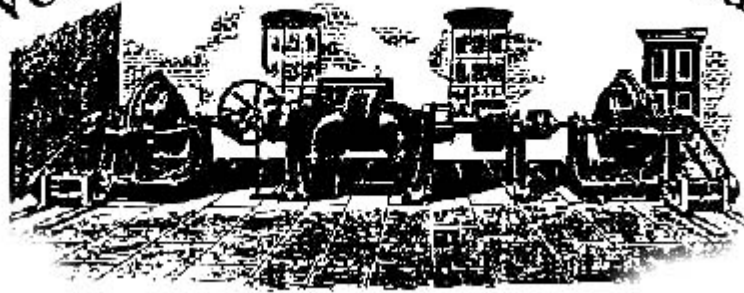


South Western Electricity Historical Society



Lynmouth Hydro Scheme 1890

The following document comes from the
South Western Electricity Historical Society website at
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This site contains all the necessary contact information you may require.

Do visit the site – you may find more items of interest.

Supplement to HISTELEC NEWS No.31 December 2005

"ELECTRICITY IN BATH 1890 – 1974" (Part I)

by the late William E. Eyles

The above booklet was published in Bath in 1974 as the last date implies and we have few copies. So when we had a request from Australia, Geoff Yates ex-SWEB Bath, for a copy of the booklet, we decided to make one. The original was split into three parts, Early History, Public Ownership and State Ownership. It is proposed to publish parts 1 & II as a supplement to the Histelec News – part I for December 2005 and part II in April 2006. We are unaware of any connection that Mr Eyles had with the ESI, but as historian we know, he had the full cooperation of SWEB at the time of writing.

PART I - EARLY HISTORY

The names of many famous men can be associated with the science of electricity but perhaps the names which most readily come to mind are those of Humphry Davy and Michael Faraday to whose close partnership at the beginning of the 19th Century must be attributed the great advancement made in the field of electrical science. From their day and age, men strove to develop the use of electrical energy for the benefit of mankind. Progress was such that although its use for public purposes was still in the experimental stage, Parliament, towards the end of the 19th Century, passed the Electric Lighting Act 1882.

Its purpose was to facilitate and regulate the supply of electricity for lighting and other purposes. The Act gave authority to the Board of Trade to grant a License or a Provisional Order to a local authority, company or person to supply electricity for public or private purposes within a defined area. Whilst a License did not require confirmation by Parliament and was granted for any period not exceeding seven years, a Provisional Order was for such period, whether limited or unlimited, as the Board of Trade thought proper, but had no force until it had been confirmed by Parliament. The Act received the Royal Assent on 18th August, 1882 and the Bath City Council, then sitting as the Urban Sanitary Authority, lost no time in making up its mind to apply for a Provisional Order for on 26th October in that year they decided to make the necessary application to the Board of Trade for an Order.

However, the unbounded and eager enthusiasm of the Corporation proved a bit of a flash in the pan. They very quickly had second thoughts about venturing into an almost unknown field and on the 13th December 1882 decided to rescind their previous resolution because in their opinion it was then inexpedient to obtain a Provisional Order. There the matter was left with nothing further being done until 1887 when at a public meeting of Citizens held in the Theatre Royal on 27th June in that year under the presidency of the Mayor (Mr. Alderman Murch), it was agreed that it was desirable that the system of electricity be used for lighting the streets of the City.

At that time there was in Bath a very enterprising citizen of the name of Henry George Massingham, whose residence was at Claremont, Oldfield Road. By trade he was a boot and shoe dealer in a large and substantial way in several towns in the west of England, his business premises in Bath being at 18 High Street and 1 The Corridor (now occupied by Bellmans Wool Stores). Mr. Massingham, however, was a man with other interests in life besides being a boot and shoe dealer because he regarded himself as something of an electrical engineer having a small electricity plant on the site now occupied by the Empire Hotel. During the summer of 1888 he made approaches to several members of the Corporation for the introduction of electric lighting, by means of an overhead wire system, in the City. He had already carried out a similar system in Taunton. The interest of the Council in this new form of lighting was now definitely gaining momentum with a result that on 1st February, 1889 they entered into a Contract with Mr. Massingham that he should generate and distribute electricity to the central area of the City. Shortly after the Contract had been entered into a Company called "The Bath Electric Light Company Limited" was formed to undertake the electric lighting of the City, Mr. Massingham being one of the Directors. The Capital of the Company was £25,000 but with less than £5,000 being subscribed, the Directors declined to proceed and the Company became defunct. Mr. Massingham was now left to proceed with his Contract on a personal basis. The Contract involved the provision and lighting of 81 public arc lamps of 1,200 candle power each for a period not exceeding an average of ten hours per night and for the general supply of private lighting in the restricted area. The price to be paid by the Corporation to the Contractor for public lighting was £21. 17s. 6d per lamp per annum and by a

