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## **International Inventions Exhibition**

**Clowes, William**

**London, 1885**

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V. - Central buildings.

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R. E. Crompton & Co. exhibit the successive improvements in the Crompton-Burgin and Crompton-Kapp dynamo machines, which have resulted in a greatly increased output and efficiency. The same firm show improvements in measuring instruments in arc-lights and accessories. On the opposite side Mr. Taylor Smith shows his ingenious domestic fittings for electric lighting.

East  
Annexe.

Parallel with the East Gallery, but separated from it, is the East Annexe, which is given up exclusively to Group XVII., which embraces food, cookery, and stimulants. This Group was very fully dealt with in the Health Exhibition. Amongst the novelties exhibited are folding-tables and seats, which are very convenient for picnics, &c. They are shown by Mr. Baker, the well-known gun-maker.

## V.—CENTRAL BUILDINGS.

OLD LONDON—PRINCE OF WALES' PAVILION—FURNITURE—JEWELRY—  
WATCHES AND CLOCKS—PHOTOGRAPHY—INSTRUMENTS—CHEMISTRY  
—AUSTRIA — JAPAN — SIAM — FOREIGN COUNTRIES — AMERICA —  
WALTHAM WATCHES — RUSSIA — MUSIC — LOAN COLLECTION OF  
MUSICAL INSTRUMENTS, &c.

The Visitor has now arrived at the point from which he started, and there still remain the central buildings to be inspected. The best way of visiting these is to proceed along the South Gallery to its middle point, then to turn to the left and proceed up the Central Avenue. "Old London" will be found on the left hand, and the Prince of Wales's Pavilion on the right.

Old  
London.

The "Old London" Street is sure to be this year, as it was last, one of the most popular features in the Exhibition. The following account of it is taken from the Official Catalogue, and is based upon the description written by Mr. George Birch, F.R.I.B.A., from whose designs and under whose superintendence the street was erected:—

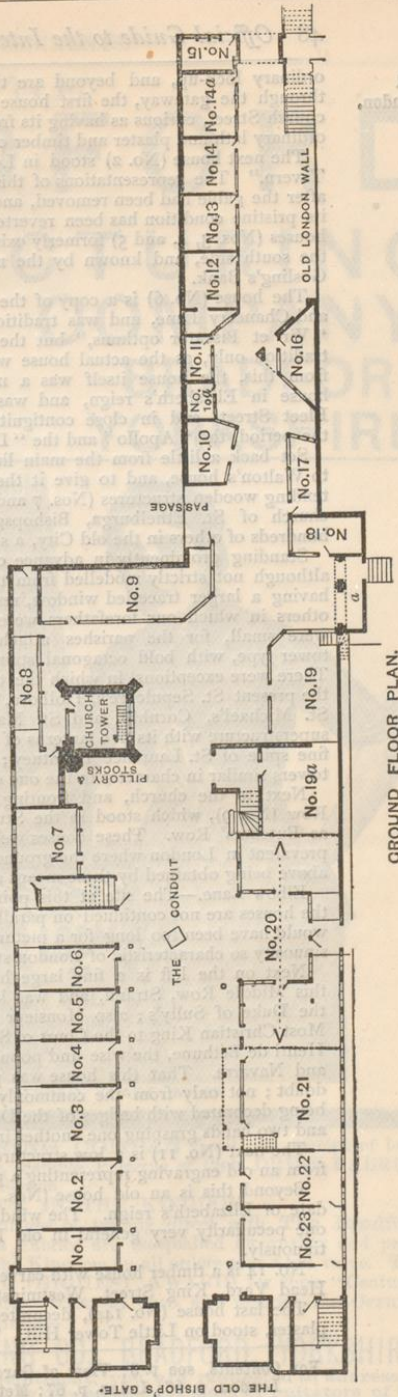
Entering from the Central Avenue, immediately in front of the Pavilion of His Royal Highness the Prince of Wales, stands one of the City Gates—Bishopsgate, reduced in proportion and flanked by the City wall; this gate (not one of the original gates, of which there were but four) was broken through the ancient walls, the peculiar Roman manner of building, with courses of tiles, being shown on the lower part. Above the arch on each side are the arms of the City of London and the arms of the Bishopric, and immediately over the gate, in a niche, stands the statue of one of the bishops, William the Norman, to whom the City was particularly indebted, for by his good offices all those rights and privileges and immunities which the City had inherited from Roman times, and which had been confirmed and strengthened under the Saxon Kings, were reconfirmed by the Conqueror. Above, on the towers which flank the gateway, are the statues of Alfred, who wrested the City from the Danes, and of his son-in-law, Aldred Earl of Mercia, to whom he committed the government thereof.

Passing through the gate, the corresponding statue, that of William the Norman, is seen, representing St. Erkenwald, the Fourth Bishop of London, A. D. 675, after the reconstitution of the see and re-establishment of Christianity by St. Augustine. The ground floor on each side shows on the right a debtor's prison, and on the left an

# THE "OLD LONDON" STREET.

1. ROSE INN, FENCHURCH STREET.
2. COCK TAVERN, SOUTH SIDE OF LEADENHALL STREET.
3. "THE THREE SQUIRRELS," FLEET STREET.
4. DITTO.
5. DITTO.
6. ISAAC WALTON'S HOUSE.
7. HOUSES, BISHOPSGATE STREET.
8. PORTION OF BUTCHERS' ROW.
9. MIDDLE ROW, STRAND, GUNPOWDER PLOT HOUSE.
10. DUKE OF SULLY'S HOUSE.
- 10a. OLD HOUSE, BISHOPSGATE STREET WITHIN.
11. DITTO.
12. OLD HOUSE, GOSWELL STREET.
13. DITTO.

14. OLIVER CROMWELL'S HOUSE.
- 14a. HOUSE IN LITTLE TOWER HILL.
15. HOUSE, KING STREET, WESTMINSTER.
16. HOUSE IN LITTLE MOORFIELDS.
17. HOUSE CORNER OF HOSIER LANE, SMITHFIELD.
18. DITTO.
- 18a. GATEWAY, HOLY TRINITY, ALDGATE.
19. FOUNTAIN INN, MINORIES.
- 19a. HALL OF THE HOLY TRINITY, ALDERSGATE STREET.
20. WHITTINGTON'S HOUSE.
21. HOUSES IN BANKSIDE.
22. HOUSE, HIGH STREET, BOROUGH.
23. DITTO.



GROUND FLOOR PLAN.

THE OLD BISHOP'S GATE.

