doubt afford a satisfactory corroboration of what I have here stated.

I am, Sir, yours,

THOMAS DUDLEY,

Kingswinford,

nr. Dudley.

January, 1847.

P.S.—The widow of Dr. Hickman is now living at Tenbury, Herefordshire.

The next letter denotes that Dr. Dudley had received Hickman's pamphlet :—

Kingswinford,

March 11/47.

Dear Madam,

I have your favour safe and the Pamphlet shall be taken every care of and returned.

Dr. Dudley acknowledges receipt of Pamphlet

I consider that Dr. Hickman is clearly entitled to the claim of having originated the idea—and had his work been published in these more liberal times, the idea would have been followed up and probably the results of investigation would have been successful instead of the system being crushed as it was by unjust criticism without due inquiry.

I shall again endeavour to call attention to the Pamphlet, and I may perhaps bring it before Dr. Elliotson, who has expressed himself interested in it, as I make a reference to him on the subject thro' another Party.

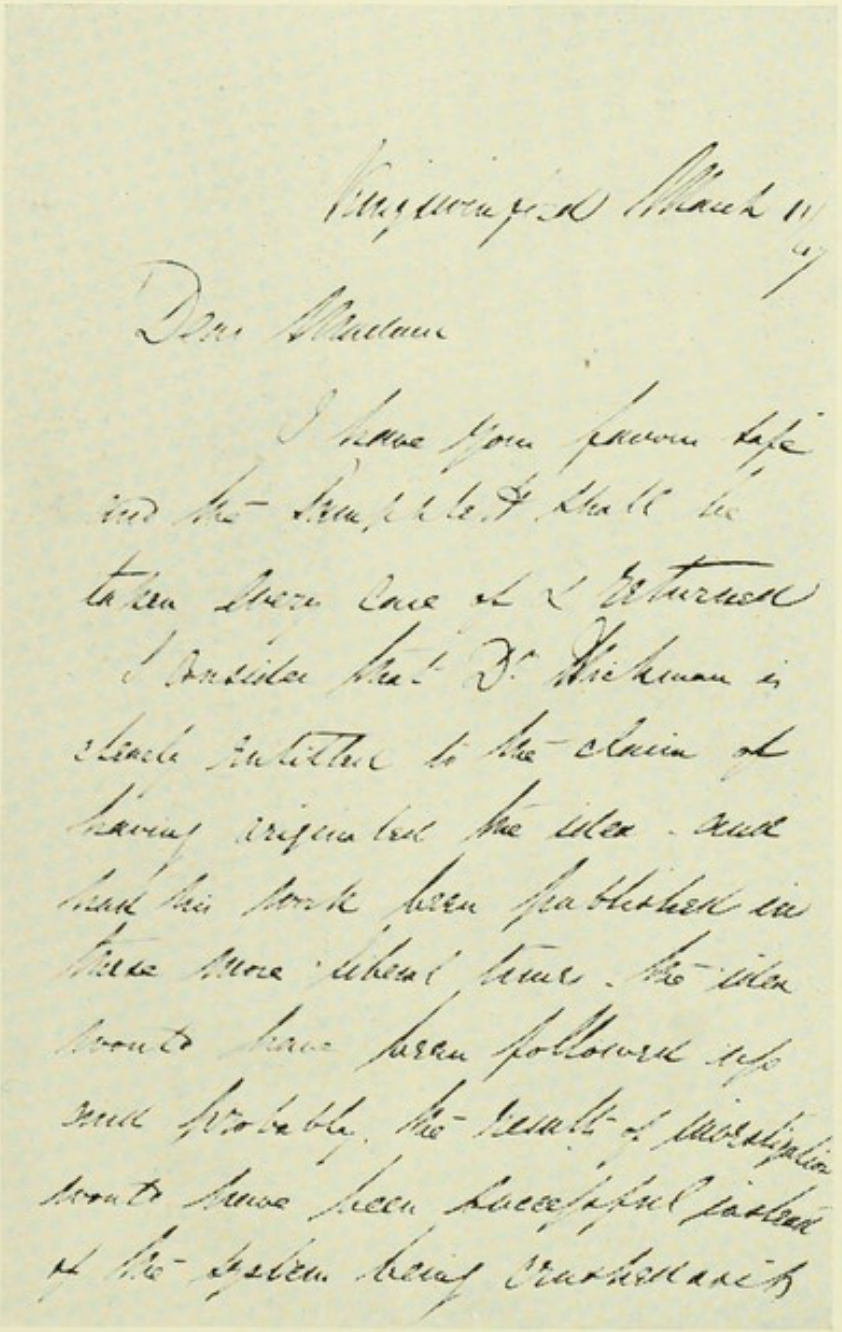
I am, Yours very truly,

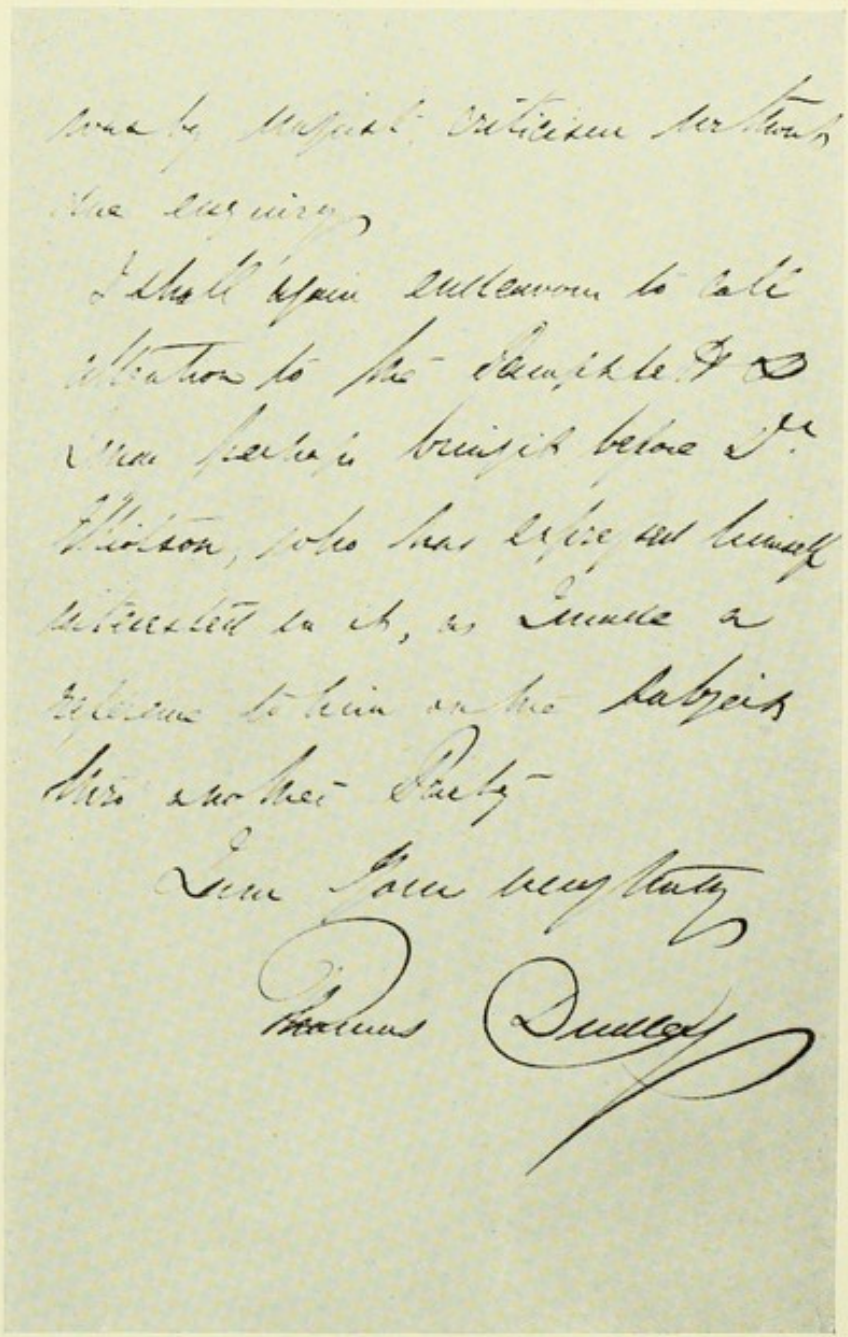
THOMAS DUDLEY.

