

Journal of the Society of Arts.

FRIDAY, FEBRUARY 2, 1866.

Announcements by the Council.

ORDINARY MEETINGS.

Wednesday Evenings, at Eight o'clock:—

FEBRUARY 7.—Renewed Discussion on the Paper read by Mr. W. HAWES (Nov. 29, 1865), "On the Proposal that the Railways should be Purchased by the Government." On this evening JOHN HAWKSHAW, Esq., F.R.S., will preside.

FEBRUARY 14.—"On the Gas Supply of Paris." By GEORGE R. BURNELL, Esq., C.E., F.G.S.

CANTOR LECTURES.

The next lecture of the course, on "Submarine Telegraphy," by FLEMING JENKIN, Esq., F.R.S., will be delivered as follows:—

LECTURE II.—MONDAY, FEBRUARY 5.

SHALLOW AND DEEP SEA CABLES.

1. *Serving and Worming*.—Hemp or jute; tarred or tanned; several conductors in one cable.
2. *Iron sheathing*, common helical (spiral) form.—(a.) Extension. (b.) Kinking. (c.) Untwisting. (d.) Protection against rough usage. (e.) Strength.
3. *Iron and steel wire*.—Qualities used, welding, splicing.
4. *Sheathing machines* do not twist the wire.
5. *Permanency of wire*.—Rust, friction, galvanizing, Bright and Clark's bituminous covering.
6. *Statistics*.—Lengths; weights and duration of cables. Interruptions, total losses.
7. *Maintenance*.—Cost of repairs; returns on capital expended.
8. *Deep-sea cables*.—Depths on various lines. Modifications of common form. 1st Atlantic cable, 2nd Atlantic cable.
9. *Proposed forms of deep-sea cables*. Hempen rope, or Rowett's cable, Allan's cable, Duncan's plaited ratan cable, Rodger's, or Wells and Hall's plaited hemp cable, bare gutta percha.
10. *Statistics of deep-sea cables*.

The lectures commence each evening at Eight o'clock.

ARTISTIC COPYRIGHT.

The following Memorial has been addressed to the Council:—

GENTLEMEN,—We, the undersigned, artists, engravers, and publishers of works connected with the fine arts, are desirous of bringing under your notice the present very defective state of the "Engraving and Artistic Copyright Acts," and do respectfully request you to give the subject your serious consideration, with a view to the speedy amendment of the said acts, and to use your earnest endeavours to prepare such a bill as shall fully meet the present emergency, and give to proprietors of copyright in works of fine art that effectual protection which it was doubtless the intention of the legislature to have secured to them by means of the aforesaid acts.

We would at the same time suggest that the various international copyright treaties appear to demand that the new act should be, as far as practicable, assimilated to the French law, which is found to work exceedingly

well, and to be in France a most effectual bar to piracy.

We would further submit for your consideration that the invention of photography having placed within the reach of all a process whereby every variety of design may be cheaply and indefinitely reproduced, the piracy of copyright engravings has for the last few years been carried on in the most unscrupulous and open manner, particularly by persons who employ hawkers to carry their illicit productions from house to house, being thus able to sell them at a very cheap rate, to the great and manifest injury of the proprietors of the copyright in such engravings.

In those cases in which the persons so offending have a fixed abode, we would endeavour to obtain a more speedy and summary remedy than is provided by the existing laws, and in case of hawkers who move from place to place and act merely as agents, refusing to give the names of their principals, we would also pray that such means might be devised as would bring these also under the power of the law.

(Signed)