Old  
London,

ordinary lock-up, and beyond are the staircases to the first-floor. After passing through the gateway, the first house on the left is the "Rose Inn" (No. 1), Fen-church Street, curious as having its front covered with small cut slates, instead of the ordinary lath and plaster and timber construction usual in London.

The next house (No. 2) stood in Leadenhall Street, and was known as the "Cock Tavern." The representations of this house, of which there are many, represent it after the gable had been removed, and a flat coping substituted, but in this instance its pristine condition has been reverted to. Following in order is a block of three houses (Nos. 3, 4, and 5) formerly existing in Fleet Street, towards Temple Bar, on the south side, and known by the name of the "Three Squirrels," now Messrs. Gosling's Bank.

The house (No. 6) is a copy of the one which stood at the corner of Fleet Street and Chancery Lane, and was traditionally known as the "Isaac Walton's house." "Vir et Piscator optimus," but there is a doubt that tradition in this case was tradition only, as the actual house was two doors further to the west; but apart from this, the house itself was a magnificent specimen of an ordinary citizen's house in Elizabeth's reign, and was for many years a conspicuous ornament to Fleet Street, and in close contiguity to those well-known haunts of the wits of the period, the "Apollo" and the "Devil" Taverns.

Set back a little from the main line of the street, in order to give prominence to Walton's house, and to give it the appearance of a corner house, are two unpretending wooden structures (Nos. 7 and 8), which formerly stood hard by the ancient church of St. Ethelburga, Bishopsgate Street, and were the ordinary type of hundreds of others in the old City, a shop below, and a solar or chamber above.

Standing prominently in advance of these is the old tower of a church, which, although not strictly modelled from that of All Hallows Staining, differing only in having a larger traceried window, resembles in its general form and outline many others in which our forefathers were wont to worship. Most of these churches were small, for the parishes attached to them were also diminutive, and this tower type, with bold octagonal staircase turret on one side, was almost universal. There were exceptions, in which the towers had lofty pinnacles at each corner, like the present St. Sepulchre's, Holborn, or the more modern re-buildings by Wren, of St. Michael's, Cornhill, and St. Mary, Aldermanbury; and the curious arched superstructure with its five lanterns of St. Mary-le-Bow, or de Arcubus, and the very fine spire of St. Laurence Pountney; but the generality of the churches possessed towers similar in character to the one depicted here.

Next to the church, and fronting down the street, is a portion of the Middle Row (No. 9), which stood in the Strand, just outside Temple Bar, and was known as Butchers' Row. These houses well represent the overhanging of the stories so prevalent in London where the ground-floor space was very limited, additional room above being obtained by these means at the expense of light and air.

Elbow Lane.—The site at this point considerably narrows from 70 to 30 feet, and the houses are not continued on parallel lines, in order to break a perspective which would have been too long for a picturesque effect, and also in order to obtain that sinuosity so characteristic of London streets.

Next on the left is a fine large house of two gables (No. 10) which stood in this Middle Row, Strand, and was known as the French Ambassador's house, or the Duke of Sully's; also Monsieur Beaumont's, both ambassadors here from the Most Christian King to the Court of St. James. This Duke de Sully was the famous Henri de Béthune, the wise and popular Minister to Henri Quatre, King of France and Navarre. That this house was probably occupied by him there can be little doubt; not only from the commonly accepted tradition, but from the fact of its being decorated with badges of the De Béthunes, the French crown and fleur-de-lis, and two hands grasping one another in a true "entente cordiale."

The next (No. 11) is a low structure of wood and plaster, and has been modelled from an old engraving representing a portion of Bishopsgate Street.

Beyond this is an old house (Nos. 12 & 13) which was in Goswell Street, of the date of Elizabeth's reign. The windows are mullioned and transomed, and show one peculiarity very general in old London, in carrying on the upper lights continuously.

No. 14 is a timber house with carved bargeboard, which stood next to Blue Boar's Head Yard, King Street, Westminster.

The last house (No. 14a), decorated with medallions of the Roman Emperors in plaster, stood on Little Tower Hill. There is nothing remarkable in the building,

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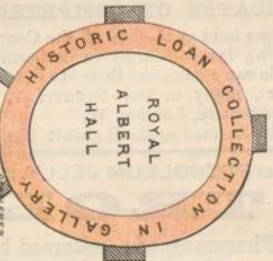
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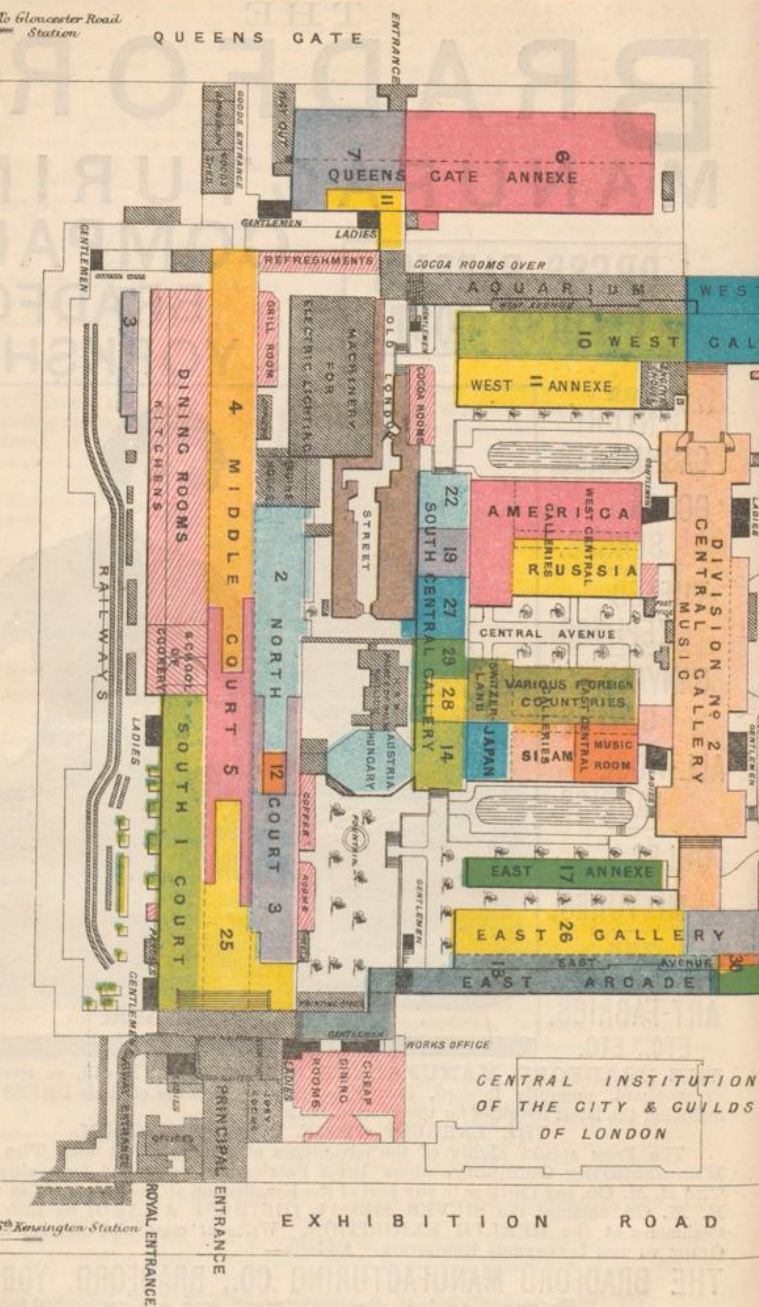
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Exhibit No. 3648, Music Gallery.

beyond that the roof line is level, and was chosen as a contrast to the all-prevailing gable.