private consumer a maximum price of £2 per annum for a lamp of ten candle power burning such hours each day from dusk to midnight as required according to the season of the year. The consumer, who certainly had a very restricted supply, was made responsible for the proper wiring of his premises. The term of the Contract was for seven years and at the end of that time the Corporation had the power to purchase the undertaking of the Contractor upon certain conditions. Before the ink was hardly dry on the Contract, in fact within three weeks of its being signed, the Council had misgivings about the overhead system of supply and decided to enter into a Supplemental Contract with Mr. Massingham, which was signed on 25th April, 1889, providing for the mains to be laid underground with a consequential increase in the annual price to be paid for each public lamp from £21. 17s. 6d. to £25. 17s. 6d.

The site chosen by Mr. Massingham for his electricity works was the Bathwick Mill, a flour mill on the bank of the River Avon near to the Pulteney Weir. This site was however abandoned, not in consequence of its being unsuitable but because apparently Mr. Massingham could not agree with the then owners as to price. So, instead, Mr. Massingham established his electricity works at premises then known as the Old Kingston Flour Mills in Dorchester Street and officially commenced to supply electricity from there on 24th June, 1890, the arc lighting being carried out on the Thomson Houston continuous current system and the incandescent lighting on the high pressure alternating current transformer system.

The *Bath Chronicle* of 26th June 1890 supplies a detailed account of the inaugural ceremony. For present purposes, however, suffice it to say that the newspaper records that a large number of citizens and visitors assembled at the Dorchester Street Works to witness the "switching on" of the electric light in the City by the then Mayor, Mr. Alderman J.S. Bartrum, at 9.00 p.m. Following the ceremony at the Works the guests were entertained by Mr. Massingham to supper at the Grand Pump Room Hotel.

At that time, the supply was being afforded without any statutory authority, Mr. Massingham not having obtained from the Board of Trade either a Licence or a Provisional Order to do so. The Works and the method of cable laying were, however, inspected by a Major P. Cardew, acting on instructions from the Board of Trade, who made two Reports to the Board on the inspections which he made on 19th February and 2nd and 3rd July, 1890, and in which he drew attention to certain matters of a technical nature which required attention.

In December 1890 Mr. Massingham was successful in obtaining a Board of Trade Licence for the supply of electricity in Bath. The Licence contained a Clause providing for the purchase of the Undertaking by the Local Authority at the expiration of its term on conditions similar to those contained in the Agreement between the Corporation and Mr. Massingham of 1st Feb. 1889. Whether or not Mr. Massingham was desirous of remaining an individualist in the field of electricity in Bath is not known, but what is known is that in the early part of the following year (1891), Mr. Massingham, on account of the limited Capital at his command and his inability to keep pace with the orders as they came in, agreed to the formation of a Company to take over and develop his business, and later in the year his Licence was transferred to the Company. The Company, with a Capital of £60,000, was known as the "City of Bath Electric Lighting and Engineering Company Limited", Mr. Massingham being one of the Directors.



**Fig. 1 Mr. H. G. Massingham
Pioneer of Electricity in Bath**

In addition to the street lighting in the central area of the City, electricity was at that time being supplied to the Royal Mineral Water Hospital, the Athenaeum, the Grand Pump Room Hotel, the York House Hotel, the Christopher Hotel and thirty business premises in Bath, which included Cater, Stoffell and Fortt Ltd. of High Street and Milsom Street, James Colmer Ltd. of Union Street, Jolly and Son of Milsom Street, R. King and Sons of Milsom Street and, perhaps rather surprisingly, Davis and Son, gas fitters in Milsom Street. In addition, a supply was afforded to a number of private residences. All this entailed the lighting of 18 private arc lamps and nearly 4,000 incandescent lamps, in addition to the street lighting.

