

HISTORY OF ANAESTHESIA & HYDERABAD CHLOROFORM COMMISSIONS

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ABSTRACT

Man's endless pursuit for finding nature's hidden treasures and secrets had rewarded him with countless discoveries in every field. The study of the development of anaesthesia is also very interesting and stimulating in the field of medicine. Today it can be said that the use of drugs to produce anaesthesia is a boon to humanity, but in 1840 this was not so. James Young Simpson discovered the anaesthetizing properties of Chloroform and put the agent to use in November 1847, which proved in his hands a great success. But the dangers of the chloroform were realised quickly and different committees of investigation were appointed. In the late 1880's Edward Lawrie entered the argument and persuaded the Nizam of Hyderabad to give all the necessary assistance for a scientific investigation on safety of chloroform, which was known as the First Hyderabad Chloroform Commission - 1888. Then came Second Hyderabad Chloroform Commission in the following year 1889. Reports of both the Commissions were later published in a book form in 1891.

"The True past departs not. No truth or goodness realised by man ever dies, or can die but all is still here, and, recognised or not, lives and works through endless changes."

T. Carlyle

"Shall those arts which have discovered a thousand instruments for inflicting pain on suffering and civilised man, never discover any new means of making him happy. Shall the fruit of the tree of knowledge always

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continue bitter, shall it never be ripened by the radiance of the Sun of benevolence. Are there any sufficiently cold hearted to believe this, let them be idle. To us hope which though it should be vain is yet an eternal source will remain. It will for ever prompt to actions which though they should deserve no laurels of triumph from mankind will never have raised them by watering the earth with blood”.

Humphry Davy

The history of medicine and the history of human race are one and the same. It is like a story having its threads so intervoven that it is difficult to pickout individually and distinguish separately each of the threads.¹ Man's endless pursuit for finding nature's hidden treasures and secrets had rewarded him with countless discoveries in every field. The study of the development of anaesthesia is also very interesting and stimulating in the field of history of medicine. Nothing new in the way of agent or method had been discovered for hundreds of years except the methods used prior to 1845 - opium, water of nightshade, henbane, lettuce, medicated wines, mesmerism, strapping, compression of nerves and blood vessels and nose etc. which might be considered a sad indication of the state of the practicing surgeon's curiosity. Today it can be said that

the use of drugs to produce anaesthesia is a boon to humanity, but in the 1840's this was not so. One of the principal obstacles in the way of the technical development of surgery prior to the discovery of anaesthesia was the need for unnatural speed and skill. Surgery technically at the beginning of the nineteenth century was limited to surface and reparative manipulations and was resorted to only in extreme cases. Prior to the use of anaesthesia all the hospitals were containing separate rooms for surgery, so that the shrieks of agony would not be plainly heard by others.

In 1795 the anaesthetic properties of laughing gas (Nitrous-oxide) were found by Sir Humphry Davy (1778-1829). On inhalation of the gas, his pain due to the cutting of wisdom tooth had disappeared. His disciple, Michael Faraday, while working on ethers, noticed its soporific effect and suggested its use as an anaesthetic. In 1824 Henry Hill Hickman (1800-1830) made significant contribution to the knowledge of anaesthesia by conducting experiments on animals with carbonic acid gas. According to him through inhalation of the gas surgical anaesthesia can be produced in man. In 1842 ether was successfully administered by Crawford Williamson Long (1815-1878) to two persons, but this success also could not get required

1. 'The English Pioneers of Anaesthesia' by F. F. Cartwright (1952) pub. by Bristol : John Wright & Sons Ltd. London. Simpkin Marshall Ltd. P.No. 166. 308 & 330.