(*The original of this letter is reproduced on page* 52)

Page 1

Page 2





DUDLEY'S LETTER TO MRS. HICKMAN, MARCH 11, 1847

Facsimile reproduction of original in The Wellcome Historical Medical Museum

In *The Lancet*, dated March 27, Vol. I., *page* 345, appears another letter on PAINLESS SURGICAL OPERATIONS:—

Sir,

I have this day procured a copy of Dr. Hickman's pamphlet on suspended animation; it is dated 1824, and is in the form of a letter, addressed to the late T. A. Knight, Esq., of Downton Castle, who was much interested in the inquiry. Further Letter to *The Lancet*

It appears that he produced insensibility by various means, viz., by the exclusion of the atmospheric air, the exhibition of carbonic acid gas, and by another method, which, he states, produced the desired effect much sooner than any of the others, that is "by the agency of Sulphuric acid and carbonate of lime." In this latter example, he notices that the results were "not so satisfactory: some blood escaped from the wounds, which did not heal so rapidly as in the first experiment."

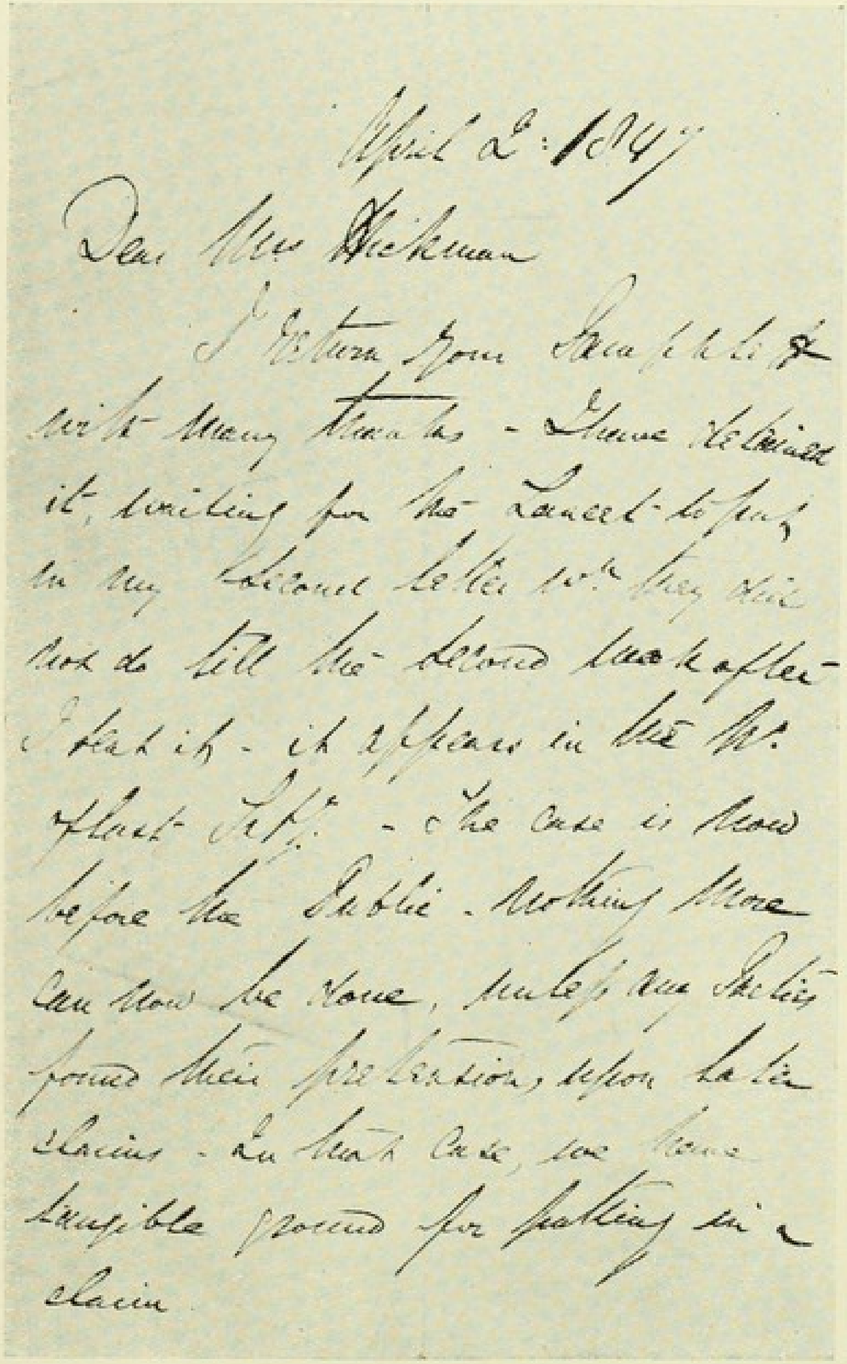
How far Dr. Hickman is entitled to the claim of this discovery, may be a question: it is perfectly clear that he is the originator of the idea of producing insensibility under surgical operations. The modern introduction of sulphuretted ether is at best but an improvement of that idea, or, in other words, it is carrying out the original views of one party, by means of a new agent suggested by another. It was known that Dr. Hickman was pursuing his experiments in 1828—that is, four years after the date of the letter referred to—and it is more than probable, that subsequent improvements may have been made, and published, at a later date.

As the discovery is now being claimed by other parties, how are we to be assured that they have not borrowed the idea from this published work? My only object in troubling you with these remarks is that justice may be done, and that the credit of this invention may be awarded to those to whom it is fairly due.