Sir E. Landseer, R.A.  
 W. P. Frith, R.A.  
 Thos. Faed, R.A.  
 John Everett Millais, R.A.  
 Richd. Ansdell, A.R.A.  
 Henry O'Neil, A.R.A.  
 Fred. Sandys.  
 Alfred H. Corbould.  
 Thos. Brooks.  
 John Phillip, R.A.  
 Alfred Rankley.  
 G. Bernard O'Neill.  
 Robt. Collinson.  
 John I. Calcott.  
 John Lucas.  
 J. R. Herbert, R.A.  
 John Faed, R.S.A.  
 Thos. Jones Barker.  
 Fred. Goodall, R.A.  
 Charles Baxter.  
 Joseph Nash.  
 George Smith.  
 Geo. Chas. Maund.  
 F. Grant, R.A.  
 Samuel Cousins, R.A.  
 Thos. Oldham Barlow.  
 F. Joubert.  
 Thos. Landseer.  
 Fred. Bromley.  
 T. L. Atkinson.  
 Francis Holl.  
 Geo. H. Every.  
 C. Mottram.  
 William Holl.  
 Robt. Mitchell.  
 John Saddler.  
 Alfred Smith.  
 W. T. Hulland.  
 R. B. Parkes.  
 J. Richardson Jackson.  
 Lumb Stocks, A.E.R.A.  
 C. C. Hollyer.  
 Richd. J. Lane, A.E.R.A.  
 W. J. Edwards.  
 J. J. Chant.  
 W. H. Mote.  
 Robert Graves, A.E.R.A.  
 H. C. Balding.  
 Henry Graves and Co.  
 P. & D. Colnaghi and Co.  
 Goupil and Co.  
 Moore, McQueen and Co.  
 Henry G. Bohn.  
 Henry Wallis.

Ernest Gambart.  
 Chas. Marshall.  
 Henry Le Jeune, A.R.A.  
 Arthur Murch.  
 Henry Wallis.  
 Angelo C. Hayter.  
 Edward A. Goodall.  
 Stephen Pearce.  
 Henry Barraud.  
 Chas. J. Lewis.  
 H. Gastineau.  
 Sir Geo. Hayter.  
 W. R. Beverly.  
 Geo. Cruikshank.  
 John M. Walton.  
 W. M. Tweedie.  
 J. Wolf.  
 Louis W. Desanges.  
 O. G. Rejlander.  
 W. O. Geller.  
 Margaret Gillies.  
 Wm. Greatbach.  
 Arthur Sanders.  
 Geo. Sanders.  
 W. H. Simmons.  
 John P. Knight, R.A.  
 Daniel Maclise, R.A.  
 C. W. Cope, R.A.  
 Erskine Nicol.  
 Thomas Creswick, R.A.  
 John Mitchell.  
 D. T. White.  
 R. C. Lepage and Co.  
 R. & A. Ackermann.  
 Hayward & Leggatt.  
 Vincent Brooks.  
 Robt. Turner.  
 M. & N. Hanhart.  
 S. B. Fuller.  
 Joseph S. Wyon.  
 J. S. Welch.  
 A. B. Fores.  
 Thos. McLean.  
 Walter Clapperton.  
 L. V. Flatou.  
 Art Union of London (Thos. S. Watson, B.A., sec.)  
 W. C. T. Dobson, A.R.A.  
 J. Edgell Collins.  
 G. E. Hering.  
 W. F. Yeames.  
 E. Armitage.  
 Philip H. Calderon.  
 Jas. Sant, A.R.A.

Marcus Stone.  
 John Ballantyne, R.S.A.  
 Baron Marochetti, A.R.A.  
 Henry Mogford.  
 M. Ellen Edwards.  
 T. M. Richardson.  
 William Moore.  
 John Richardson.  
 T. George Cooper.  
 J. G. Middleton.  
 Philip Westcott.  
 Thos. Grieve.  
 C. Tomkins.  
 Jas. Stephenson.  
 Jas. Scott.  
 Samuel Bellin.  
 Philip Thomas.

Thos. L. Rowbotham.  
 T. H. Maguire.  
 Richard Buckner.  
 Samuel J. Carter.  
 P. R. Morris.  
 Edward H. Corbould.  
 Henry Warren.  
 Edmund G. Warren.  
 Joseph Bouvier.  
 Hon. Henry Graves.  
 Edward Hopley.  
 W. L. Leitch.  
 Frederic Tayler.  
 T. A. Prior.  
 G. S. Shury.  
 W. Giller.

The Council have resolved to comply with the request contained in the Memorial, and have invited those gentlemen whose names are attached to it to a meeting this day (Friday, 2nd February), to confer with the Council upon the subject.

NATIONAL PORTRAIT EXHIBITION, 1866.

The Council desire to draw the particular attention of members to this Exhibition, which is to open early in April next.

The Committee of Council have decided to limit it, for this year, to portraits of eminent persons who lived previously to 1688; and any members of the Society, either themselves possessing such portraits, or knowing of their existence, are requested to address the Secretary of the Science and Art Department, South Kensington, without delay. Portraits of foreigners who have obtained distinction in English History, as well as of eminent Englishmen, will be admitted.

PARIS UNIVERSAL EXHIBITION OF 1867.