The electrically minded reader will obviously expect to be told something about the type of plant and apparatus which was first installed as well as how, in the early days, the electricity generated was

conveyed throughout the central area of the City. So with apologies to those not so minded, these points can perhaps be best dealt with now. With regard to the plant etc., it is considered desirable, because the writer is not an Engineer even in the remotest sense of the word, to give the following extract from the Report, dated 16th February, 1891, of Major General Webber, C.B., R.E., Consulting Engineer and Past President of the Institution of Electrical Engineers as contained in the Company's Prospectus :-

"Motive Power and Engineering Plant. - Four 105 H.P. Babcock and Wilcox Boilers duly erected and put to work. Four 6 1/2inch and 12 1/2inch by 8-inch Vertical Brush Compound Engines, each with an acme governor, flywheel and continuous lubricating arrangement, and three 12-inch and 20-inch by 14-inch Brush Vertical Compound Engines each with an acme governor, stop valve, sight feed, and continuous lubricating arrangement, hand expansion gear and flywheel with eight grooves for driving direct. One Brass Tube Surface Condenser with a surface stated to have 1,000 superficial feet, with a 7-inch by 10-inch and a 10-inch by 12-inch duplex air and circulating pump, said to be capable of delivering 20,000 gallons of water per hour. This was installed in March 1890, and has been at work giving a vacuum of about 20 to 22 inches. It is provided with a serviceable mercury vacuum gauge. One Steam Boiler feed pump said to be capable of delivering 1,000 gallons per hour, also one Worthington duplex feed pump; either of these pumps is equal to the duty of feeding two boilers. Two feed tanks to contain 490 gallons carried on iron girders. One steam trap. The necessary steam, circulating and exhaust pipes and valves for the Engines that are fixed. One overhead travelling crane with rails.



Fig. 2 Mr. Massingham's Electric Light Works in Dorchester Street

touching the iron by bituminized wooden bridges, the whole sealed in by the space within the trough around the cables being run in with bitumen, after which the covers are secured.

Arc Lamps. - Lamps placed in suitable lanterns, carried in most cases on cast iron lamp posts which stand 30 feet out of the ground, and which are amply substantial and securely fixed, known as Thomson-Houston Arc Lamps of a nominal 1,200 candle power; 83 are for double carbons and 50 for single."

The electrical energy generated by the alternators was conveyed by a system of high tension mains throughout the area of supply and high tension services to consumers' premises taken off the high pressure mains with isolated house transformers installed on each consumer's premises in order to reduce the pressure of the current to that suitable for use by the consumer. This system of isolated transformers on consumers' premises has continued in use up until the present day, although to a large extent the system was later abandoned in favour of low tension networks with larger transformers in substations in the streets. It is of considerable interest that a system laid down in 1898 should, in part, continue to be in use today. The areas where it remains are those where the properties are widely spaced, and it is therefore inefficient to transmit the required power at low voltage over these distances. The principal area where this method of supply is still maintained is on the southern fringe of Bath, in the Combe Down/Claverton area.

It would have been too much to expect that the inauguration of this new system of lighting would not be attended by teething troubles. Many of these were of a minor character such as complaints regarding the intensity or quantity of light given by the public lamps; the need for the use of better globes, unsteadiness in the lamps and a contention that in many parts, the workmen did not lay the

Electrical Plant. - Four Dynamos on the Thomson-Houston system, each capable of supplying current to fifty arc lamps of 1,200 nominal candle power, and also three Mordey Victoria 75 Kilo Watt alternating Dynamos, each capable of yielding 38 amperes at the terminals at 2,000 volts pressure when driven at 500 revolutions a minute, and capable of supplying current to 2,000 eight candlepower glow lamps, allowing for a loss of 10 per cent with a full load in the conductors and transformers, as they are used and circumstanced at Bath. (Since the Report a fourth Mordey Victoria 75 Kilo Watt alternating Dynamo has been added.)