Old  
London.

At this point (No. 15)—the termination westward of the street—the entrance thereto is masked by one of the galleried fronts of an old London inn. The "Oxford Arms," Warwick Lane, was chosen as a typical specimen; but there are still remaining in Bishopsgate Street, Holborn, and more especially the Borough, several examples of these.

The house beyond (No. 16) was on the west side of Little Moorfields, Finsbury, and was a very fine specimen of plaster work. It was not removed until the commencement of the present century. A low building connects this with two houses (Nos. 17 & 18) possessing considerable interest; they stood at the south corner of Hosier Lane, Smithfield, over against the famous "Pye Corner," where the fearful conflagration of 1666 was arrested, after having laid considerably more than three-fourths of the City in ashes; they were not removed until 1800.

Another gateway here arrests our steps: this was the entrance to the famous Priory of the Holy Trinity, Aldgate, founded by Queen Matilda, and whose Prior, by virtue of his office as representing the Knighten Guild, who had made over to this priory their lands and soke, was admitted as one of the Aldermen of London, of the Ward of Portsoken. According to custom, he sat in Court, and rode in scarlet, or such livery as the other aldermen used.

Beyond this (No. 19a) is the gable end of the Hall of the Brotherhood of the Holy Trinity (which is reached by ascending the staircases to the first floor) in Aldersgate Street, near to Little Britain. This Hall has been selected as a typical example of the Hall of a Guild or Livery, of which there were many within the boundaries of the ancient City. The ancient stained glass with a figure of St. Blaise, and several ancient shields which existed in 1611, have been faithfully reproduced.

The house beyond is one of the most remarkable in this street (No. 20), remarkable not only for its extreme richness of decoration, but as being connected with Sir Richard Whittington, famous in song and in story. It was situated four doors from Mark Lane, in Crutched Friars, or Hart Street, up a courtyard, and was described in old leases as Whittington's Palace. Although the house, from its style and ornamentation, could not possibly have been of his time, it is possible that the front only had been ornamented and altered, for in general outline and arrangement it resembled houses of that date; it was richly ornamented with carvings of the armorial bearings of the City Companies, which stamped it as being the house of a remarkable personage, and one whom the City delighted to honour. It was impossible to reproduce the extreme richness of its decoration. The ornamentation has therefore only been painted, the original having been entirely carved and painted and gilt.

The next two houses (No. 21) were drawn by Mr. Gwilt before they were removed; they were situated in Bankside, and are picturesque examples of plaster decoration and open balconies.

The last two houses (Nos. 22 & 23) in this street, on the left before arriving at the gate at which we entered, were also from the Gwilt collection (now in the Gardner) and stood in the High Street, Borough; they were only removed of late years, and were drawn and measured by Mr. Gwilt.

As to actual size the whole of the buildings have only been slightly reduced, but this has been done in proportion, although such reduction is not to a uniform scale, but has been adopted in the different cases to suit the uniformity of the plan and arrangement of the whole. The interiors, it must be recollected, do not in all cases correspond in size with the exteriors.

The foregoing notice is written from particulars furnished by Mr. Geo. H. Birch, the architect, and is not intended to be more than a very brief description of the examples selected to represent "Old London."

The buildings were designed and constructed as bearing upon and connected with the special objects of the International Health Exhibition, 1884, to which the Corporation of the City of London and several of the Livery Companies liberally subscribed.

Upon the transference of the numerous courts and structures which had contained the "exhibits" of the Health Exhibition to the Executive Council of the International Inventions Exhibition, 1885, that body resolved to retain the "street," and to adopt it as a special feature of attraction outside the general scope of a display mainly confined to productions of the last twenty-five years, and in any case not previous to the present century.

The exhibitors to whom the shops and rooms have been allotted this year were consequently selected with the object of providing, as far as was practicable, useful comparisons between ancient and modern handicrafts. The exceptions to this rule are very limited in number.

The plank flooring which covered the roadway last year, time not allowing of Mr. Birch's original idea for a pavement being carried out, has been replaced—under the direction of Mr. Wilson Bennison, architect and surveyor to the Council—by an appropriate pavement in imitation of the old style cobble stones and bricks which greatly adds to the antique appearance of the whole of the surroundings. Although the buildings remain substantially as in last year, improved access and means of communication with other parts of the Exhibition have been established.

The street is now illuminated at night by electricity, thus avoiding the necessity of closing it at dusk, as was the case last year. Both arc and crystal glow lamps are used; of the former kind, five Mackie lamps of 2500-candle-power each are so arranged as to produce the picturesque effect of moonlight in the street and narrow lane and alleys, while the shops and rooms upstairs are lit with 300 incandescent lamps by Crompton & Co., from two dynamos supplied by a 45-horse power Willans' high-speed engine.

**Prince of  
Wales'  
Pavilion.**

Opposite to the gateway of Old London is the pavilion of H.R.H. the Prince of Wales, which has been completely decorated and furnished by Messrs. Gillow & Co. The entrance-hall and adjoining alcoves are decorated in the Egyptian style, with panels of Musharabyeh woodwork, Oriental embroideries, carpets, metal work, and faience. The drawing-room is of white woodwork, of the Early Style of Louis XIV. The panels are painted on gold in shades of grey and blue, and the chairs are covered in Royal Windsor tapestry. The dining-room is in classical style, with niches and divans in colours. The adjoining room is hung with Italian Mezzari, the floors are all laid in parquet, and covered with Anglo-Persian carpets specially manufactured. Messrs. Gillow & Co. have also kindly provided the furniture and fittings in the room set apart for the accommodation of the Press. The Conservatory is decorated with a very beautiful rockery and fernery, and with a dripping well built by Messrs. Dick Radclyffe & Co. The rockery is lit up by hidden electric lamps. The floor is in mosaic marble.