Forms of application for space, and copies of the regulations, may be had on application to the Secretary of the Society of Arts, and should be applied for without delay.

Although the 28th February, 1866, has been fixed as the last day for receiving demands for space, intending Exhibitors are requested not to delay forwarding such demands, but to send them as soon as possible.

Proceedings of the Society.

CANTOR LECTURES.

"ON SUBMARINE TELEGRAPHY." By FLEEMING JENKIN, Esq., C.E., F.R.S.

LECTURE I. MONDAY, JANUARY 29.

THE INSULATED CONDUCTOR AND ITS PROPERTIES.

The lecturer stated that in the lectures he was about to deliver he should aim rather at spreading more widely the knowledge possessed by those practically acquainted with submarine telegraphy, than at announcing the latest discoveries or most novel theories.

1. *Terms Used*:—*Conductor, Insulator, Battery, Earth, Circuit, Current*.—Some elementary explanations were given with the view of explaining these terms. The action of a current on a magnetic needle, the simplest form of galvanometer and electromagnet, were shown

with their application to practical telegraphy. The two sources of failure, viz., want of continuity in the conductor, and want of insulation forming a short circuit were explained. The reflecting galvanometer was exhibited as a means of indicating a feeble current.

The following is a more detailed abstract of the rest of the lecture:—

2. *Component Parts of Submarine Cable*.—These are, 1st, the conducting wire, generally formed of copper; 2nd, the insulator, surrounding the conductor, generally gutta-percha or india-rubber; 3rd, the outer covering, intended to give strength, and generally formed of a hempen serving, surrounded by iron wires, laid as in a rope round and round the core.

3. *Conductor*.—(a.) *Mechanical Properties*.—The conductor is almost universally made of copper, but a solid copper wire is apt to be brittle, breaking after being bent a few times; interruptions occurred from this cause in early cables: this defect is wholly removed by the use of a strand of several wires, generally three or seven. The tensile strength of copper wire is in some books given as 60,000 lbs. per square inch. That used for submarine cables, being selected for electrical rather than mechanical qualities, will only bear from 35,000 lbs to 39,000 lbs. per square inch. Copper stretches so much (10, 11, 12, or 15 per cent.) before breaking that its full strength can seldom be made use of. This extensibility is, as will be seen, a very valuable property, preventing the interruption of the circuit until the strengthening part of the cable be fairly broken. The following are convenient approximate formulæ:—A copper strand will bear 1½ lbs. per pound weight per knot before breaking; it will stretch one per cent. with 1 lb., and will not stretch at all with 0.75 lb. per pound per knot; thus a strand weighing three hundred pounds per knot will barely support 450 lbs., will stretch one per cent. with 300 lbs., and will not stretch at all with 225 lbs. The weight of copper in lbs. per knot can be calculated from the diameter *d* in inches by the use of the following constants:—weight = 18,500 *d*<sup>2</sup> for solid wire, or 15,100 *d*<sup>2</sup> for strand. The joint of the conductor is made with great care: a scarf joint is made by soldering together two filed and fitted ends; this joint is wrapped round with fine copper wire to give it strength, and solder is again run round this wire; a second wrapping of fine copper is then applied, and left without solder. The joint is necessarily less extensible than the rest of the strand; if forcibly torn asunder, the last wrapping of copper maintains the electrical connexion, being simply pulled out like a spiral spring. No interruption from breakage at joints has ever occurred since this system was adopted.

(b.) *General Electrical Properties*.—Copper is what is called a good conductor, offering small resistance to the passage of the electric current; that is to say, a much less powerful current would be sent by any given battery through a long iron or lead wire than through a copper wire of equal length and diameter. Table I. gives the relative electrical resistance of several substances compiled from Dr. Matthiessen's experiments. The lower the number the better the conductor.

TABLE I.

Relative resistance of materials at 0° C. Wires of equal length and diameter.

PART I.—CONDUCTORS.