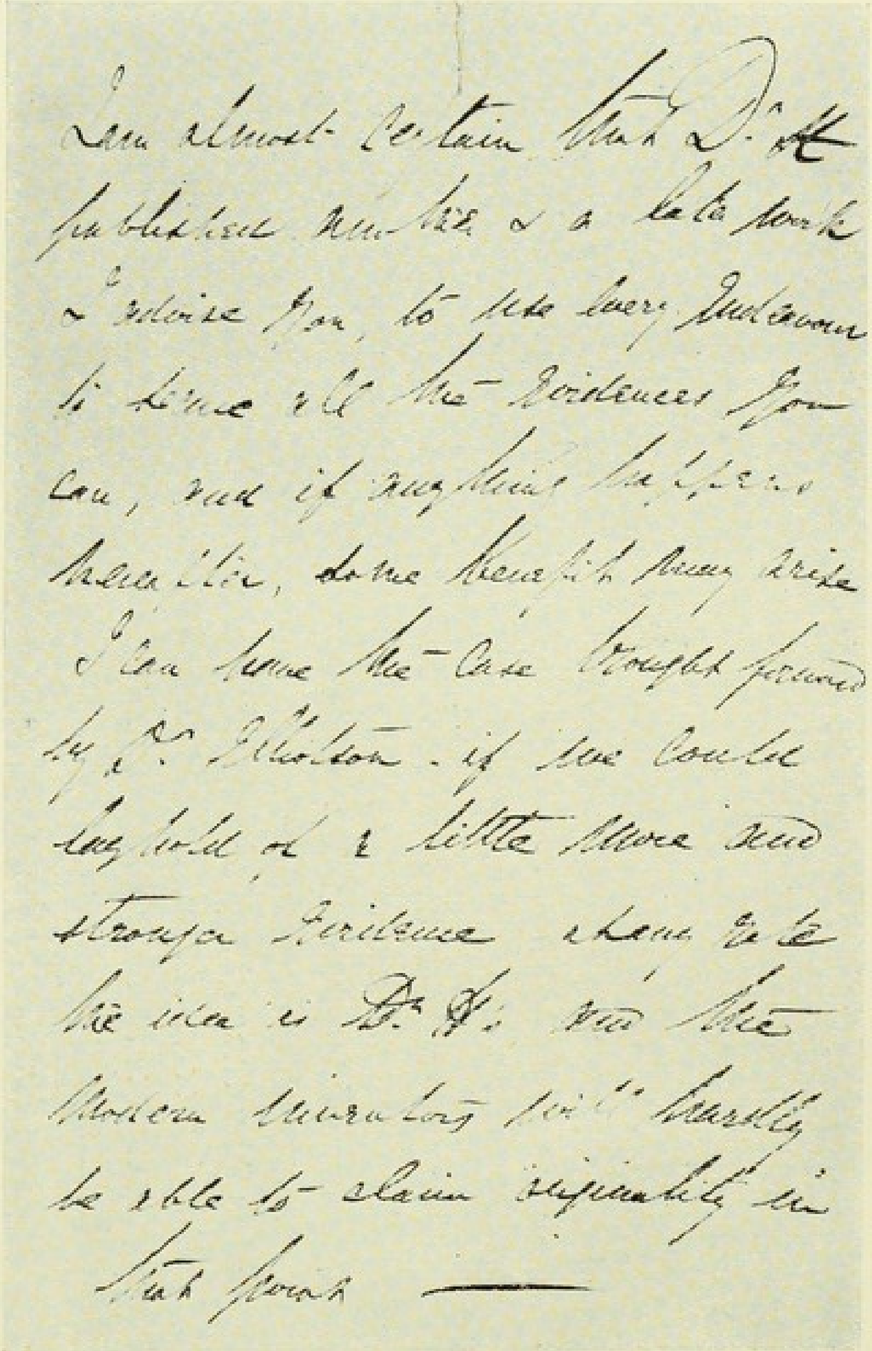
I am, Sir, yours very obediently,

THOMAS DUDLEY,

March, 1847. Kingswinford.



April 2: 1847
Dear Mrs Hickman
I return your pamphlet with many thanks - I have retained it, waiting for the Lancet to put in my second letter wh they did not do till the second week after I sent it - it appears in the [illegible] - The case is now before the Public. Nothing more can now be done, unless any parties found their pretension upon later claims. In that case, we have tangible ground for putting in a claim



I am almost certain that Dr H published nothing of a late work & advise you, to use every endeavour to trace all the evidences you can, and if anything happens hereafter, some benefit may arise. I can trace the case brought forward by Dr Elliotson - if we could lay hold of a little more and stronger evidence & have to the idea is Dr H's own the Modern inventors will hardly be able to claim originality in that point ——

[concluded on page 55

DUDLEY'S LETTER TO MRS. HICKMAN, APRIL 2, 1847. PAGES 1 AND 2
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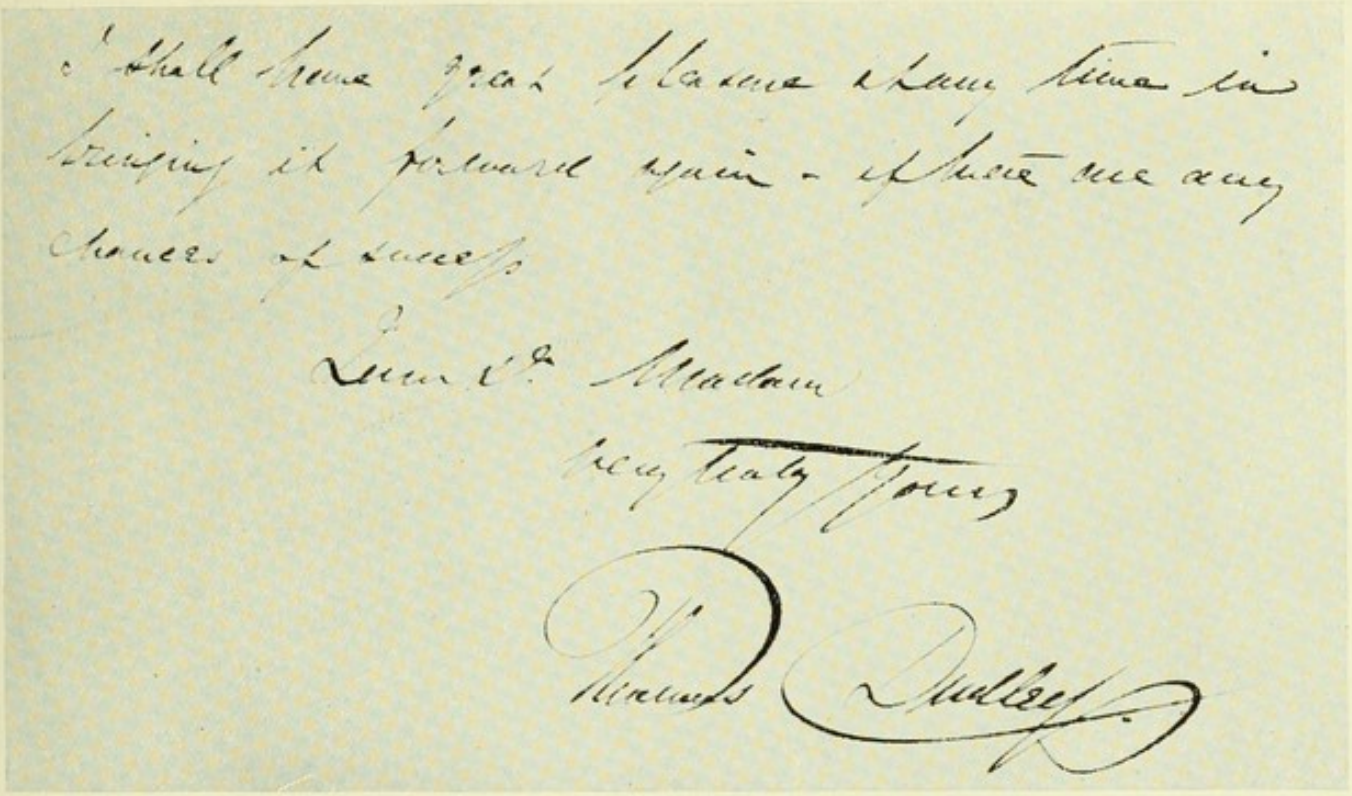