Conductors for Distributing Electricity in Bath from the Central Station. -

The Callender Company's Cables, containing copper wire stranded, and insulated with bitumen on the well known Callender system, laid in iron troughs, and kept apart and from

mains at a sufficient depth from the surface to ensure safety. Perhaps, at least from Mr. Massingham's point of view, the most serious trouble was the failure in supply, which on occasions was bound to occur. Under the Contract if he made default in supplying electricity to all or any of the public lamps he was liable to a penalty not exceeding five shillings in respect of every default for each street lamp for each day on which the default occurred. Whilst the local authority exercised a certain amount of tolerance and did not insist upon the payment of these fines for some considerable period they eventually did so when failures occurred.

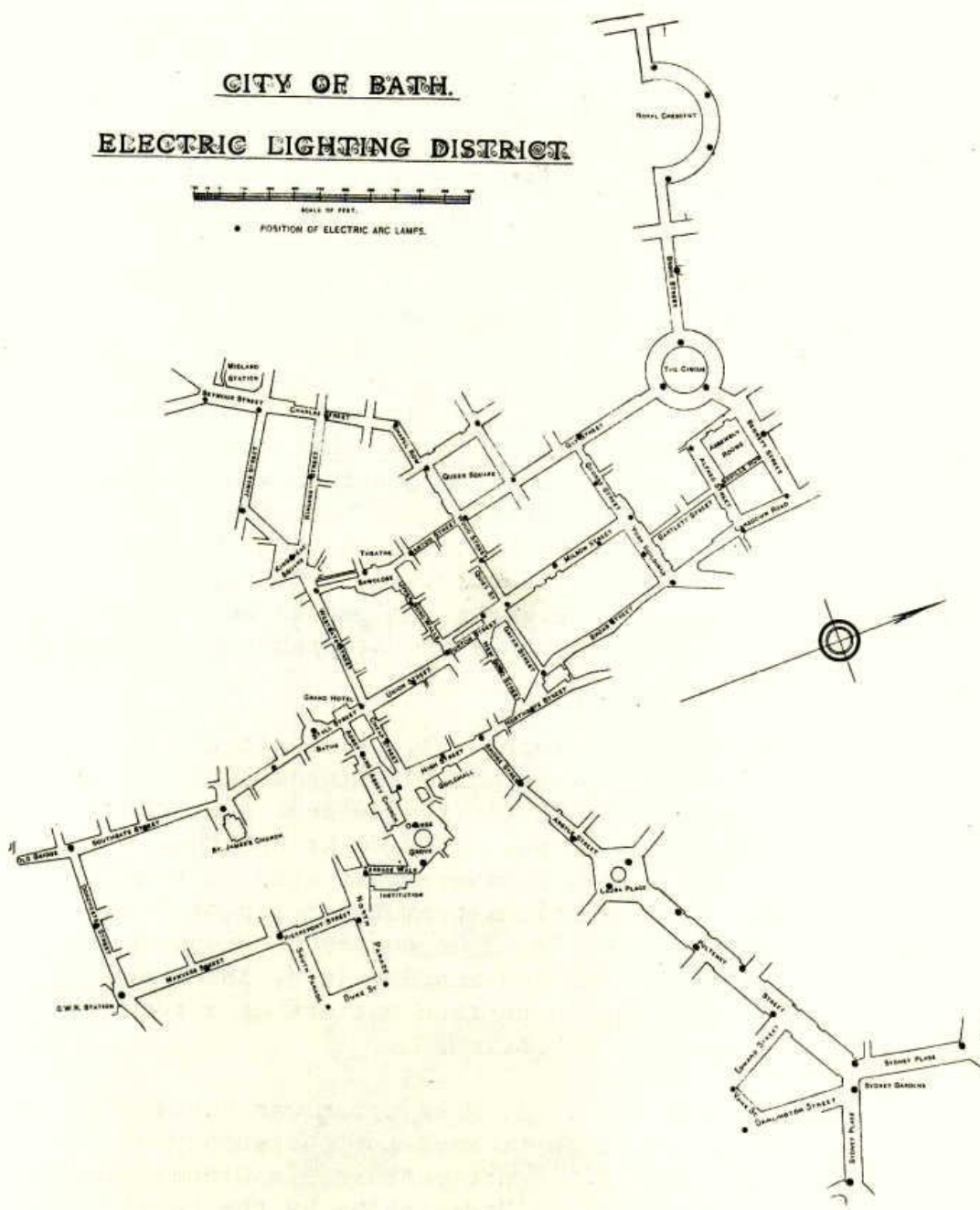


Fig. 3 First Electric Lighting District - from the Prospectus of the City of Bath Electric Lighting and Engineering Co. Ltd, of 8th May 1891

In January 1891 the Corporation, with the safety of the public obviously in mind and with a view to ensuring an efficient service, appointed Professor George Forbes, F.R.S., of London, to inspect and make a report on the electric lighting in the City. He duly made his inspections on 4th and 5th February, and his Report on 28th February 1891. Professor Forbes thought the Contract had been properly carried out except for certain defects and doubtful points to which he drew attention. He thought the public arc lighting appeared to be as satisfactory as could be expected from the terms of

the Contract. In accordance with the terms of the Contract he recommended that a competent Electrical Engineer should be appointed by the Corporation and in the following September they appointed a Mr. J. W. Gatehouse, one of fifteen applicants, to the position of Electric Inspector. His office and testing station was first established at No.36 Broad Street. In 1893 the Company appointed a Mr. G.F. Metzger as their permanent Electrical Engineer and Manager and he took up his duties on 25th April in that year remaining with the Company, and subsequently with the Corporation, until he left Bath on 16th March '01.

The following year (1894) the Company decided to apply to the Board of Trade for the grant of a Provisional Order in substitution of the Licence transferred to them from Mr. Massingham. A Provisional Order would give them, provided the Board of Trade agreed, a greater security of tenure and possibly wider powers, e.g. authority to supply electricity over the whole area of the City instead of the central area only. The Corporation successfully opposed the application.