Silver, Hard.....	1.00
Copper „.....	1.00
Gold „.....	1.28
Iron.....	5.94
Tin.....	8.09
Lead.....	12.02
Brass.....	4.50
Gold Silver alloy.....	6.65
German Silver.....	12.82
Platinum Silver alloy.....	14.93
Mercury.....	58.15

## PART II.—INSULATORS.

Gutta Percha at 75° Fahrenheit  
 60,000,000,000,000,000,000.....or  $6 \times 10^{19}$   
 Glass not less than  
 600,000,000,000,000,000,000,000.....or  $6 \times 10^{26}$

Conduction takes place through the mass, and not along the surface of the wire. A strand and solid wire of equal weights are equally good conductors; but owing to what is termed lateral induction, to be hereafter explained, the strand is at a slight disadvantage for rapid speaking through long submarine cables. Messrs. Bright and Clark, to avoid this defect, used in the Persian Gulf cable a segmental strand, built up of six wires fitting one another and drawn through a tube; they hoped thus to combine the advantages of the strand with those of the solid wire. Mr. Thomas Allan surrounds his copper conductor with fine steel wires, to give strength and avoid the use of heavy external protection. In a sample given to the lecturer, the resistance of the conductor so formed was about 30 per cent. more than that of a simple copper conductor of equal weight. Taking induction into account, Mr. Allan's cable would be about 50 per cent. inferior in speaking power to a cable with simple copper conductor of equal weight, and covered with an equal amount of insulating material. This inferiority is not a fatal defect if the cost of the outer protection is avoided. The general merits or defects of this plan will be spoken of in a future lecture; although the danger of decay where iron and copper meet is known, Mr. Allan's proposal deserves serious consideration.

(c.) *Chemical Properties of Copper Wire.*—A current flowing from the copper end or pole of the battery through a hole in the insulator to the sea, causes the formation of chloride of copper, a soluble salt. The copper is thus gradually eaten away, until metallic continuity is interrupted, and the cable ceases to transmit messages. The current from the zinc pole does not produce this effect, but only a deposit of soda in the fault, which, however, then allows a greater leakage, tending to enlarge the hole in the gutta percha. Mr. C. F. Varley has proposed to twist up a fine platinum wire with the copper strand of long cables. This wire would maintain the communication at any point where the copper might be eaten away.

4. *Insulator.*—(a.) *Gutta Percha and Chatterton's Compound.*—Gutta percha is pressed out, while warm and plastic, through a die round the conductor; several successive coatings or tubes are thus applied, till the desired thickness is obtained. The first coating is attached to the strand by a substance known as Chatterton's compound, which is also used between each layer of gutta percha, and between the separate wires of the strand, to prevent the percolation of water along the interstices, in case any part of the copper should be accidentally immersed in water.

(b.) *Mechanical Properties.*—Gutta percha has considerable tensile strength, bearing about 3,500 lbs. per square inch of section, but, owing to its great extensibility, it does not add more than about one-third of its whole strength to the copper strand. Roughly, it may be said to add in small wires 20 per cent. and in larger cases 30, 40, or even 50 per cent. to the strength of the copper strand; it will stretch 50 or 60 per cent. or more without breaking, but almost always fails as soon as the copper inside gives way. It will bear ill-usage, such as knotting, squeezing, or stretching, without injury, but can be pierced with a sharp instrument or cut by a knife without much difficulty. Uniform pressure, such as it sustains under water, improves its electrical qualities, augmenting its insulation resistance, according to Mr. Siemens' experiments, about 60 per cent., at 24° C, for every ton pressure per square inch, corresponding nearly to 1,000 fathoms depth of water. It becomes soft at about 100° Fahrenheit, and should, after manufacture, never be heated beyond 90°. The joints required are

made by heating the two ends of the covered conductors after the copper is joined, and applying by hand successive coatings of warmed and plastic gutta percha. The separate layers of gutta percha are also cemented by Chatterton's compound; thus the joint is, when sound, very similar to the rest of the core. Extreme cleanliness and much skill are required in making these joints. Some years since the joints frequently failed, not always when just made, but after some months, becoming hard and brittle, and shrinking, so as to leave a gap between the old and new materials. The process is now thoroughly understood, and is a safe one in skilled hands, but in skilled hands only.