**South  
Central  
Gallery.**

Between the Prince's Pavilion and the "Old London" gateway is the entrance to the South Central Gallery. Six of the smaller groups are provided for in this building. On the left-hand side as we go in, at the extreme western end of the Gallery, is the department for furniture and fancy goods. The furniture and decorations of the Royal Pavilion are included in this group, and constitute the most extensive exhibit.

**Furniture.**

There are also several examples of pieces of furniture ingeniously contrived to meet special cases, also wall and floor coverings and various systems of decoration, together with sundry fancy goods.

**Jewelry.**

The next group is Jewelry. In this department the largest exhibits are by Messrs. Hancock & Co., who show the manufacture of jewelry, also silver plate and precious stones. The visitor should not fail to inspect the small case of jewelry exhibited by Mr. Guiliano, which contains some of the most artistic specimens of ornaments in gold and precious stones which have ever been brought together. The collection comprises reproductions of Greek, Roman, and Mediæval necklets, bracelets, brooches, &c.; also specimens of open Arabesque work, in gold and enamel, and a method of cutting stones in the natural forms of the crystals. Mr. E. Gray shows some machinery used in the jewellers' trade.

The kindred trade of watches and clocks is next illustrated. Many of the best known watch and clock makers show specimens of beautifully made English time-pieces. There are also a few turret and chiming clocks. **Watches and Clocks.**

Photography is illustrated in the next space. Here are shown numerous examples of the latest forms of photographic apparatus, and of processes, especially those based on the newly discovered properties of gelatine emulsion (see also page 14). Mr. J. Swan, the inventor of the incandescent lamp, which bears his name, is also great in this department, and makes a very interesting show. The majority of visitors will probably be most interested by the processes for printing in ink, from blocks prepared by photography. The results obtained by these methods are extremely beautiful, and all the details of the processes are of great interest; foremost amongst them may be cited the Woodbury and the derived Stannotype processes. **Photography.**

Philosophical instruments and apparatus are shown in the adjoining space. The collection includes microscopes, telescopes, barometers, thermometers, anemometers, spectroscopes, models of mechanism, chemical apparatus, drawing and surveying instruments, calculating machines, and electrical instruments, &c. **Philosophical Instruments.**

The last Group in the South Central Gallery is that of applied chemistry (see also page 11). Here are exhibited the manufactures and industries, based upon the utilisation of the waste products of gas works. One of the most important of these is the manufacture of alizarine, which is exemplified by the British Alizarine Company. There are also exhibited products prepared from paraffin and petroleum, leather tanned by the bichromate process (see also page 12), improvements in the manufacture of sulphate of ammonia and other artificial manures, and various methods of manufacturing bicarbonate of soda (see also page 11). The majority of visitors will probably be astonished at the number of substances manufactured from the waste products of gas works, as set forth in the large chart hung over the eastern doorway of the Gallery. **Chemistry.**

From this end of the Gallery access is obtained to the Austrian Court, which contains exhibits in various groups. The Austrian collection is, however, specially remarkable for the beauty of its pottery, porcelain, and faience. It occupies the old Water Companies Pavilion, and in the beauty and artistic effect of its exhibits offers a striking contrast to the character of the rest of the Exhibition. The principal exhibitor of ceramic ware is the firm of Wahlliss, of Vienna. A large portion of the porcelain was made in Bohemia and hand-painted in Vienna. Amongst other things worthy of special attention is a portion of a dinner and tea service, in ivory tint and dark blue and gold, made for the Crown Prince. The centres of the plates are decorated with a monogram and royal crown. There is a good deal of bentwood furniture exhibited, and some beautiful toilet tables inlaid with tiles, also drawing-room cabinets inlaid with plaques. The visitor should not omit to notice the collection of Austrian National Costumes, as shown by coloured photographs. **Austria.**

After inspecting the Austrian Collection the visitor had better leave the Court by the way he came in, and cross over the South Central **East Central Galleries**

into the East Central Gallery, which is given over to Japan, Siam, Switzerland, Germany, and various other foreign countries.

Japan.

The Japanese Collection is, as has been usually the case in these exhibitions, of great interest to Europeans, not merely on account of the beautiful specimens of bronzes, porcelain, and other decorative objects shown, but also because of the evidence given of the extremely rapid progress which Japan is making in the arts of Western civilisation. In the Japanese section there are exhibits in twenty-four out of the thirty-four groups into which the Exhibition is divided. It will be a surprise to many visitors to find improvements in modern fire-arms, and complicated telegraph instruments included in the collection. The show of specially Japanese goods, such as silks, porcelaines, bronzes, lacquer work and fans is very representative.

Siam.

To the North of Japan is the space allotted to Siam, but at the time of going to press the Siamese collection was not unpacked. In between the two countries is an interesting case of Indian jewelry, fabrics and costumes. On the Western side are several pianofortes, and a specimen of Mr. Baillie Hamilton's Vocalion, which is a variety of the reed organ, embodying several new improvements. To the North of Siam is the music-room, in which recitals are given at intervals on various instruments shown in the Exhibition. The Western half of the East Central Galleries is allotted to various foreign countries. Amongst the most striking of objects shown in this section are the specimens of Venetian glass shown by the Venice and San Murano Glass and Mosaic Company, the hard glass railway chairs and other objects shown by Mr. F. Siemens of Dresden, and the collection of majolica by DuVigneau and Co., of Magdebourg. The Swiss section contains many beautiful specimens of the watchmaker's craft, and also mathematical instruments.

Music Room.

West Central Galleries.

America.

Multiplex Telegraph.

The West Central Galleries are divided between the United States of America and Russia, the Southern and Western portions being reserved for the former country. On entering the gallery by the door leading from the Central Avenue the first exhibit of importance which the visitor comes across is the Multiplex Telegraph System, invented by Mr. Delaney, of Boston. By means of this system are obtained simultaneously over one wire 6 distinct "Morse" circuits with a rapidity of transmission determined only by the expertness of the operator; or 12 similar circuits with a rate of transmission of above 20 words per minute; or 36 messages are transmitted (by the use of the inventor's printing instruments); or 72 printed messages are similarly transmitted at a rate equal to 100 messages during the ordinary business hours of the day. With either the "Morse" or printing instruments these messages may be sent all in one direction, or any number within the limits named in either or both directions over a *single wire* at the same time. Each circuit is independent and private, and it is impossible to "tap" wires and interpret despatches in transit. Facsimile drawings in fineness equal to the ordinary woodcut can be rapidly transmitted over a single wire. The whole system is based upon the principle of having a motor carrying a contact brush over a series of segments at each end of the main line, and both motors working in absolute synchronism by the action of an automatic corrector.