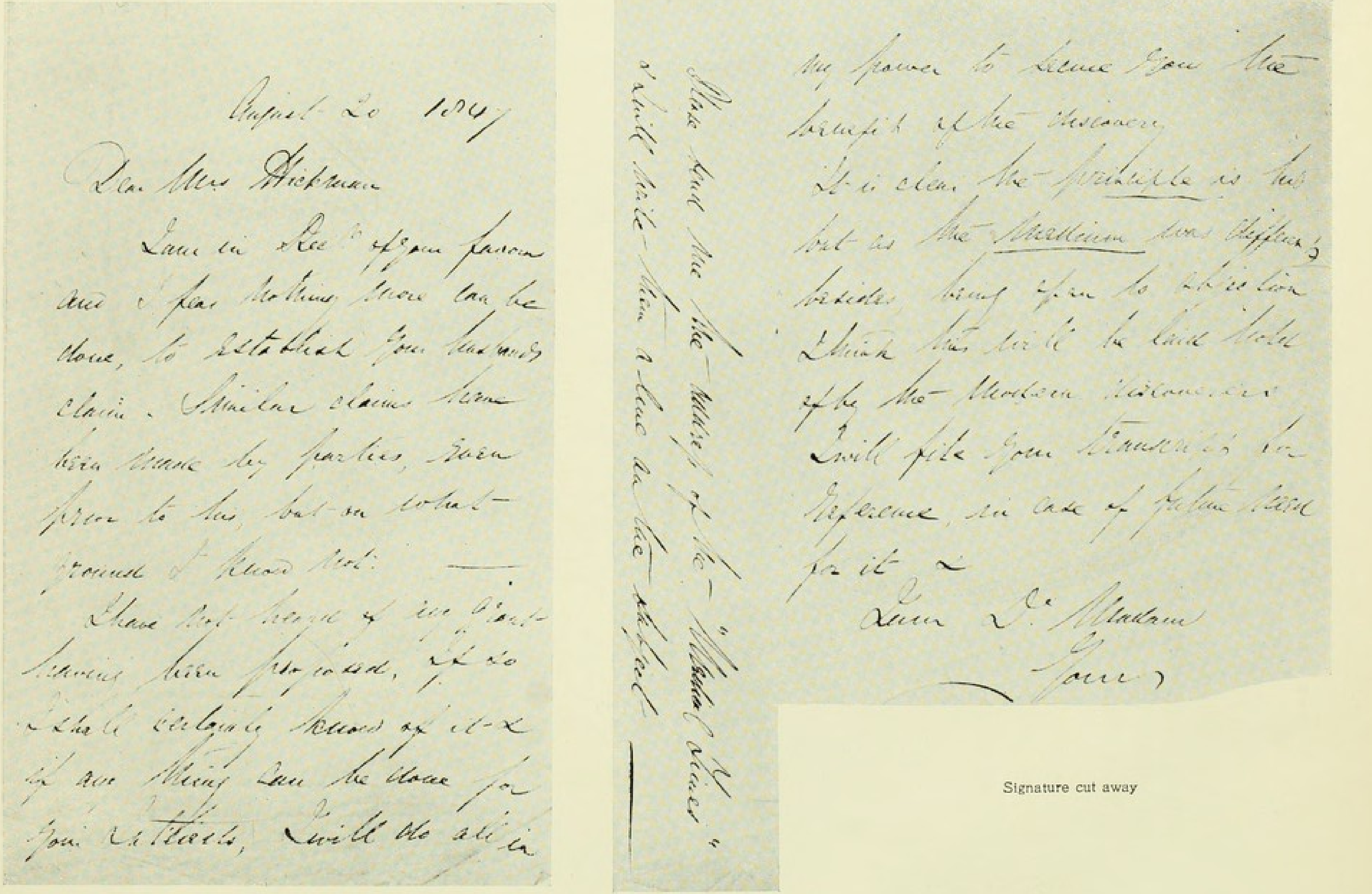
CONCLUSION OF DUDLEY'S LETTER TO MRS. HICKMAN, APRIL 2, 1847
Facsimile reproduction of original in The Wellcome Historical Medical Museum

Other letters from Dr. Dudley to Mrs. Hickman are as follows:— Further Correspondence with Mrs. Hickman

April 2, 1847.

Dear Mrs. Hickman,

I return your Pamphlet with many thanks. I have detained it, waiting for *The Lancet* to put in my second letter wh. they did not do till the second week after I sent it—it appears in the No. of last Saty. The case is now before the Public—nothing more can now be done, unless any Parties found their pretensions upon later claims. In that case, we have tangible ground for putting in a claim. I am almost certain that Dr. H. published another and a later work. I advise you, to use every endeavour to secure all the evidences you can, and if anything happens hereafter,



April 20 1847

Dear Mrs Hickman

I am in Rec.t of your favour and I fear nothing more can be done, to establish your husbands claim. Similar claims have been made by parties, even prior to his, but on what ground I know not: —

I have not heard of any Painless operations been proposed, if so I shall certainly hear of it — & if any thing can be done for your interests, I will do all in my power to secure you the benefit of the discovery.

It is clear the principle is the but as the medium was different, besides being open to objection I think this will be laid aside by the modern discoveries. I will file your transcripts for reference, in case of future need for it —

I am D.r Madam

Yours

Signature cut away

Please send me the address of the "Medical Times" & I will write them a line on the subject —

DUDLEY'S LETTER (WITH POSTSCRIPT) TO MRS. HICKMAN, APRIL 20, 1847

Facsimile reproduction of original in The Wellcome Historical Medical Museum

some benefit may arise. I can have the case brought forward by Dr. Elliotson—if we could only lay hold of a little more and stronger evidence—at any rate the idea is Dr. H's, and the modern inventors will hardly be able to claim originality on that point.

I shall have great pleasure at any time in bringing it forward again—if there are any chances of success.

I am, dr. Madam,

Very truly yours,

THOMAS DUDLEY.

April 20, 1847.

Dear Mrs. Hickman,

I am in Rect. of your favour and I fear nothing more can be done, to establish your husband's claim. Similar claims have been made by parties, even prior to his, but on what ground I know not.

I have not heard of any grant having been proposed. If so I shall certainly know of it, and if anything can be done for your Interests, I will do all in my power to secure you the benefit of the discovery.

It is clear the *principle* is his, but as the *Medium* was different, besides being open to objection, I think this will be laid hold of by the modern discoverers. I will file your transcripts for reference, in case of future need for it, and

I am, Dr. Madam

Yours

(from Thomas Dudley)
(Signature cut away).