(c.) *India-rubber.*—This material is applied in many ways; most commonly tapes of masticated or bottle rubber are wrapped round and round the conductor until the required thickness is reached. At first these tapes were, as it might be termed, gummed together with solvents, but these caused decay, and have been abandoned; heat is now the common agent for effecting the adhesion. Mr. Siemens, who applied his tapes longitudinally, like two long half-tubes, used simple pressure to join the two halves together. He employed most ingenious machinery to cut the tapes the instant before they were applied to the copper, as the material only reunites if quite freshly cut; several successive coatings could be applied in this way at one operation. Some manufacturers considered that none of these methods were fully successful, and vulcanized the india-rubber, converting it into various materials of different degrees of flexibility according to the process employed. This material was also criticised, and Mr. Hooper has covered conductors with pure india-rubber next the copper, followed by a coating of oxide of zinc and rubber, and enclosed by a vulcanised jacket. In the process of baking the core to vulcanise the jacket, a little sulphur penetrates the india-rubber and the whole mass becomes remarkably compact and durable. Mr. Hooper heats the core to 250° Fahrenheit, and bakes it for four hours. The mechanical properties of these different materials vary greatly; they are all, however, very extensible, and do not add sensibly to the tensile strength of the conductor; they will bear considerable ill-usage, but are mostly softer than gutta-percha, and the pure rubber will not bear continued pressure even by a blunt surface, but gradually yields. The joints in each form are now made so as to imitate as far as possible the main core. Mr. Hooper bakes his joints two hours in a steam jacket.

(d.) *Chemical Properties and Permanency.*—When dry and exposed to light, gutta percha becomes dry and brittle, losing all its valuable qualities, and is said to be oxidized. Under the same circumstances the various forms of india-rubber decay in various ways; some become treacly, some brittle, some almost friable. Mr. Hooper's hard-covered seems to last best of all in air. When in water gutta percha is, so far as fifteen years' experience can show, absolutely permanent. Many thousands of miles have been laid down, and many hundreds of miles picked up after lying in the sea in various parts of the world, in deep and shallow waters, for many years, and not one single yard of material has been found which had under those circumstances decayed or lost its insulating properties. The importance of this fact cannot be over-estimated. The experience as to india-rubber is the very opposite to this; little has been employed, and a great deal of that little has been found to decay, so as to be utterly useless. No doubt improvements are continually introduced, and possibly some of the forms now made may answer better, but till the subject is more thoroughly understood it would be lost time to reproduce all the theories by which the various failures are explained. Out of five specimens supplied lately to the Indian Government, one only, Mr. Hooper's, proved durable even for a year. The lecturer's own experience confirmed this experiment. It must in justice be said, that considerable lengths of india rubber-covered wire are successfully used on land, supplied by Messrs. Silver and their descendant

the India-rubber and Gutta-percha Telegraph Construction Company, and by Messrs. Wells and Hall. The Indian Government has ordered about 100 miles of wire covered by Mr. Hooper's material, which will, therefore, now be subjected to a thorough practical test. India-rubber stands heat much better than gutta-percha.

(e.) *General Electrical Properties.*—Gutta percha is a very good insulator; all insulators conduct a little, but the figure written after gutta percha in table I. will show the relative resistance to conduction with equal bulks of copper and gutta percha. A better idea of the vastness of the number will be obtained by observing that light would take a century to travel through the number of feet which that number would express. The practical result of this degree of insulation with the Atlantic core is that more than 99½ per cent. of the current leaving England would reach America if the cable were but laid; any improvement in insulation will, therefore, only go to diminish this half per cent. loss, in itself of no consequence whatever. India-rubber has a higher resistance still; the chief advantage to be obtained from this high resistance is the facility it gives for detecting faults. India-rubber is, however, superior to gutta-percha in another electrical property, called its inductive capacity. More words per minute, in the proportion of 4 to 3 at least, could be sent through an Atlantic or other long cable insulated with India-rubber than if insulated with gutta-percha, the weight of insulator and conductor remaining the same. This point will be more definitely treated of hereafter.

(f.) *Absorption of Water.*—Mr. Fairbairn long since stated the superiority of gutta-percha to india-rubber for deep sea cables, owing to the comparatively small quantity of water which it absorbs. Probably the newer forms of india-rubber may have improved in this respect, but Mr. Siemens found that pure india-rubber absorbed 25 per cent., vulcanised rubber 10 per cent., and gutta-percha 1½ per cent. of their weight in pure water; these quantities were reduced to 3, 2·9, and 1 per cent. respectively in salt water. The absorption continued for three hundred days: it was eight times greater for india-rubber at 120 deg. of Fahrenheit than at 39 deg., but for gutta-percha it was only doubled by the rise in temperature. Mr. Siemens considered that pressure affected the absorption very little. The amount absorbed by gutta percha in no way damages it. This is proved by thousands of miles of submerged cables; for instance—the tests of the Malta Alexandria cable, laid four years since, under Mr. Forde's superintendence, by Messrs. Glass and Elliot. Part of this cable supports about half-a-ton per square inch pressure.