publicity.¹ In 1844 a dentist, Horace Wells (1815-1848) observed a demonstration of gas by Gardner Quincy Colton (1815-1898) in which, a person was unable to feel the injuries received due to fall, after the inhalation of Nitrous oxide. Horace Wells tested the effects of the gas, on himself for extraction of his tooth, and felt no pain. Charles Thomas Jackson (1805-1880) suggested the use of Sulphuric ether for deadening pain by sprinkling it over the skin and mucous membrane surface. His pupil William Thomas Green Morton (1819-1868) took up the suggestion and in a case where excess of ether was used, it ran over the face producing numbness of the entire face, which gave him the idea of using ether for inhalation.² Morton tested on himself successfully on September 30, 1846, he was unconscious for about 8 minutes by the inhalation of ether vapour. In this year he administered ether successfully in a case of tumour of the neck, operated by John Collins Warren and the Massachusetts General Hospital. With the support of Warren and Henry Jacob Bigelow, etherisation was accepted and widest publicity was also accorded to it. Since then there has followed a tale of human endeavour which has given us drugs and yet more drugs, methods and yet more methods.

Owing to the irritating and unpleasant odour of ether, search was made for other volatile agents. Chloroform was discovered in 1831 by three independent persons-Eugene Soubeiran (1793 - 1858) a French chemist, Samuel Guthrie (1782-1848) of America and Justus Von Liebig (1803-1873) of Germany by distilling Chloride of lime and alcohol. Chloric ether, a solution of Chloroform and alcohol had been used by Jacob Bell (1810-1859) and by William Lawrence (1783-1867) in 1847 as an anaesthetic.³ There is no doubt that, true anaesthesia was occasionally attained, but the cases were few and far between. It is likely that, anaesthesia can never have been produced with complete certainty until the introduction of chloroform by James Young Simpson (1811-1870). He discovered the anaesthetizing properties of chloroform and put it for use in 1847, which proved to be a great success. Chloroform became very popular due to its potency, sweet odour and smoothness in administration in comparison to the drawbacks of ether such as its explosiveness, irritancy and its tendency to produce vomiting etc. But the dangers of its use were realised soon and some were convinced that chloroform was an inherently dangerous agent capable of causing death by stopping the heart. Hence,

1. History of Anaesthesia by Thatcher, P.Nos. xiii (introduction) 6, 14, 15, & 16.

2. Evolution of Anaesthesia by Dr. Hari Rao, Ind. Journal of the Hist. of Med, Vol. 2 No. 1, P. Nos. 29 to 32.

3. History of Anaesthesia by Thatcher, P. No. 13.

research work in physiology and pharmacology and for the establishment of basic principles of anaesthesia continued. John Snow (1813-1858) led the anaesthesia from handicraft to science, based on physiological principles. The actual cause of death from chloroform was not known, and therefore, this became the subject of great controversy which was settled by the valuable findings of A. Goodman Levy in 1911.¹

In England the number of deaths due to the inhalation of chloroform had reached upto 123 by 1863, apart from the deaths in other parts of the world due to its use. So, the Royal Medical and Chirurgical Society (now the Royal Society of Medicine) appointed a special committee of investigation in 1864. The committee reported that as an anaesthetic, ether was far safer than chloroform, because when overdose of ether was given, the respiration stopped before the heart and it was possible to revive the animal through artificial respiration whereas due to overdose of chloroform the action of the heart stopped before the respiration and the animal could not be revived. Ether anaesthesia was impracticable on account of its immoderate slowness in producing the anaesthetic state and the frequent turbulence, during

the introduction period of the subject being etherized. The Committee suggested that, chloroform should be diluted by mixing it in various proportions with ether. Since then ether had rarely been used in England.

Then in 1877, came the Glasgow Committee doing no more than, reassuring both, those who used ether and those who used chloroform. For those, who in 1870 adopted ether considering it safer than chloroform found it still superior to chloroform and the length of time required to obtain its required effect was immaterial for them. On the other hand, those, who had adopted chloroform in spite of the very general re-adoption of ether found that, no additional deterrent to its use had been discovered since 1864 except the paralyzing effect of chloroform upon the heart and this deterrent was not so important to the chloroformists.²

In 1880, Edward Lawrie (Fig.1) entered the argument. He was in Indian Medical Service, appointed as the surgeon in the British Residency in Hyderabad. He very soon became principal of the Medical School of Hyderabad and also the personal physician of Nawab Mir Mahboob Ali Khan, the Nizam VI (Fig.2). He had been a medical student and house