Please send me the address of the "Medical Times" and I will write them a line on the subject.

Letter from Dr. Wells to Royal Academy of Medicine

At a meeting of the Académie Royale de Médecine on February 23, 1847, a letter from Dr. Wells was reported, claiming priority for the discovery of anæsthesia by means of ethereal vapours. Together with the discussion, it reads as follows :—

Monsieur le Président, je prends la liberté de vous prier de vouloir bien donner connaissance à l'Académie des faits suivants, dont je suis en état de fournir les preuves, et qui établiront d'une manière positive mes droits à la priorité de la découverte des effets d'inhalations de diverses vapeurs, pour produire l'insensibilité à la douleur.

Il y a déjà quelques années que, raisonnant d'après l'analogie, je fus porté à croire que des opérations chirurgicales pourraient être pratiquées sans douleur. Un individu excité par des causes extérieures peut recevoir des blessures graves sans souffrir : tel est, par exemple, le soldat sur le champ de bataille. L'homme ivre peut être très maltraité sans manifester des signes de douleur. Songeant à ces faits et à beaucoup d'autres analogues, je me demandai si on ne pourrait obtenir ces mêmes effets en faisant inhaler des vapeurs ou des gaz stimulants dont l'action sur le système ne serait que passagère et sans danger. Ayant inhalé moi-même le gaz protoxyde d'azote, ainsi que les vapeurs d'éther sulfurique, je ne tardai pas à me convaincre que ces deux substances étaient identiques quant à leur action, produisant d'abord une stimulation marquée, puis de la stupeur, et enfin une insensibilité complète. Je me décidai à me soumettre à l'avulsion d'une de mes dents, opération qui fut faite sans douleur aucune, et que je répétai sur douze ou quinze personnes avec le même résultat. Cela se passait *au mois de novembre* 1844. Je demeurais alors à Hartford, Connecticut (Etats-Unis), et je me rendis de là à Boston, au mois de décembre 1844, afin de faire connaître ma découverte à la Faculté médicale de cette ville. Je la communiquai en premier lieu à MM. les docteurs Warren et Hayward, médecins de l'hôpital général de Massachusetts, puis à MM. les docteurs Jackson et Morton. D'après l'invitation expresse du docteur Warren,

je fis une leçon à ses élèves, auxquels je m'efforçai de démontrer la théorie qui s'était si clairement établie dans mon esprit, savoir que la stimulation portée à l'excès produit toujours l'insensibilité complète du système nerveux. Les médecins et élèves auxquels je m'adressai parurent fort sceptiques à l'endroit de ce que j'avançais, et personne ne semblait porté à m'aider dans mes recherches. La vive contrariété que j'en éprouvai amena une maladie qui me força à garder le lit pendant plusieurs mois. Relevé de cette maladie, je n'en persistai pas moins à poursuivre mon idée, et depuis cette époque jusqu'au mois de février 1846, j'avais pratiqué l'extraction des dents à plus de *vingt-cinq* personnes, sans douleur. Je dois dire toutefois que j'accordai la préférence au gaz protoxyde d'azote, parce que celui-ci est plus agréable à inhaler que l'éther. Avant de terminer, je dois insister sur un détail relatif à la préparation du protoxyde d'azote, savoir : que l'on ne doit point s'en servir sans que le gaz (qui résulte, comme on sait, de la décomposition du nitrate d'ammoniaque) soit resté en contact avec l'eau pendant une heure au moins, afin que les vapeurs *d'acide nitrique*, etc., puissent avoir le temps de disparaître.

J'ai voulu, monsieur le Président, communiquer à l'illustre assemblée des médecins de Paris la date et les résultats de ma découverte. Mes droits seront soutenus par des centaines de témoins et par des preuves irrécusables.

A l'occasion de cette lettre, M. Orfila demande à faire quelques observations. M. Wells, dit-il, propose indifféremment le gaz protoxyde d' azote et les vapeurs d'éther pour endormir la sensibilité pendant les opérations chirurgicales ; il laisse même entrevoir qu'il donne la préférence au protoxyde d'azote. Ce gaz n'est cependant pas sans inconvénients : toutes les personnes qui l'ont respiré, MM. Davy, Vauquelin et Thénard, en ont beaucoup souffert. J'ai répété leurs expériences, et j'en ai éprouvé de si vives douleurs dans la poitrine et une telle suffocation, que je suis resté convaincu que si j'eusse continué l'expérience, je n'en serais pas revenu.

M. Davy est le premier qui ait respiré ce gaz : il a d'abord éprouvé une sorte de vertige ; puis le vertige diminua, et il sentit des picotements à l'estomac. La vue, ainsi que l'ouïe, acquirent un surcroît d'énergie. Vers la fin de la respiration, les forces musculaires augmentèrent ; M. Davy se sentait un penchant irrésistible à agir et à se mouvoir. Il ne perdit pas entièrement la conscience de ce qu'il faisait ; mais il était dans une espèce de délire caractérisé par une vivacité et une gaîté extraordinaires. Ces effets cessèrent dès qu'il eut cessé de respirer le gaz protoxyde d'azote, et dix minutes après il n'y paraissait plus.

— M. Boullay parle dans le même sens, et insiste sur les mauvais effets ressentis par M. Vauquelin de la respiration du même gaz.

— M. Orfila : J'entends dire autour de moi que le protoxyde d'azote, dégagé, par le lavage, de l'acide nitrique, serait peut-être moins nuisible. Il suffit d'être initié aux notions les plus communes de la chimie pour savoir que le protoxyde d'azote résulte de la décomposition du nitrate d'ammoniaque, qui ne contient pas d'acide nitrique, et ne peut donner que du gaz protoxyde d'azote et de l'eau.

— M. Gérardin : Il y a dix-sept ou dix-huit ans, lorsque l'Académie était partagée en trois sections, le ministre de la maison du roi adressa à l'Académie la lettre d'un médecin anglais, où l'on exposait divers moyens d'amortir la sensibilité pendant les opérations chirurgicales : entre autres moyens, on citait le protoxyde d'azote. La section nomma, suivant l'usage, une commission dont j'avais l'honneur d'être le rapporteur. Je n'ai pas besoin de dire que cette proposition rencontra beaucoup d'incrédulité. Un seul membre, M. le baron Larrey, dit qu'elle méritait l'attention des chirurgiens. Cette affaire n'alla pas plus loin ; on doit en retrouver les traces dans les procès-verbaux.

Translation

The President,
Academy of Medicine,
Paris.

Sir,

I take the liberty of asking you to be good enough to make known to the Academy the following facts, the proofs of which I can furnish, which will positively establish my rights to the priority of the discovery of the effects of inhalations of different gases, to produce insensibility to pain.