Type Writers.

Close by will be found some most useful machines known as type-

writers, which are intended as substitutes for the ordinary process of writing with pen and ink. One of these, the "Columbia" type-writer, is the latest machine of this class. It is a model of simplicity and neatness of arrangement, and is extremely portable and comparatively inexpensive. It is claimed that an experienced hand can write by means of it far faster than by hand. Ordinary press copies can be taken, or if preferred any number of copies up to six can be made simultaneously with the original impression by means of carbon paper. The other instrument of this class exhibited is the Hall type-writer, which is also a very excellent machine. Few people have any idea of the extent to which type-writing is adopted in the United States. Thousands of women earn their livelihood by means of these instruments.

The space at the end of this part of the Court is occupied by the Waltham Watch Company, whose display is one of the most interesting in the entire Exhibition. The idea of making watches by machinery is essentially American in its developments. So far back as 1850 a small factory was started at Roxbury, Massachusetts, which was removed four years later to Waltham, and has since grown into the famous establishment with its five acres of floors and over three miles of work-benches, which is represented by the model in the Exhibition. The original stock capital of £40,000 has increased to £800,000, and the number of hands has grown from 75 to 2500. During the last eighteen months half a million of watches have been made, and the working capacity of the factory will soon be 2000 watches a day. In order to employ the hands in the finishing-rooms to advantage, it is necessary to have at least 30,000 watches in progress. For many portions of the work female operatives are employed on account of their greater rapidity and delicacy of manipulation. The women get the same wages as men for doing the same kind and amount of work. The factory is divided into twenty-five departments, each under its own foreman. The majority of the latter have been for about a quarter of a century in the employ of the company. The number of distinct operations required to produce a medium grade of keyless watch was specially calculated for the "Scientific American." It reached the surprising total of 3746—a number which is considerably exceeded for some of the higher grades of watches. The great aim of the company is to secure absolute interchangeability of parts. The various pieces of the work are measured with extreme accuracy; for instance the jewel holes are measured to be two ten-thousandths of an inch larger than the pinions which work in them. The result of this extreme accuracy is that should any part of a watch fail in actual use, a duplicate can be supplied by post on receipt of the name of the part and the number of the movement. All Waltham watches have "going barrels" instead of fusees, which have long since been discarded as useless in every country but England. They have invariably lever escapements and quick trains, by which is meant that the watch beats 18,000 to the hour against 16,200 times, which is the standard in this country. It would be impossible to describe in detail even the principal operations involved in watch making by machinery, but twelve of the most interesting automatic machines may be seen at work in the Exhibition.

Waltham  
Watch  
Making  
Machinery.

They are as follows: a screwing tool, which makes 4000 screws per day. A pinion-turning tool. A dial feet making machine. A tool for drilling and inserting screws into the rims of compensation balances. A lathe for turning the "staffs" of balances at the rate of 500 a day, as against one per hour, which is all that can be accomplished by the most expert hand labour. A pinion leaf polishing machine. A universal lathe for repairing purposes. A pinion leaf cutter. A keyless bevel wheel cutter. A train wheel cutter. An escapement wheel cutter, and a pinion staff polishing tool. It is worthy of note that all the teeth of wheels are cut to a true cycloidal shape, thus ensuring frictionless rolling contact in the wheel work of the watch. The cutters and polishers of these tools are themselves kept true and in perfect order by a machine specially invented to give the exact cycloidal form. The gauging of the strength of hair springs may be seen close to the office of the company. Each spring is tested and provided with a balance wheel of a weight suitable to its strength. Thus one of the most troublesome operations connected with the regulation is accomplished before the watch is put together. In the cases at the wall of the court are to be seen watches of the various grades manufactured by the company, and sold at prices ranging from £2 10s. to £50. Close to the large engine at the North end of the Court are two stands of considerable interest. One is occupied by a weighing and packing machine, which is productive of great economy of labour in large establishments. It is able to pack 18,000 parcels of one pound each per day. The space at the bottom is occupied by the Troy Laundry Machinery Company. The magnificent Corliss engine by Messrs. Hicks, Hargreaves and Co., which drives the machinery in the American Court, should be inspected by all engineers. It is in every way a credit to the Exhibition. It is provided with a small auxiliary or "barring" engine for starting, which throws itself out of gear as soon as the main engine commences to work.

Hicks,  
Hargreaves  
& Co.'s  
Engine.

Russia.

In the Eastern section of this gallery is to be found the Russian collection, which contains many objects of interest. Mr. Woerffel, of St. Petersburg, whose exquisite bronze castings excited so much notice last year, will be again well represented. There is an interesting collection of dress, jewelry and armour from the Caucasus, a magnificent case of furs, and a very good show of pianos, and other musical instruments. Cigarette making machinery is shown at one side of the Court, and freshly made Russian cigarettes can here be purchased. The Russians are celebrated for their enamels on silver, and there is a case exhibited containing many beautiful objects of this description. At the South end of the Russian Court there is a beautiful show by Messrs. Howell and James of Roumanian embroideries.

Music.

From the Russian Court the visitor can easily find his way to the great Central Gallery running East and West, which is reserved for the Musical Exhibition. Here he will find a collection of pianofortes, organs, harmoniums and string and wind instruments, by nearly all the best makers, such as has never before been equalled. To go into all the peculiarities of the different instruments would be impossible, but all novelties in construction and mechanism are open to inspection.

For Contents, see p. 3; View of Gardens, p. 41; Ground Plan, p. 48; View of Old London, p. 56; Index, p. 67; Method of reaching the Exhibition, pp. 72-77.

The leading modern improvements in musical instruments have been already briefly described. (See p. 14.)

Before leaving the Central Gallery a few minutes should be spared to inspect the twelve beautiful tile panel decorations put up by Messrs. Doulton on the walls of this part of the Exhibition. Commencing on the left-hand side these panels represent scenes from the lives of the following inventors and musicians: William Caxton, Benjamin Franklin, James Watt, George Stephenson, Henry Purcell, Mozart, Handel, Haydn, Richard Arkwright, Robert Peel, Louis Daguerre and N. Niepce, and Michael Faraday.

It will be found convenient to keep the description of the Musical Sections of the Exhibitions together, and for this reason the important Loan Collection of musical instruments, manuscripts, &c., which is housed in the upper gallery of the Albert Hall, will be here referred to. The easiest means of access to the collection is by the large lift, which plies continuously between the upper and lower galleries of the Hall. It will be found convenient to commence with the three furnished rooms which have been arranged by Mr. George Donaldson, and which are intended to illustrate domestic musical life at three different epochs. The first room, nearest to the great organ, belongs to the early eighteenth century. Both the furniture and the musical instruments should be noted; they include a quartett stand,—a viol d'amore,—a viol da gamba,—and a fine Hitchcock spinet.