1. Evolution of Anaesthesia by Dr. Hari Rao. Ind. Journal of Hist. of Med. P.No. 32.

3. The development of inhalation Anaesthesia by Barbara M. Duncum p. nos. 21, 22, 253, 428 & 429.

surgeon of Prof. James Syme (1799-1870) at Edinburgh. He used chloroform anaesthesia in thousands of patients without any incident in the manner of his teachers who had taught that death during chloroform anaesthesia primarily was due to respiratory failure, not to heart failure and that consequently, if the respiration were carefully watched the pulse could be ignored. He believed that chloroform was absolutely safe, if administered by the method of Edinburgh School. He persuaded the Nizam to pay for the scientific research work on safety of chloroform, which came to be known as the 'First Hyderabad Chloroform Commission', which was carried out in early 1888.'

First Hyderabad Chloroform Commission - 1888 A.D.

This commission consisted of

1. Surgeon Patrick Hehir, as President,
2. Dr. A. Chamarettes - member and
3. Dr. J. A. Kelly - member (Fig.3).

A series of experiments were performed on dogs to determine the exact cause of death due to chloroform anaesthesia, to test the effects of poisonous doses of chloroform on dogs, with the aim that, the experiments should have an important bearing on the way in which the administration of the anaesthetic ought to be conducted in the human objects. The experiments of the commission lead them to conclude that "Chloroform can be given to dogs by inhalation with

perfect safety, and without any fear of accidental death if only the respiration - and nothing but the respiration - is carefully attended to throughout.'

Dr. Lawrie, while forwarding the report to the Government, stated that "the results of the experiments with the principles necessary for the safe administration of chloroform taught by Mr. Syme, who never had a fatal case and with my own experience, which is founded upon the same principles. I have killed scores of dogs with chloroform and in every instance death has resulted from failure of respiratory function. I have also given chloroform in surgery without a death for more than twenty years and for as many as five to ten times a day during the last fifteen years I have never seen Syncope or failure of the hearts action produced by it". He lost no time in publicising the result.

On the occasion of the distribution of prizes to his students by the Royal Highness the Duke and Duchess of Connaught, Dr. Lawrie gave a short speech on February 23, 1889 saying that.....he had made experiments with reference to the effect of chloroform and had never seen the heart injuriously or dangerously affected by chloroform. Reacting to this statement of Dr. Lawrie, commented the *Lancet* on March 2, 1889 that the result of the research made

upon pariah dogs was that these animals were killed from respiratory failure, and in no case did cardiac syncope occur directly. Unfortunately Mr. Lawrie contents himself with bare statements of results, adding that these results tally with his own experience, which he believes to be uniquely large. Mr. Lawrie, as a disciple of Simpson and Syme arrives at conclusions consonant with the teaching of those great clinicians, but utterly, at variance with the experience alike of experiment and practice as carried out in Europe. We should require more than the scanty statements of experiments performed upon dogs - notoriously non-susceptible to chloroform syncope - before we could accept the conclusions of the Hyderabad Commission when they appear to go in the very teeth of those at which the commission appointed by the Royal Medical and Chirurgical Society and by the British Medical Association (The Glasgow Committee) arrived, and further, are opposed to the careful and painstaking experiments of such scientific observers as Snow, Claude Bernard, Mc Mendrick and others too numerous to mention. All those who are familiar with chloroform are well aware that syncope, when primary, as a rule supervenes in the initial stages of inhalation, while secondary syncope due to respiratory embarrassment in the result of accumulation of chloroform in the blood leading to paralysis of the medullary

centres, and occurs in a late stage of the administration. The primary syncope it is rarely, if never, possibly to induce in dogs, although, unfortunately, it is this form of chloroform heart failure which does occur in human beings, and which it is almost impossible to remedy. While welcoming the attention paid to the subject by the Hyderabad Commission, we cannot but feel that, should the commission inculcate a disregard of the heart as a factor in chloroform dangers, it will do harm and provoke a slipshod carelessness in the use of that valuable anaesthetic, which must in the long-run do damage to the cause the commission has espoused" (*Lancet* 1889, i.438).