It appeared apparent that around this time the Company's finances were not all that they would have wished, for instance the only dividend they declared had been one of 4 per cent in 1892, so not being daunted by their lack of success in obtaining an Order in 1894, the Company renewed their application in 1895. On this occasion, however, not only did the Corporation refuse to give their consent to the application, but decided to apply for a Provisional Order themselves. Throughout the protracted negotiations, which ensued, the Corporation had as their expert electrical advisor Mr. Robert Hammond, M.I.E.E., of London, an Electrical Consulting Engineer of very considerable experience. In a Report he made to the Council on 9th September 1895 he dealt very fully with the questions of (1) the desirability of the Corporation undertaking the supply; (2) the system of generation and distribution and (3) the advisability of the Corporation purchasing the property of the Company. Mr. Hammond's valuation of what he considered the Corporation might advantageously purchase was £8,285 for the generating plant and works (excluding land) and £6,500 for the distributing plant, a total of £14,785. He did not recommend the Corporation taking over the arc lighting plant. The Company offered three alternatives (1) to sell the whole undertaking for £45,000; (2) to take a lease from the Corporation, or (3) to sell their undertaking by arbitration. The Corporation and the Company could come to no agreement and the Board of Trade suggested a meeting of representatives of both bodies at their Office. This meeting took place in February 1896 without result. Sir Courteney Boyle, then Permanent Secretary to the Board, stated that the Board would nominate an Engineer to report independently to the Board upon the value of the undertaking, the Corporation and the Company to pay the cost (about 100 guineas) in equal shares. The parties agreed to this proposal and the Board appointed Professor A.B.W. Kennedy, F.R.S., of London to examine the plant and report. Professor Kennedy came down to Bath, examined the Works and mains and gave his valuation as £22,733 as against Mr. Hammond's valuation of £14,785. To both these figures was to be added the value of the land and buildings £1,800, which had been valued separately by Mr. W.J. Willcox, the Somerset County Surveyor. Then followed an unsuccessful attempt by the Company to force the Corporation to purchase the arc lighting plant, but on this point, at least, Professor Kennedy was of the same view as Mr. Hammond, that the Corporation should not be compelled to buy it.