The second room belongs to the Tudor epoch. It is hung with splendid pieces of tapestry, and the floor is covered with a Persian carpet, which it would be difficult to match for beauty of design. Both hangings and carpet are at least as old as the Tudor epoch. The musical instruments contained in this room are a theorbo, a chitarrone, an arpanetta, and Queen Elizabeth's own virginal, beautifully decorated, of Italian make, and bearing the Royal Arms. The virginal belongs to the same family of instruments as the spinet and harpsichord,—a family out of which has grown, by a process of continuous development, the modern grand pianoforte.

The third room is in the Louis Seize style. In it are shown a harp of beautiful shape, and a harpsichord belonging to Lord Powerscourt, and painted by Van der Meulen. This instrument formerly belonged to Marie Antoinette.

Passing out of the rooms into the gallery the visitor enters the collection of musical instruments. The first cases contain Mr. George Donaldson's very interesting collection, which includes a guitar that belonged to Louis Seize when Dauphin, and another guitar with fleur-de-lis pegs, which is said to have been the property of David Rizzio. We next come across Mr. Alma Tadema's pianoforte, made by Messrs. Broadwood, in the Byzantine style; the instrument and seat, which is included in the design, are decorated with inlays, ivory carvings, &c. At the far end a silver panel, of great value, is let into the case of the piano. It is by the Neapolitan sculptor, Amendola, and the subject is the drowning of Orpheus. The lower side of the cover contains many autographs of celebrated musicians who have played on this instrument. The back of the seat is painted by Mr. Tadema, as is the little pianino close by, which was also designed by this artist.

For Contents, see p. 3; View of Gardens, p. 41; Ground Plan, p. 48; View of Old London, p. 56; Index, p. 67; Method of reaching the Exhibition, pp. 72-77.

Doulton &  
Co.

Musical  
Loan  
Collection.

Alma Ta-  
dema's  
pianoforte.

**Old Violins.**

We now come to what, to many musicians, will be the most interesting collection in the gallery, viz., the cases containing the fine old Italian violins, violoncellos, &c. There is a certain interest which attaches itself to this class of instrument which never can belong to any other, and which is based upon the fact that no modern makers have succeeded in developing or changing the type of the best instruments of the Cremona School, which remain, after nearly a century-and-a-half, the very best violins that can be placed in the hands of the modern musician. Collectors will have a rare chance while this Exhibition remains open of making themselves thoroughly acquainted with the peculiarities of the instruments of the old makers, for no such collection has ever before been brought together. It contains no less than 150 fine violins, violoncellos, &c., of which twenty-five are by the celebrated Stradivarius, the prince of violin makers.

**English School of Violin Makers.**

A special feature has been made of the instruments of the old English makers, who have hitherto been very much neglected, but many of their productions rival, and have been often sold as, fine specimens of Italian make. Amongst the English makers may be mentioned Bernard Fendt, of whose make a splendid violin is shown,—Banks—Forster—Duke—Wamsley—Betts, and five generations of Hills, one of whom of the fifth generation has arranged the present collection. An interesting violin of English make, by Urquhart, is shown. It was made in 1666, the year of the great fire of London.

**Brescian School.**

The Italian collection is arranged, as far as possible, chronologically. The first cases contain instruments by the famous Brescian makers, Gaspar di Salo, Maggini, and Zannetto, who lived as far back as the year 1500. These makers may be called the fathers of modern violin making. The instruments shown are nearly all tenors, which are of very fine tone. It is a curious fact that the violins by these makers are not nearly so good as their tenors.

**Amati School.**

The next cases contain specimens of the make of the Amati school. The greatest of the Amati family is Nicholas, and one of his instruments is shown which is the finest in existence. It is called the Alard, date 1645. There is also a very fine specimen of Antonius and Hieronymus Amati, and several by Francesco and Joannes Baptista Ruggerius, both pupils of this famous family. There are also four tenor Amatis shown, one of which belongs to the Queen. Three of these instruments have been reduced from their original size in recent times. The fourth, which will be easily recognised, retains its original size: it is by Antonius and Hieronymus. It is almost too large to be played, except between the legs, after the manner of a violoncello.

**Violins by Stradivarius and Guarnerius.**

We next come to the cream of the collection, the cases containing instruments by Stradivarius and Guarnerius. So highly valued are these instruments, both by collectors and violinists, that a good violin in the best style of either of these makers, and in perfect preservation, will fetch the price of a thousand guineas. The first case contains violins by Stradivarius, in excellent preservation, though not perhaps in the very best model of this famous maker. The second case contains six instruments by Stradivarius, which it would be difficult to match. The latest violin, dated 1732, which in workmanship is as good as anything he ever turned out, and is probably the best instrument known of its



THE OLD LONDON STREET



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date, was made when the master had reached the age of eighty-three years. The model is perhaps a little fuller than what is now reckoned as his best type. Each of these instruments would fetch a thousand guineas. There are not more than twenty violas by Stradivarius in existence; so this Exhibition is fortunate in showing two, and both perfect specimens. Their dates of 1690 and 1721. The instruments in this case show the three epochs of Stradivarius, viz. :—1689, 1690—1711, 1716—and 1721, 1732; the two of his grand period 1711, 1716, are the finest in the entire collection. There is a third case containing several interesting instruments by this maker, and then we come to the collection of violins by the celebrated Guarnerius family, the greatest of whom, Joseph Guarnerius del Jesu, was the only equal of Stradivarius. There are seven fine violins by this maker shown, which are worth from £700 to £800 each.

Then comes a case belonging to the Venetian school, of whom Peter Guarnerius, Sanctus Seraphino, and Montagnana were the most famous makers. The best specimens of their make fetch from £150 to £200 a-piece. The handsome Sanctus Seraphino violoncello is known as the "beauty."

Venetian School.

Following on, the next case is chiefly remarkable for a violoncello made for Charles IX. of France, by Andreas Amati. Then comes a small collection of instruments of the Roman school by Techler and Guadagnini, and next a case containing specimens of the Dutch and German schools, including two unique Steiners and a violoncello by Rombouts, of the Hague, date 1720.

The last case, which will be particularly referred to, contains two violoncellos by Stradivarius, one of which belonged to the husband of the singer Mora, who evidently took but little care of his instrument, which in model, wood, and workmanship is a beautiful specimen. The other instrument was made for a Corfu nobleman, by whose family it was kept, wrapped up in cotton wool, for a century; hence its perfect state of preservation. In this case are also contained two Bergonzi violins and a cello.