Lawrie accepted the *Lancet's* challenge. In a letter to that journal, published on May 11, 1889, he wrote "there is no such thing as chloroform syncope. It is conceivable that syncope may occur in the initial stages of inhalation of chloroform, but in the course of a very large experience I have never met with a single instance of such an accident, and if it ever does occur it cannot be due to chloroform poisoning though it might be caused by fright or shock. Owing to the numerous accidents that have happened with chloroform to the discussions prevalent in the profession, and to the mistaken notion that the risk of heart failure is inseparable from its use, the public dread its administration much more than

they dread surgical operations, and fainting from mere fright in the early stages of inhalation is no less intelligible that it is easy to prevent, in case where it is likely to occur by a preliminary dose of alcohol. On the other hand, it is equally intelligible that syncope may be induced if an operation be commenced in the initial stages of chloroform administration, before the patient is rendered insensible to shock by being brought fully under its influence. In poisoning by chloroform the heart fails when the respiration ceases, and never before ... the heart rapidly or gradually stops beating as a direct result of the stoppage of respiration, and as an indirect effect of the poisoning with chloroform. The *Lancet* asserts that the statements made in my address are utterly at variance with the experience alike of experiment and practice as carried out in Europe.....The *Lancet* would trust to the heart and circulation for signals of danger in 'chloroform administration'. Our contention is that if the administration is ever pushed far enough to cause the heart to show signs of danger, the limits of safety have already been exceeded and a fatal result must almost inevitably ensue But we say, further, that the respiration invariably gives warnings when a danger point is approached, and consequently that it is possible to avert all risk to the heart by devoting the entire attention to the respiration during chloroform administration (*Lancet*, 1889, i, 952).

In reply to this letter from Lawrie, the *Lancet* said ".....Mr. Lawrie has contended himself with mere dogmatic assertion and iteration of his former statements. Whatever may be the value of the work done by the Hyderabad Commission — and Mr. Lawrie seems inclined to accept the conclusions arrived at, rather than those of well-known and tried scientists—it is quite impossible for those who have neither seen the experiments to which Mr. Lawrie refers, nor received an authoritative statement as to the methods employed and precautions taken, to accept as evidence the results to which he refers .. concerning the depressant action of chloroform upon the heart (*Lancet* 1889, i, 949).

Due to the *Lancet's* dismissive reaction Dr. Lawrie persuaded the Nizam of Hyderabad to pay for a second more extensive study in this regard and in 1889 in a further letter Lawrie stated that "he was directed by his highness the Nizam to offer *Lancet*.....the sum of one thousand pounds to send out a representative to repeat the experiments of the Hyderabad Chloroform Commission". In response to this offer, the *Lancet* proposed Dr. T. Lauder Brunton as its representative in this matter (He was an authority on the action of drugs on the heart and had published books on this subject) who accepted the offer (*Lancet*, 1889, ii, 601, 606. 1351-2).

Second Hyderabad Chloroform Commission 1889

This new commission, under the presidency of Dr. Lawrie, of which Mr. Lauder Brunton was one of the members, came to be known as the 'Second Hyderabad Chloroform Commission'. The other members were surgeon Major Gerald Bomford and Dr. Rustomji. The President and members of the First Commission were also associated with this commission.

For three months, the commission performed various kinds of experiments on some six hundred animals, the first telegram sent by Lauder Brunton from Hyderabad was "Four hundred and ninety dogs, horses, monkeys, goats, cats, and rabbits used. One hundred and twenty with manometer. All records photographed. Numerous observations on every individual animal. Results more instructive. Danger from chloroform is asphyxia or overdose, none whatever heart direct".

In December 1889 its report was completed with the same conclusion that, on administration of chloroform by inhalation the respiration stops first followed by the heart. One of the most significant findings of the second commission was that the administration of chloroform causes a fall of blood pressure and dilatation of the ventricles of the heart. The report of this commission was first

published in instalments in the *Lancet* between January and June 1890 (*Lancet* 1890, i, 149-59, 421-9, 486-510, 1140-2, 1369-88).