The Board of Trade then decided to grant the Provisional Order for which the Corporation had applied (the Order to apply to the whole City instead of the central area only) on the understanding that the Corporation would purchase the plant and land of the Company for £24,533 within fourteen days after the Board had approved a loan for the purpose. The Corporation having agreed to abide by the valuation of Professor Kennedy made the necessary application to the Government for consent to borrow £45,000 made up as follows:-

For works and land	£24,533
Expenses of obtaining Provisional Order	£967
Mr. Hammond's estimate of additional capital required	£14,500
Extensions of mains	£5,000
	<hr/>
	£45,000

The Agreement between the Corporation and the Company for the purchase of the undertaking was signed on 7th August 1896 and the consent of the Board of Trade having been obtained to borrow the £45,000 referred to above, the Corporation took over the Company, and thus became the electricity authority for the City on 7th January 1897.

Although the Agreement provided for the purchase of the arc light mains it did not include the purchase of the arc lighting plant, so provision was made in the Agreement that the Corporation should be entitled to use the arc lighting plant for a period of twelve months after take over on

payment of £100 for the first three months and afterwards at a monthly hire charge of £25 a month.

The Corporation also agreed, inter alia, to take over the Company's Engineer and Manager, Mr. G.F. Metzger, and the employees and apprentices of the Company as well as the Contracts, which the Company had previously entered into. The Agreement sets out the rates of pay received by the staff at that time, and it may be of interest to quote some of them here:-

Station Superintendent	£150 per annum
Assistant Engineer	£80 per annum
Carpenter	6½d an hour
Mason	6d an hour
Drivers	£1 a week of 56 hours
Stokers	£1. 4s. a week of 56 hours.
Switchboard Attendant	10s. a week
Coal trimmer and boiler cleaner	4d an hour
Station boy	10s. a week.
Store keeper and time keeper	£1. 4s. a week.

Among the Contracts taken over was one with Samuel Thomas and Co., of Aberdare, South Wales, for a year's supply of 2,000 tons of coal at 8s. 6d. per ton, less 1% discount.

Up to this time the Corporation had really been in the position of a watchdog, no doubt rightly so in the public interest. They had made sure they got their pound of flesh under the terms of the Contract even to the extent of inflicting fines when there was a failure in the lights; they appointed a Consulting Engineer to inspect the Works for them; they opposed the Company's efforts to obtain a Provisional Order and eventually got one themselves which had the effect of forcing the Company out of business. Now, as from 7th January 1897, the electricity undertaking had been transferred from private to public ownership and the boot was on the other foot. The ratepayers wanted to see this as a profit making concern and the Council needed all their efforts, as will be seen from Part II, to handle this new trading undertaking on which it had embarked, an undertaking, though now growing in popularity was beset with many difficulties.

Mr. H.G. Massingham

As Mr. Massingham was known nationally as one of the pioneers in the development of electricity and having regard to his close connections with Bath before his Electric Light Works were taken over by the City of Bath Electric Lighting and Engineering Co. Ltd., it is considered that some reference should be made to him as a person.

A member of the family, Mr. C.H. Massingham of Ringwood, Hampshire, has kindly supplied the writer with the photograph, which appears on page 2, together with an extract from the Bath and Wilts Chronicle and Herald of 13th December 1935 recording the occasion when Mr. Massingham was the guest of honour at a dinner held in Taunton that month to celebrate the Town's Golden Jubilee of electric street lighting and also an extract from the Sussex Daily News of 26th September 1938, recording Mr. Massingham's passing. The extracts reveal that Mr. Massingham was a man of great force and charm of personality and that he was fearless and forthright in the expression of his views. He was born in Guildford and educated at Bristol Grammar School. At the age of 20 he entered the boot and shoe trade, later becoming interested in electricity, his activities in that field imposing upon him such a physical, mental and financial strain he had a breakdown with little hope of recovering his health. Then he became a vegetarian and moved to Brighton and started the Benares Hotel where only food reform menus were served. There he lived actively until he reached the age of 87. At one time, he was a sidesman at Bath Abbey and afterwards at St. Thomas's Church, Hove.