Several years ago, reasoning by analogy, I was led to believe that surgical operations could be performed without pain. A person excited by external causes may receive serious wounds without suffering, as, for instance, the soldier on the battlefield. A drunken man may be ill-treated without showing any signs of pain. Thinking over these facts and many other analogous ones, I wondered whether these same effects might not be obtained by inhaling stimulating gases or fumes, whose action on the system is only passing and without danger. Having inhaled nitrous oxide myself, as well as the fumes of ether, I was soon convinced that these two substances had the same action, producing first of all a marked stimulation, then stupor, and, lastly, complete insensibility. I decided to have one of my teeth extracted, which was done without any pain. This operation I repeated on twelve or fifteen people with the same effect. That took place in November, 1844. I was then living at Hartford, Connecticut (U.S.A.), and from there I went to Boston in the month of December, 1844, in order to make known my discovery to the medical Faculty of that town. I made it known first to Doctors Warren and Hayward, doctors at the General Hospital of Massachusetts, and then to Doctors Jackson and Morton.

At the express invitation of Dr. Warren, I delivered a lecture to his pupils, to whom I endeavoured to explain the theory which was so firmly fixed in my mind, that is, that stimulation carried to excess always produces complete insensibility of the nervous system. The doctors and pupils

to whom I was speaking, seemed very sceptical with regard to my theory, and no one seemed ready to help me in my researches. The keen opposition which I experienced brought on an illness which forced me to keep my bed for several months. Having recovered from this illness, I still persisted in following up my idea, and from that time to the month of February, 1846, I extracted teeth painlessly from more than *twenty-five* people. At the same time, I must add that I gave preference to nitrous oxide, because this is more agreeable to inhale than ether. Before ending, I must insist on a detail relative to the preparation of nitrous oxide, that is, that this gas must not be used (it is formed, as is known, by the decomposition of nitrate of ammonia) unless it has been in contact with water for at least an hour, in order that the fumes of *nitric acid*, etc., may have time to disappear.

I wish, Mr. President, to communicate to the illustrious assembly of doctors of Paris, the date and the results of my discovery. My rights will be supported by hundreds of witnesses and by undeniable proofs.

Discussion on letter at Royal Academy of Medicine

With reference to this letter, Mr. Orfila asks to be allowed to make a few remarks. Mr. Wells, he says, suggests the use of nitrous oxide or ether vapour without distinction to deaden the sensibility during surgical operations ; but hints that he gives preference to nitrous oxide. This gas, however, is not without its disadvantages : all those who have inhaled it, Messrs. Davy, Vauquelin and Thénard, have suffered greatly from it. "I have repeated their experiments, and I felt such sharp pains in my chest, and such a feeling of suffocation, that I remain convinced that if I had continued the experiment, I should never have recovered consciousness."

Mr. Davy, the first to inhale this gas, felt first of all a sort of dizziness ; then the dizziness diminished and he experienced a pricking feeling in his stomach. His sight as well as his hearing acquired an increase of energy. Towards the end of the inhalation the muscular energies increased ; Mr. Davy felt an irresistible longing to exert himself and to move about. He did not altogether lose consciousness,

but he was in a kind of delirium characterised by extraordinary vivacity and gaiety. These effects stopped as soon as he had ceased to inhale the nitrous oxide, and ten minutes later they had entirely disappeared.

Mr. BOULLAY speaks in the same way, and insists on the bad effects felt by Mr. Vauquelin on inhaling the same gas.

Mr. ORFILA : I hear it said around me that nitrous oxide freed from nitric acid by washing would be less noxious. It is sufficient to know only the elements of chemistry to be aware that nitrous oxide, which results from the decomposition of nitrate of ammonia, contains no nitric acid, because nitrate of ammonia can yield only water and nitrous oxide.

Mr. GÉRARDIN : Seventeen or eighteen years ago, when the Academy was divided into three Sections, the Minister of the Royal Palace sent a letter to the Academy. This letter was from an English doctor, and it set forth the different means of deadening sensibility during surgical operations ; among other means, nitrous oxide was mentioned. According to custom, the Section elected a committee of which I had the honour to be the reporter. I need not say that this proposition met with much incredulity. One member only, Baron Larrey, said that it deserved the attention of surgeons. This affair went no further ; the outlines of it can be found in the minutes.

At the next meeting of the Academy, held on March 2, 1847, Mr. Gérardin reported that he had found Hickman's memorial addressed to King Charles X ; and that the subject matter related to the inhalations of various vapours for producing a state of anæsthesia.

Article in the *Medical Times*, July 31 1847

In the *Medical Times* for July 31, 1847, on *page* 454, there appears an Article entitled *The Inventors of Ethereal Inhalation*, in which the American inventors' claims for priority are discussed :

> . . . Mr. Morton, Dr. Jackson and Mr. Wells all lay claim to the invention, and in the midst of contradictory statements it is no easy matter to wade towards the truth. . . .

Dr. Jackson, however, on Mr. Morton's own admission, appears to have been repeatedly consulted on the substance to be employed and the apparatus, etc., and his suggestions were sufficiently valuable to induce Mr. Morton to offer him a share in the profits to be derived from the invention. It appears equally certain that Mr. Morton, acting upon these suggestions, did successfully employ the ethereal inhalation, and was the first to publish their results and claim their reward.

The *Boston Medical and Surgical Journal*, June 18 1845

In the *Boston Medical and Surgical Journal* of June 18, 1845, we find, however, the following passage, in which the discovery professed to have been made afterwards by Messrs. Jackson and Morton is spoken of as a matter of sufficient notoriety to require only a cursory notice :—

The Nitrous Oxide gas has been used in quite a number of cases by our dentists during the extraction of teeth, and has been found, by its excitement, perfectly to destroy pain. The patients appear very merry during the operation, and no unpleasant effects follow.

We think, however, we can set these various claims at rest by the following extract from the printed report of the Academy of Medicine of Paris, 1828 :—

(Archiv. Acad. Royale de Médecine, Tom. 18 1st Ser., *page* 455.)

Method of performing operations without pain.

Mon. Gérardin gave an account of a letter written to His Majesty Charles X by Mon. Hickman, a London surgeon, in which this surgeon describes a method of practising the most delicate and dangerous operations without pain in the case of individuals who are forced to undergo them.

This method consists in suspending the faculty of sensation by the careful introduction of certain gases into the lungs. Mon. Hickman has made repeated experiments on live animals and desires the co-operation of the chief physicians and surgeons in Paris in making a trial of the method on man.

This passage is sufficiently explicit; no doubt can be entertained. The *principle* was discovered by Mr. Hickman and it is in the *principle* that the invention resides. Mr. Hickman took, in our opinion, the safest and best measures for the carrying out of his invention; they failed, but not by his fault. A scientific body was by him put into possession of the facts, the communication was made generously and freely. No patent was taken out and no attempt made to confine its pecuniary benefits to himself. It was the gift of a man of science to the world.

In all probability Mr. Hickman is no more (*sic*) or he would doubtless have arisen to defend what we must in justice consider as *his* property—the discovery of the method of performing operations by the inhalation of medicated vapours.