The conclusions of the Second Commission provoked numerous adverse comments in England's leading medical journals. Typical one of these was that from Leonard Hill, the distinguished physiologist, who said that "the doctrine that Chloroform kills by paralysing the respiratory centre propounded by the findings of the two Hyderabad Chloroform Commissions, and the prejudiced enthusiasm of Surgeon-Major Lawrie, is one of the most pernicious and dangerous doctrines ever put before the medical profession". He also found many of the conducted experiments faulty. Such as, chloroform anaesthesia was started, with the animals in 'induction boxes'. No less than 6% of the animals were found to have died, unobserved, in the boxes during induction with chloroform before any of the experiments on them had been set up 'In this Hill said, "the commission gives away their whole case. They never observed these accidental deaths". He was right, Lawrie, Brunton and their colleagues had ignored these deaths, and had glibly ascribed them to the slipshod techniques of their unqualified assistants whose task was to render the dogs unconscious prior to the commission's experiments.

Similarly, after the publication of the results of the careful researches of Dr. E. H. Embley, the editor of the 'British Medical Journal' said of the second commission that it had "..... looked upon respiratory failures as the primary cause of death, most other researchers look upon this as secondary to the failure in the circulatory apparatus. The commission deserves much credit for pointing out the importance of 'the respiration ... but from the scientific point of view no impartial observer can maintain that they proved its main contention"¹.

In spite of all the above experiments, Lawrie's personal assurance based on his vast experience that he had never seen a death from heart failure due to the direct action of chloroform and Lauder Brunton's conversion to Lawrie's beliefs, the *Lancet* remained to some extent doubtful regarding the authenticity of the results.

A careful prepared questionnaire was sent to individual members of the British medical profession and similar information was sought in a more detailed form of questionnaire from the hospitals at home and abroad. The material thus gathered was analysed and many interesting observations were made by 1893.

Such as, by far the most prevalent method of administering chloroform was 'poured on a handkerchief' and in descending order of frequency on lint, on a towel, a napkin, into an extemporized cone, or on a sponge etc. (Fig.4). The recorded deaths resulting from chloroform being administered without an inhaler are rather more than double those occurring when an inhaler is used As to the determining causes of death by chloroform, the answers to the *Lancet's* questionnaire bore out the findings of the Chloroform Committee of 1864 and the Glasgow Committee of 1880. The larger proportion of deaths were reported as having resulted from initial heart failure, in opposition to the view of the physiological researches of the Hyderabad Commission. A possible explanation of why the observations of the Hyderabad Commission differed from those made during the above survey by *Lancet* was suggested that, the conflicting views are reconcilable and seems to be possible, atleast in many cases. The reports of numerous cases refer to failure of the pulse, as occurring before that of respiration, and it is undoubtedly true that although the pulse does fail, yet the actual heart action continues for sometime after pulse failure. This explanation however seems hardly to apply to those cases

1. Edward Lawrie and the Hyderabad Chloroform Commission, by A. Ramachari & A. Patwari, published in the International Congress and Symposium Series - 134 (July 1987) entitled "The History of Anaesthesia" published by Royal Society of Medicine Service Ltd. - London in 1988. P.no. 236.

of sudden death which occur at the commencement of chloroform anaesthesia, nor can these deaths be explained as being due to fright, and not to the anaesthetic (*Lancet* 1893, i, 29, 693, 761, 899, 971, 1111, 1236, 1479).¹

Edward Lawrie gave convincing replies to all these criticisms and he finally believed the results of both