5. *Mechanical Properties of Completed Core.*—Few persons are aware of the great strength of the common gutta-percha covered wire. An experiment was shown by the lecturer, in which 5 cwt. was hung from the slender looking core of the New Atlantic cable; it stretched some ten per cent. under this weight, and was then taken down, knotted, squeezed, and cut open, when the copper conductor appeared quite undisturbed in the centre of the gutta-percha, which exhibited no trace of injury. Before the application of Chatterton's compound, the wire was liable to start out of the cable

after it had been stretched and cut, or softened, owing to the unequal elasticity of copper and gutta-percha, but with Chatterton's compound considerable force must be used to drag out the copper wire, even when the core has been stretched and is cut open. Table II. shows the strains which various wires can support.

Table III. gives the dimensions of the cores in some of the most important cables laid. It is noteworthy that 300 miles of the very smallest core practically in use, laid without any outer protection whatever, maintained our connection with the army for nine months during the Crimean war.

TABLE III.

Dimensions of Cores of important Cables.

Name of Cable.	Copper Conductor.		Gutta Percha.		Approximate Ratio	Log e d
	Total weight in lbs. per knot.	Total diameter of conductor = d.	Weight in lbs. per knot.	Diameter in inches = D.		
Red Sea Cable .....	180	0·105	212	0·34	3·4	1·224
Malta Alexandria Standard .....	400	0·162	400	0·457	2·95	1·082
Persian Gulf .....	225	0·109	275	0·35	3·343	1·249
First Atlantic .....	107	0·083	260	0·32	4·8	1·57
Second Atlantic .....	300	0·144	400	0·464	3·28	1·19
England and Holland .....	143	0·095	223	0·34	3·47	1·244
Toulon and Algiers .....	107	0·083	223	0·34	4·26	1·45
Varna, Balaclava .....	73	0·062	166	0·3	4·84	1·53

NINTH ORDINARY MEETING.

Wednesday, January 31st, 1866; William Hawes, Esq., F.G.S., Chairman of the Council, in the chair.

The following candidates were proposed for election as members of the Society:—

- Ashworth, George Leach, Roche Mount, Rochdale.
- Barry, John Boyle, 16, St. Peter's-terrace, Notting-hill, W.
- Blackburn, George, 32, Fore-street, City, E.C.
- Brooks, William Elliot, 14, Gt. Queen-street, Lincoln's-inn-fields, W.C.
- Butler, William, St. Helen's, Lancashire.
- Ella, John, 18, Hanover-square, W.
- Fase, Berkeley W., 22, Oxford-street, W.
- Gushlow, George, 60, Newman-street, Oxford-street, W.
- Homfray, H. R., The Place, Stradishall, near New-market.
- Jonas, John, 150, Leadenhall-street, E.C.
- King, John, The Rushetts, Thames Ditton, S.W.
- Macintosh, John, Craven-street Chambers, Strand, W.C.
- Myers, Abraham, 171, New Bond-street, W.
- Nicol, Robert, Westminster Palace Hotel, S.W.
- Phillips, Charles Palmore, 109, Fenchurch-street, E.C.
- Pullar, Wm. Black, Perth.
- Ross, J. C., Ravensglass, Cumberland.
- Sim, William Fisher, Rose Bank, Peckham Rye, S.E.
- Storr, John S., 26, King-street, Covent-garden, W.C.
- Terry, Charles, Newport Pagnell.
- Trevelyan, George, M.P., 8, Grosvenor-crescent, S.W.
- Vansittart, Miss, Reading.
- Walker, William, 1, Stock Orchard-villas, Holloway, N.
- Wall, Prosper, 6, Fortess-terrace, Kentish-town, N.W.
- Webster, George, Melbourne (care of Messrs. Hopcraft and Broadwater, 3, Billiter-square, E.C.)
- Woodford, John Wm. Gordon, 12, Park-st., Grosvenor-square, W.

The following candidates were balloted for, and duly elected members of the Society:—

TABLE II.