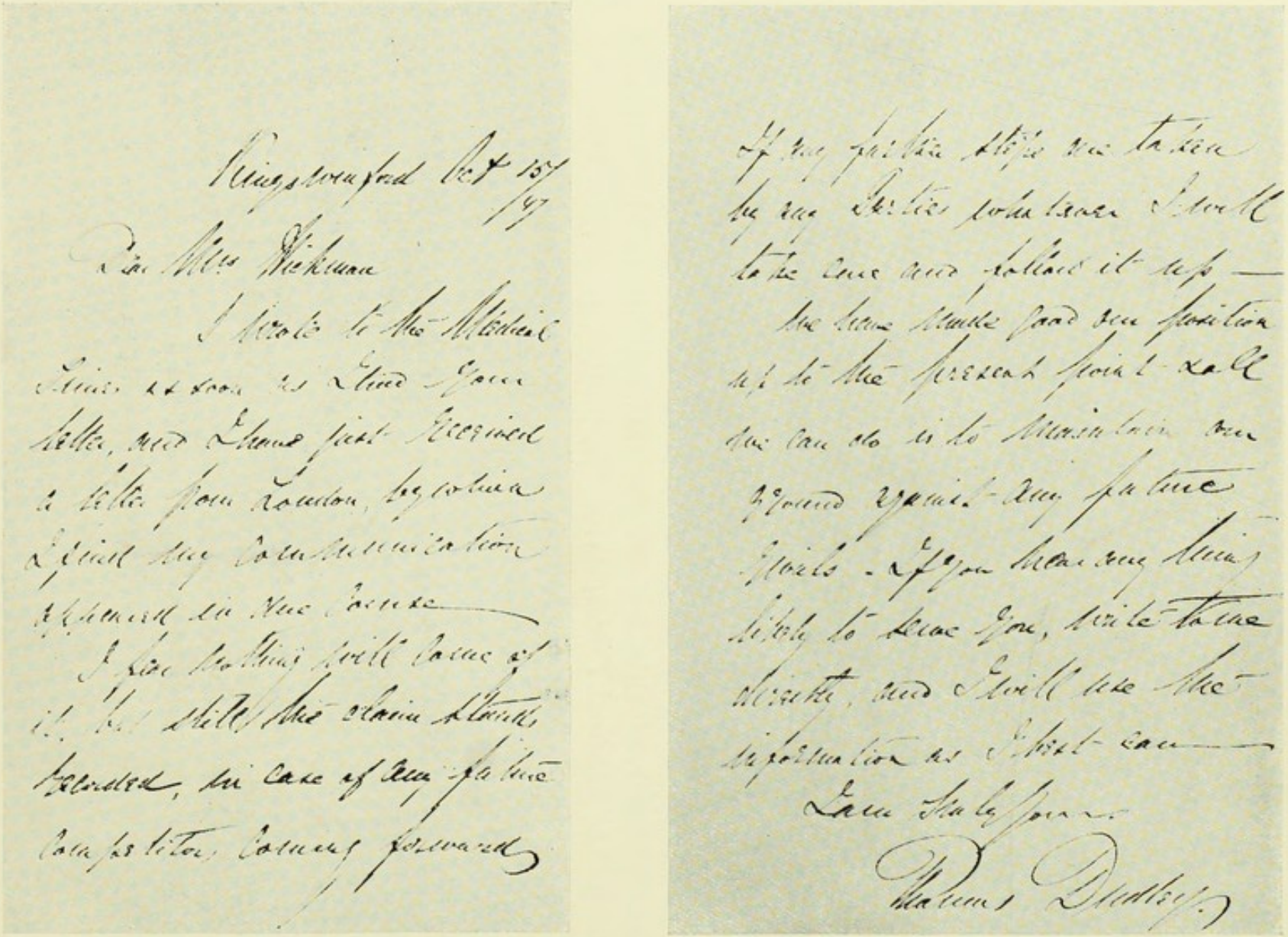
D. Macarthy, D.M.P.

As a result of this article, Dr. Dudley wrote the following article to the *Medical Times*, dated September 4, 1847. Vol. XVI, *page* 561 :— The *Medical Times*, Sept. 4 1847

Sir,

In your letter of July 31, I remark an allusion to Dr. Hickman's invention, of performing operations under the influence of inhalation; and I am happy to observe that you appear to recognise the justice of his claim as the first inventor of the principle in question. You are right in your surmise, but he is no more. He died soon after this discovery, and before he had time to prosecute his inquiries. Had he still lived, I have no doubt he would have brought his experiments to a satisfactory conclusion.

I can put you in possession of a copy of the memorial which he addressed to the French King Charles X; and I think, in justice to his memory, that his claim ought to be recognised by the scientific world. His widow is still living, and, as may be supposed, is most anxious for the claim of



DUDLEY'S LETTER TO MRS. HICKMAN, OCTOBER 15, 1847
Facsimile reproduction of original in The Wellcome Historical Medical Museum

her late husband to be substantiated. Some time ago I addressed two letters to *The Lancet*, which were inserted in that publication, but no further notice has been taken of the matter.

The memorial is dated 1828, but I believe there are claims on behalf of parties prior to that period, but I know not on what evidence they are founded.

As a friend of Dr. Hickman's family, I have endeavoured to support his claim to this discovery—so far, at least, as the year 1828. As you appear to consider his claim to be founded on justice, I trust you will use your influence to secure for the benefit of his widow any advantages that may result from the invention.

I am, Yours,

THOMAS DUDLEY.

Dr. Dudley's final letter

Notwithstanding Dr. Dudley's disinterested efforts to secure recognition for Hickman's claims, nothing further was done; and in a letter to Mrs. Hickman, dated October 15, 1847, he says:—

Kingswinford,

Oct. 15/47.

Dear Mrs. Hickman,

I wrote to the *Medical Times* as soon as I had your letter, and I have just received a letter from London, by which I find my communication appeared in due course.

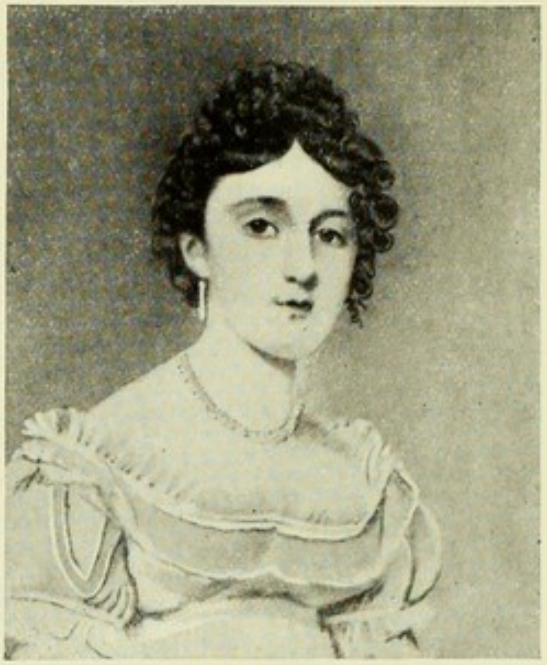
I fear nothing will come of it, but still the claim stands recorded, in case of any future competitors coming forward. If any further steps are taken by any Parties whatever, I will take care and follow it up.

We have made good our position up to the present point, and all we can do is to maintain our ground

against any future rivals. If you hear anything likely to serve you, write to me directly, and I will use the information as I best can.

I am, truly yours,

THOMAS DUDLEY.