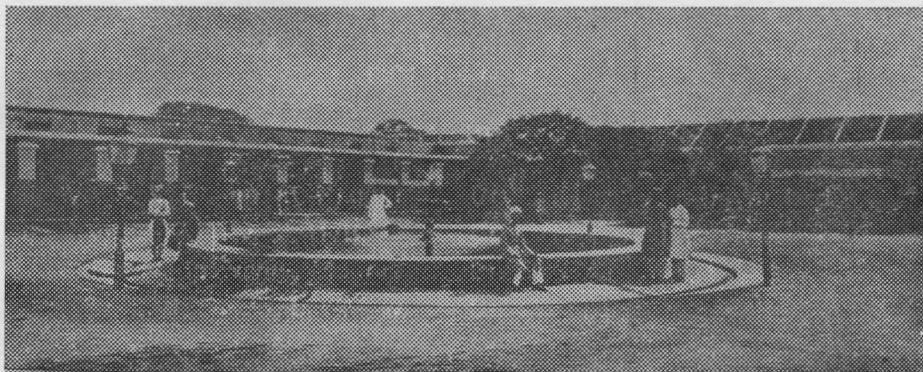
the Hyderabad chloroform commissions were right, up until his death in 1915.

Reports of both the commissions were later published by His Highness the Nizam's Government in a book form in the year 1891 A.D. This memorable event has given Hyderabad and India a permanent place in the History of Medicine.²

BIBLIOGRAPHY

1. Anonymous (1988) Souvenir, Hyderabad Chloroform Commissions Centenary (1888-1988), pub. by the Centenary Celebrations Committee of Afzal Gunj Hospital (1886-1986) & Diamond Jubilee Celebrations Committee Osmania General Hospital & Osmania Medical College, Hyderabad—A.P. (1926-1986).
2. Barbara M. Duncum (1947) The development of inhalation Anaesthesia with special reference to the years 1846-1900 pub. by The Wellcome Historical Medical Museum - New York.
3. Cartwright, F. F. (1952) The English pioneers of Anaesthesia, pub. by Bristol : John Wright & Sons Ltd. London; Simpkin Marshall Ltd.
4. Hari Rao, D. (1957) Evolution of Anaesthesia - Pub. in the Indian Journal of the History of Medicine Vol. II, No. 1.
5. Ramachari A & Patwari A (1988) Edward Lawrie and the Hyderabad Chloroform Commissions pub. in the International Congress and Symposium Series - 134 (July 1987) entitled "The History of Anaesthesia", pub. by Royal Society of Medicine Service Ltd. - London in 1988, p. no. 236.
6. Virginia S. Thatcher (1953) History of Anaesthesia with Emphasis on the Nurse Specialist - pub. by J. B. Lippincott Co. London.

1. The development of inhalation Anaesthesia by Barbara M. Duncum, P.Nos. 21, 22 & 423 to 441.
 2. Souvenir, Hyderabad Chloroform Commissions, Centenary, 1888-1988.



AFZALGUNJ HOSPITAL
Venue of the Hyderabad Chloroform Commissions



Surgeon-Major Edward Lawrie
(Fig. 1)