	No stretch.	One per cent. stretch.	Breaking strain.
Atlantic core .....	lbs. 340	lbs. 414	lbs. 660
No. 14 copper covered to No. 1, 107 lbs. } copper, 166 lbs. gutta percha .....	134	162	218
No. 16 copper covered to No. 4, 73 lbs. } copper, 93 lbs. gutta percha .....	100	120	150

Barnes, James Richardson, Brookside, Chirk, near Ruabon.  
 Beggs, Thomas, 37, Southampton-street, Strand, W.C.  
 Binyon, George, 106, York-road, Lambeth, S.  
 Buckley, R. W., Currig Bawn, Ballintemple, Cork.  
 Coales, Robert, 10, Trinity-square, Southwark, S.E.  
 Elias, Alfred, 18, Princes-gardens, W.  
 Forrest, G., Springfield-house, Muswell-hill, N.  
 Goadby, Edwin, Loughborough, Leicestershire.  
 Graves, Boydell, 6, Pall-mall, S.W.  
 Gray, Thomas, Board of Trade, Whitehall, S.W.  
 Hamilton, George, 106, York-road, Lambeth, S.  
 Joule, Benjamin St. John Baptist, Thorncliffe, Old Trafford, near Manchester.  
 Mackreth, George Edward, 18, Little Tower-street, E.C.  
 Newmach, William, F.R.S., Messrs. Glyn, Mills & Co., 67, Lombard-street, E.C.  
 Rule, Rev. W. H., D.D., 45, Bedford-street, Plymouth.  
 Smedley, Joseph Valentine, M.A., Oxford and Cambridge Club, S.W.  
 Stewart, George, 47, Mark-lane, E.C.  
 Taylor, Samuel, 13, Manor-place, Walworth, S.  
 Wright, William, 32, Bucklersbury, E.C.

The Paper read was—

#### DWELLINGS FOR THE PEOPLE—HOW TO MULTIPLY AND HOW TO IMPROVE THEM.

By THOMAS BEGGS, Esq.

At the last meeting of the Social Science Association, held at Sheffield, I had the honour to read a paper on "The Home Accommodation of the People," and since then I have been requested, from several quarters, to resume the subject, and to elaborate some of the views only incidentally referred to. I embrace this opportunity of doing so, as many questions of vital interest to the working classes are now under public discussion, and the facts and arguments I have to produce may assist the elucidation of some of them. Be that as it may, the facts will form an appropriate introduction to the subject of this paper—"How can we multiply dwellings for the people, and how can we improve them in construction?"

I think it right at the outset to say that I shall confine myself this evening to a consideration of the question so far as it affects the industrious classes. I am aware that there is a large indigent class, who have become almost helpless in themselves, and who are suffering intensely from insufficient and wretched home accommodation, and that this class are costing the community year by year, in poor-rates and other means of public expenditure, a much larger sum than could, by possibility, if properly invested, be required to provide comfortable and healthy homes. At some future time I may enter upon the question of what can be done for this class, but at present I confine myself to the inquiry as to what can be done for the struggling classes, who equally demand our sympathy, and who are in reach of more immediate help. The lowest class will only be indirectly affected by my propositions, which aim at the improvement of the homes of those who, with limited incomes, have to pay from one-sixth to one-fifth of their earnings for very imperfect house accommodation. The class I allude to is composed of those who earn from 24s. per week, to the clerk, bookkeeper, shopman, or warehouseman, with salaries from £100 to £200 per annum. I know of no man more to be pitied than he who, with some 27s. or 30s. a week, has to support a wife and family, and has to seek in the central districts of London for apartments in which to shelter them. There are thousands of these engaged in a perpetual struggle, and on this evening I wish to keep this class in view.

For the last twenty years the subject has attracted the attention of practical philanthropists, and many excellent schemes have been devised and carried out with more or less success. Much substantial good has been done by them, but they have proved one thing which has an important value, namely, that private or public benevolence is totally unable to meet the large demand made for

houses, where public improvements are going on with bewildering rapidity, and to such an extent that above 20,000 persons have in one year—the year 1865—been driven from their old habitations to seek new ones. We are forced then to the consideration of the subject by the weightiest reasons, and it will be necessary to employ all the resources that can be made available. The urgency is great, the efforts to meet it must be proportionate, and the pecuniary means to give them effect must be dealt out with no niggard hand.