After passing the violins we come to the collection of spinets, harpsichords, old wind instruments, &c., which is undoubtedly the most interesting and complete ever brought together. We first come across the collection sent by the Conservatoire of Music of Brussels, and which is so complete that it may almost be said to be a museum in itself. It fills several cases, which contain, amongst other things, a fine Flemish spinet—the Patavini spinet of the year 1550,—exact copies of the Roman Cornu and Lituus—a remarkably fine specimen of an early upright grand pianoforte by Frederici of Gera, dated 1745,—and a complete set of 16th century cromornes, the only set in existence: this instrument is almost unknown, even by name, except for the Cremona stop on the organ, which takes its name from it. This collection contains also a positive and portative organ, or Regal; only two specimens of this instrument are known to exist. With these latter is exhibited M. Victor Mahillon's Shudi harpsichord, which once belonged to the Empress Marie Theresa.

Close by is exhibited a claviorganum, a once not uncommon instrument, with two rows of keys, which is a compound of organ and

Loan Col-  
lection.

harpichord, and was made in London in 1745. The next remarkable objects are, a double spinet by Hans Ruckers, belonging to Messrs. Chappell, and the Maidstone clavichord, which is said to have belonged to Handel. Close by is a curious-looking piano of anonymous make, which belonged to the Irish Lady Morgan. In style and inlaying it resembles the cabinets of the epoch. We next pass a Broadwood grand piano, made for Mr. W. Graham, and painted by Mr. Burne Jones with the Story of Orpheus and an Allegory of the Earth and her Children.

In the centre of the Gallery are two old Highland harps, resembling the famous one in the museum of Trinity College, Dublin. They are of the fifteenth century. One belonged to Mary Queen of Scots, and was given by her to Beatrix Gardyne of Banchory. The other, which is called the Lamont harp, was for a long time in the family of the Robertsons of Lude. They are lent by Mr. Stewart of Dalguire.

We now come to an interesting collection lent by the Queen, and which contains an Erard piano with old French paintings and a Ruckers harpsichord from Windsor Castle, which Mr. A. J. Hipkins, who is a great authority on musical instruments, and has had an important share in forming and arranging this collection, considers to have been Handel's, and the one described in his will; also a case containing the original scores, in Handel's own handwriting, of the 'Messiah,' 'Israel in Egypt,' and other works.

Musical  
Manu-  
scripts, &c.

The remainder of this gallery is given up to the splendid collection of ancient musical manuscripts, treatises, scores and old printed musical books, which is of great interest to antiquarians and musicians. It would be impossible to describe in detail all the interesting objects contained in this section, but a few of them may be mentioned, such as the Mainz Psalter of the year 1457, lent by Lord Spencer, which is the first book printed with music inserted by hand, and which is insured for £10,000. A curiosity of composition is Tallis' forty part song, the MS. score of which is shown. Another interesting relic is a Gloria written in 1502 by Dr. Fayrfax for his degree. In one case are contained autographs of Beethoven, Bach, Mozart, Haydn, Purcell, Wagner, Schuman, Cherubini, Gounod, and other famous composers. The musical notation of early times is illustrated by a manuscript of the eleventh century, written in a series of symbols called Neumes. The collection contains also a set of the musical treatises of Franchinus Gafforius, printed between 1480 and 1497 and lent by Lord Spencer, Mr. A. Lyttleton, and the Trustees of Anderson's College, Glasgow. The earliest example of printed music in England is shown by a copy of Higden's 'Polychronicon,' printed by Wynkyn de Worde at Westminster in 1493. There are four treatises on the organ, and three very early works on dancing by Curoso and Negri; also a splendid manuscript lent by Lord Ashburnham; a ballad written to English words on the death of Cardinal Wolsey, and a Mass which was probably written for the coronation of Henry VIII.

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**LIST OF EXHIBITORS, ELECTRIC LIGHT DEPARTMENT.**

\*\* DAVEY, FAXMAN, & Co. supply for this Department Five Engines and Eight Boilers.

No. of Section.	Name of Section.	Exhibitor.	Description of Dynamo.	Description of Lamps.				Description of Motive Power.
				Name of Lamp.	No.	C. P. V.	Glow. C. P. V.	
1	South Promenade	R. E. Crompton & Co., Mansion House Bldgs., 4 Queen Victoria St., Edison Swan Et. Lt. Co., 57 Holborn Viaduct.	1 Crompton Bilgin	Crompton	10	3000	...	"Tower" Spherical Engine
2	South Court (a) (b) Entrance Vestibule (c)	Edison Edison Swan Et. Lt. Co., 57 Holborn Viaduct.	Edison 2 Edison Hopkinson	Swan Edison Swan Swan	...	...	...	Davey, Faxman, & Co. Engines. Nos. 1, 2, & 3. Lamps in parallel. Lamps 2 in series.
3	Dining Rooms	Paterson & Cooper, 76 Little Britain, E.C.	1 Phcenix, 38 unit 1 " 12 " 1 " 10 " 2 W. J. Siemens " 2 D Exciters	Bernstein	...	...	...	D. P. & Co. Engines. No. & Lamps 4 in series.
4	Middle Court	Siemens Bros., 12 Queen Anne's Gate, Westminster.	2 F3 Victoria	Swan	...	1080	10-46	Lamps 2 in series. Lamps 4 in series.
5	North Court	Anglo-American Brush Et. Co., 112 Belvedere Road, Lambeth.	2 F3 Victoria	Victoria	...	750	20-60	Kitson Parson High Speed Engines. Lamps 2 in series.
6	Water Pavilion	Goulden & Trotter, 2 Victoria Mansions, Westminster.	2 G. T.	W. & R.	...	300	20-100	Lamps in parallel. Lamps 2 in series.
7	H.R.H. Pavilion, Conservatory (b)	Elwell Parker, Commercial Road Works, Wolverhampton.	2 E. P.	Swan W. & R. W. & R.	...	100	20-46 50 50-22	Elwell Parker High Speed Engine. Worked in parallel, with E. P. storage cells.
8	Old London Street	S. J. Mackie, Turk's Head Yard, Turmill Street.	1 B Gramme 2 A Grammes	Swan	...	30	10-60	Arcs in series. Glow lamps in parallel. Lamps 2 in series. Fittings by E. Verity.
9	Old London	R. E. Crompton & Co., Mansion House Bldgs., 4 Queen Victoria St.	2 Crompton Bilgin	Woodhouse & Ravenson	...	300	20-50	"Williams & Robinson" Engine. Lamps 2 in series. Fittings by E. Verity.
10	Engine Shed	J. D. P. Andrews & Co., Woodside Electric Works, Woodside Rd., Ghascow, N.B.	2 Andrews	Andrews	...	700	...	D. P. & Co. Engines . . . . 2 series of 10 lamps.
11	S. & P.'s Refreshment Bar and Grill Room.	Clarke, Chapman & Co., Victoria Works, Gateshead-on-Tyne.	2 C. C.	Gérard	...	30	50-35	C. C. Turbine Engine . . . . 2 lamps in series.
12	Queen's Gate Annexe	Anglo-American Brush Et. Co., 112 Belvedere Road, Lambeth, S.E.	2 Brush	Brush-Salton	...	3000	...	D. P. & Co. Engine . . . . 2 circuits of 12 lamps each.
13	South Central Gallery	Jablochhoff Et. Lt. Co., 38 Albert Embankment, Lambeth.	4 Jablochhoff Gramme	Jablochhoff	...	60	350	D. P. & Co. Engine . . . . Lamps arranged in 12 circuits of 6 each.
14	West Arcade	Gülcher Et. Lt. Co., Belfersee Country, Switzerland.	2 Gülcher	Swan	...	760	16-45 & 50	Coathrookdale High Speed Engine. Lamps in parallel.
15	East Arcade (a) (b) Concert Room (b) B. Bar (c)	Goussier Et. Lt. Co., 15 Whitechapel Street, Regent Street.	...	Varley Maixim Swan	...	24 ...	50 50 80	D. P. & Co. . . . . Lamps by induction bobbins from one circuit. Lamps 2 in series. Lamps 2 in series. Lamps 2 in series.