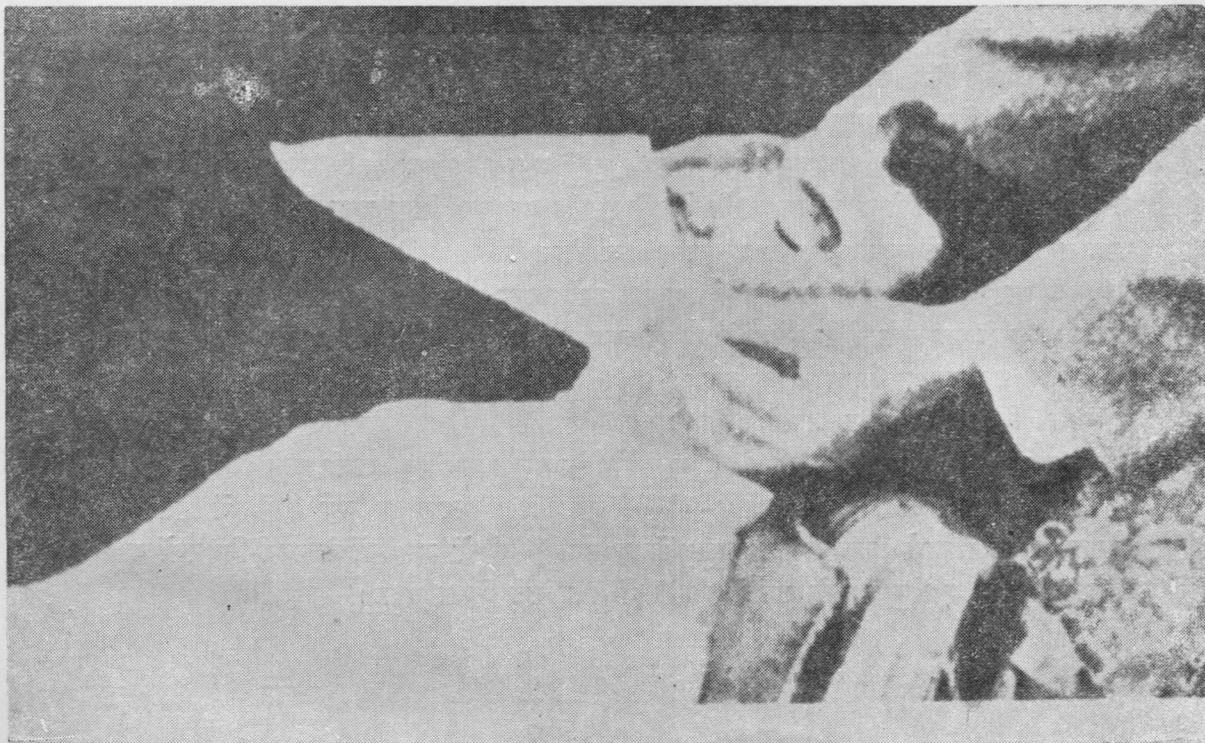


Nawab Mir Mahboob Ali Khan
Nizam of Hyderabad
(Fig. 2)

HYDERABAD CHLOROFORM COMMISSION

Seated (L-R) Dr. Rustomji, Dr. T. Lauder Brunton, Surgeon Major Edward Lawrie,
Dr. P. Hehir, Dr. Gerald Bomford.

(Fig. 3)



Hyderabad Chloroform Cap in use

सारांश

असंवेदनता का इतिहास एवं हैदराबाद क्लोरोफार्म आयोग

मोमिन अली

ए. रामाचारी

प्रकृति के गुप्त खजानों एवं रहस्यों की जानकारी प्राप्त करने हेतु मानव ने जो निरन्तर प्रयास किये उनके फलस्वरूप वह प्रत्येक क्षेत्र में असंख्य आविष्कारों से लाभान्वित हुआ है। चिकित्सा शास्त्र के क्षेत्र में असंवेदनता के विकास सम्बन्धी विषय का अध्ययन अत्यन्त रोचक और प्रेरणादायक है। आज यह कहा जा सकता है कि संवेदनाहारी औषध द्रव्यों का प्रयोग मानव जाति के लिए एक बरदान सिद्ध हुआ है किन्तु 1840 में ऐसा नहीं था। जेम्स यंग सिम्पसन द्वारा क्लोरोफार्म के असंवेदनकारी गुणों की खोज एवं नवम्बर 1847 में इसी उद्देश्य से इसका प्रयोग एक अत्यन्त महत्वपूर्ण उपलब्धि थी। किन्तु तुरन्त ही क्लोरोफार्म के प्रयोग से उत्पन्न दुष्प्रभावों का पता चला जो कि एक वाद-विवाद का स्वरूप धारण कर लिया। ऐसे समय 1880 के अन्त में एडवर्ड लारी ने इस वाद-विवाद में प्रवेश किया तथा हैदराबाद के निजाम को क्लोरोफार्म की निरापदता पर वैज्ञानिक अध्ययनार्थ सभी प्रकार की आवश्यक सहायता प्रदान करने हेतु राजी करा लिया। यह प्रथम हैदराबाद क्लोरोफार्म आयोग-1888, कहलाया। तत्पश्चात् वर्ष 1889 में द्वितीय हैदराबाद क्लोरोफार्म आयोग का गठन किया गया। दोनों आयोगों के कार्य-विवरणों व उपलब्धियों को एक पुस्तक के रूप में 1891 में प्रकाशित किया गया।