MRS. HICKMAN

From original Miniature in The Wellcome Historical Medical Museum

Dr. Dudley's claim for Hickman

Dr. Dudley made the claim that Hickman was "the originator of the idea of producing insensibility under surgical operations." The *Medical Times* claimed that "the principle was discovered by Mr. Hickman, and it is in the principle that the invention resides." This was in 1847, but, except for passing notices, the claims of Hickman escaped attention until Dr. (then Mr.) Henry S. Wellcome was organising his Historical Medical Exhibition for the XVIIth International Medical Congress, which was held in London in 1913.

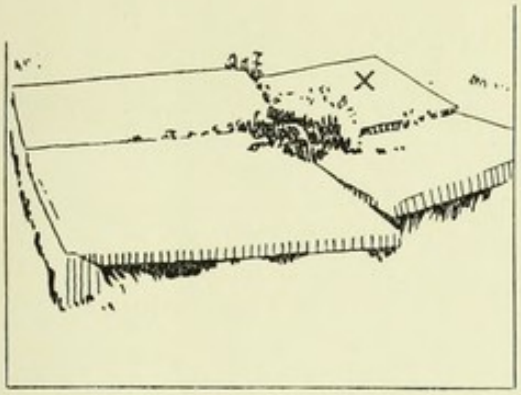
The documents relevant to Hickman's work are now published in full for the first time. They are exhibited at The Wellcome Historical Medical Museum, London, in connection with the centenary of his death.

HICKMAN'S MORTAR AND PESTLE

Reproduced from original in The Wellcome Historical Medical Museum

THE
HICKMAN FAMILY GRAVE
BROMFIELD CHURCHYARD

The actual position of Hickman's Grave is marked with a cross on the key below



A · M · D · G

HENRY HILL HICKMAN

Member of the Royal College of Surgeons
Born at Lady Halton, in this Parish, Jany. 27
Baptized in this Church, January 30, 1800

Died at TENBURY April 2
Buried in this Churchyard
April 5, 1830

This tablet is placed here at the initiative of the Section of Anæsthetics of the Royal Society of Medicine as a Centenary tribute to the memory of the earliest known pioneer of Anæsthesia by Inhalation

HONOUR A PHYSICIAN WITH THE HONOUR DUE UNTO HIM

A. D. 1930

INSCRIPTION
ON
MEMORIAL TABLET
to be placed in
Bromfield Church
at the initiative
of the
Section of Anæsthetics
Royal Society of Medicine

HALL OF STATUARY—THE WELLCOME HISTORICAL MEDICAL MUSEUM

General View of Portrait Gallery—The Wellcome Historical Medical Museum

THE WELLCOME BUREAU OF SCIENTIFIC RESEARCH AND MUSEUM OF MEDICAL SCIENCE

ENDSLEIGH COURT, LONDON, W.C.1

THE WELLCOME
BUREAU OF SCIENTIFIC RESEARCH
AND AFFILIATED RESEARCH INSTITUTIONS
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Experience has been gathered by the Author as a result of civilian work and military service—the latter in the South African Campaign and in nearly all the fields of operations in the Great War.

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HUMAN INTESTINAL PROTOZOA IN THE NEAR EAST: By C. M. WENYON, C.M.G., C.B.E., M.B., B.S., B.Sc., F.R.S., and F. W. O'CONNOR, M.R.C.S., L.R.C.P., D.T.M. An enquiry into some problems affecting the spread and incidence of intestinal protozoal infections of British Troops and Natives in the Near East, with special reference to the "carrier" question, diagnosis and treatment of amœbic dysentery, and an account of three new intestinal protozoa.

The work carried out in Egypt, of which this paper forms the report, was undertaken at the request of Surgeon-General Sir WILLIAM BABTIE, V.C., K.C.M.G., at that time P.D.M.S., M.E.F., in consultation with the Medical Advisory Committee. Its object was threefold, namely, an investigation into the carrier problem of amœbic dysentery amongst the troops with a view to the possible elimination of the carriers; secondly, an inquiry into the best method of administering emetine to carriers and actual dysenterics, with the object of establishing some uniform line of treatment which would give the maximum of good result; and, thirdly, an examination of the fly transmission of amœbic dysentery by means of cyst carriage, and a determination of the best means of destroying the resistant amœbic cysts after their escape from the body.

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" II. The characters and diagnosis of the various intestinal protozoa of man in Egypt, " with a description of three new forms.

" III. Treatment of *E. histolytica* and other protozoal infections of the human " intestine.

" IV. Experimental work with the human intestinal protozoa, their carriage by " house-flies and the resistance of their cysts to disinfectant and other agents.

" There is also an Appendix with histories of cases treated and some most useful " plates illustrating the different types of intestinal protozoa. Altogether a most " useful book."—*Medical Journal of Australia.*

" This very helpful volume contains a revised issue of the authors' well-known " Report on the human intestinal protozoa in Egypt, published during 1917 in the " *Journal of the Royal Army Medical Corps*, to which has been added an Appendix " giving the history of the cases treated. After giving an account of the methods of " collecting material and of examining various groups of men for protozoal infections, " the authors describe the characters of the intestinal organisms, especially *Entamœba* " *histolytica*, *E. coli* and *E. nana*, the last-named being a new species which proved " to be one of the commonest protozoa in the human intestine in Egypt.

" One of the chief practical problems considered is that relating to carriers: " ' cases may remain as healthy carriers for long periods without showing any signs " of dysentery,' but on microscopical examination of their fæces the characteristic " quadrinucleate cysts of *Entamœba histolytica* are found. Observations on " the part played by house-flies in carrying protozoal infection from fæces " to food demonstrate the importance of the measures directed against flies. " Examination of the droppings of 229 flies captured in a hospital compound " showed that eighteen of the flies had deposited cysts of protozoa or eggs of " parasitic worms."—*Edinburgh Medical Journal.*

MOSQUITO SURVEYS: A Handbook for Anti-Malarial and Anti-Mosquito Field Workers. By MALCOLM E. MACGREGOR, M.A., Entomologist, The Wellcome Field Laboratory, The Wellcome Bureau of Scientific Research. With Foreword by Sir RONALD ROSS, K.C.B., K.C.M.G., F.R.S. An essential addition to the library of all those whose work is wholly, or partly, concerned with the study and prevention of mosquito-borne disease in all parts of the world.

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" Everything connected with Salerno is of interest to the medical profession, " and we congratulate Dr. Capparoni on having made some notable additions to the " already published and valuable researches of De Renzi and Piero Giacose, the fruit " of his study of a MS. belonging to the Library of the Cathedral of Salerno. Before " entering on a description of the MS. and his researches therein, Dr. Capparoni " gives a most interesting historical review of Salerno and its medical school, " which probably began somewhere about the eleventh century, though there had " been a hospital as early as the year 820. He gives his readers a number of " illustrations, reproduced from photographs of various leaves of the MS. and of " other documents in the Cathedral of St. Matthew. Dr. Capparoni has conferred " a real benefit upon all those interested in the history of medicine, and altogether " the book is a joy both to read and to look at."—*Lancet.*

THE ICONOGRAPHY OF ANDREAS VESALIUS (André Vésale), Anatomist and Physician. 1514–1564. Paintings—pictures—engravings—illustrations—sculpture—medals. With notes, critical, literary and bibliographical, by M. H. SPIELMANN, F.S.A. Published by John Bale, Sons & Danielsson, Ltd., London (Eng.), for The Wellcome Foundation Ltd.

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