LIST OF EXHIBITORS, ELECTRIC LIGHT DEPARTMENT.—continued.

No. of Section.	Name of Section.	Exhibitor.	Description of Dynamo.	Description of Lamps.						Description of Motive Power.
				Name of Lamp.		Arc.		Glow.		
				No.	C. P.	No.	C. P. V.			
16	West Gallery	Pilsen Joel El. Lt. Co., St. Stephen's Chambers, Telegraph Street, Moorgate Street.	4 Schickel	Pilsen	42	700	...	...	D. P. & Co. Engines	Lamps, 3 circuits of 14 each.
17	West Annexe	Patterson & Cooper, 76 Little Britain.	2 Phoenix	J. F.	24	700	...	...	D. P. & Co. Engines	Lamps, 2 circuits of 12 each.
18	West Central Gallery	Ordner Allen & Co., 20 Bucklersbury.	4 G. T. (Halfax)	Thornston S. N. & R.	30	1000	60	20-50	D. P. & Co. Engines	Lamps on 3 wire system 10 arcs, 20 glows, paral- lel on each machine.
19	East Central Gallery	Maxim Weston El. Co., 32 Queen Victoria St.	2 Weston	Weston	25	2000	...	...	D. P. & Co. Engines.	Lamps all in parallel.
20	Central Gallery	Gilcher El. Lt. Co., Battersea Foundry.	3 Gilcher	Gilcher	50	1000	...	...	Westinghouse High Speed Engines.	Lamps all in parallel.
21	Chinese Restaurant	Gilcher El. Lt. Co., Battersea Foundry.	(As above)	Swan	...	...	...	16-45	As above	Do. with "arc." In series.
22	Mast Light	Goulden & Trotter, 2 Victoria Mansions, Westminster.	1 Hochhausen	Hochhausen	6	3000	...	...	D. P. & Co. Engine	In series.
23	Fountain	Siemens Bros, 12 Queen Anne's Gate, West- minster.	1 Siemens Dito.	...	12	...	...	...	D. P. & Co. Engines	Used for the illumination of the fountains, being burnt in parallel arc.
24	East Gallery	Lane, Warton & Down, 1 & 9 Holborn Viaduct, (Thompson Houston)	1 Thompson Houston	Thompson Houston	45	1000	...	...	D. P. & Co. Engines	In series.
25	East Annexe A	E. Fox, 4 Orchard Build- ings, Acton Street, Kingsland Road, E.	1 Oppermann	Harling-Hartmann	6	1000	...	...	Armington Series High Speed Engine.	In series.
"	B	J. E. Statter, 37 High Street, Cheshamford.	1 Birgin	Statter	6	1000	...	...	D. P. & Co.	In series.
26	West Quadrant	Clark & Co., 411 Brixton Road.	2 Phoenix	Clark-Bironau	16	1000	...	...	D. P. & Co.	In 2 series of 8 each.
27	Conservatory	Siemens Bros, 12 Queen Anne's Gate, West- minster, S.W.	1 Siemens D	Siemens	4	6000	...	...	D. P. & Co.	In parallel.
28	Dual Dining Rooms (a) Austrian Court (b) Entrance Vestibule (c) Casualties (d)	Electric Sun Lamp Co., 6 Riding House Street, Regent Street, W.	2 Clerc Bureau 2 Gramme (Exclters)	"Sun"	32	1200	...	...	D. P. & Co.	On 4 circuits of 8 each.
29	Club Dining Rooms	Woodhouse & Rawson, 11 Queen Victoria St.	1 Elwell Parker 1 Victoria	W. & R.	...	...	300	20-80	D. P. & Co. Engines "Tower" Engine	Lamps in parallel.
30	Press Rooms and Elzen- berger's Coffee Stall	W. H. Allen & Co., York St. E. Works, York Road Lambeth, Street, E.C.4	1 Kapp 1 Victoria (?)	W. & R. Consolidated	...	...	180 100	16-50 5-72	Allen High Speed Engine ...	Lamps 2 in series. Do. 4 "
31	S. & P.'s Temperance Refreshment Rooms	Consolidated El. Co., Street, E.C.4	1 Victoria (?)	Consolidated	...	...	250	16-60	D. P. & Co. Engines	In parallel B. T. K. sys- tem from accumulators.
32	Queen's Gate Entrance	Peakin, Parker & Co.	1 Siemens	Siemens	4	1500	...	...	M. & P. High Speed Engine	Lamps in series.
33	S. & P. Tea Rooms	Mather & Platt	2 Mather & Platt	Swan	...	...	150	16-80	"Davey" Motors	Lamps in parallel.
34	S. & P. Cellars	Harborn, Daye & Co.	2 Grammes	Swan	...	...	50	16-80	"Williams" Engine, "Obbrick" Boiler.	Lamps in parallel. (Ma- chinery in Duplicate.)
35	Subway	Property of Commis- sioners of Exhibition.	2 Elwell Parker	Swan	...	...	...	...	...	...