Amongst the other means suggested, we are urged in some quarters to apply to Government for help, and to borrow money from the Public Loan Commissioners for the erection of lodging-houses and dwellings for the poor. I trust that, like a good subject, I am truly grateful to the Government of the country, and fully appreciate the principles recognised by them—principles which have raised the nation to a proud pro-eminent, and, notwithstanding many grievous defects, have made it an example and a blessing to the world. I am, however, jealous of government interference with the daily life, the trade, and the social arrangements of the people. It has become an axiom in political science that the more narrowly you can confine the province of government the better for the governed, and I believe that in the particular case before us the Legislature can render more effectual help by removing restrictions and obstructions out of the way than by any active measures it may be induced to take. It may be that money lent by the Government at a small rate of interest can be properly and beneficially employed in erecting homes for the indigent class—those who have not the power to help themselves; and, knowing as I do the necessities of the case, I will not say one word to discourage such an appropriation of the public funds. The application of such funds, however, requires great care, lest, in our zeal to avert suffering, we do mischief in other directions. It is easy to enervate certain classes by ill-advised and hasty benevolence, and our experience has shown that many of our schemes of philanthropy have tended to impair that spirit of independence among our people which, once destroyed, can never be restored. For the class at present before us, those who retain the power of self-help, I repudiate all such assistance. The Legislature may assist us by correcting some vicious clauses in Acts of Parliament and supplying some omissions, and if they will be pleased to do that they may safely leave the matter in the hands of the people themselves. After removing the restrictions, to which I shall hereafter have to refer, the best thing they can do is to stand out of the way.

I believe, after all that can be done by benevolent associations, or philanthropic individuals, or even by Government loans, that the remedy for defective and insufficient house accommodation will be found in giving free scope to commercial enterprise and the employment of capital in that direction. As I have said in another place, the man who will show that dwellings suitable to the requirements of all classes of the people, within the reach of their means, and of sound and convenient construction, can be made to pay a fair interest for the capital invested, is the true benefactor. It will be a still greater boon to bring the ownership of a house within the reach of that very numerous class who have now to pay high rents for very inconvenient accommodation. These two points define the positions I am about to take to-night, and as the latter is the more important of the two, that of making a man the proprietor of his own home, I will enter upon that first.

I propose to effect this object by an extension and further development of building societies and freehold land societies. Institutions of this class are not much known, and still less understood, by the middle and higher ranks; but they have found great favour among the industrial classes, as they afford facilities for the thrifty and sober man to attain a small property. They are becoming one of the most powerful agencies in the work of improve-

ment, and when some of the disabilities are removed, which arise mainly from the state of the law, they will serve a great and important end. They embrace all the advantages of the associative as distinguished from the communistic principle. Experience has shown that nothing makes a man so conservative as the possession of property. That state will be the most secure, all other things being equal, which contains the largest number of independent proprietors. The building society or freehold land society supplies the means by which the humblest workman who is sober and prudent may become possessed of a freehold house. If a man obtain this he will be careful of all changes likely to affect his own possessions; he will not be a ready dupe of the demagogue, nor will he be the promoter of strikes and combinations.

I propose, in the first place, to glance at the history of these societies; and as a freehold land society embodies all the principles adopted by a building society, I will take that as the basis of my exposition. Freehold land societies were commenced for a political purpose, that of creating forty shilling freeholds to secure votes in favour of certain projects of financial and parliamentary reform. The first society of this kind was established in Birmingham in 1847, the declared object being to purchase large estates, and to sell them out to the members in such portions as would make a garden plot or a site for a house, and at the same time create a freehold qualification. The success of the experiment at Birmingham encouraged others, and in 1849 the National Freehold Land Society was established, under the auspices of the late Mr. Cobden. These societies were established under the Benefit Building Societies' Act, 6 and 7 Will. IV., cap. 32, which provides (section 4) that all the provisions of the Friendly Societies' Act, 10 Geo. IV., cap. 56, and the 4 and 5 Will. IV., cap. 40, so far as the same may be applicable to benefit building societies, and to the framing, certifying, enrolling, and altering the rules thereof, shall apply to benefit building societies. It will be seen on reference to the Acts, that the Act of Geo. IV. includes the clauses which govern the rules of a building society, and the Act of 6 and 7 Will. IV. confers the ability to use them. I wish this to be borne in mind, as it is important to one of the suggestions I have to make in the sequel.

Before this a class of societies, known as building societies, had been enrolled under the 10 Geo. IV., but it could not be said that they conducted their business in a strictly legal manner. Their existence, however, was a manifestation of the desire on the part of certain classes to make the principle of association available for the purchase of houses. And it was for the purpose of giving these societies a legal status that the Act 6 and 7 Will. IV. passed the legislature. The building societies confined their operations to making advances out of a fund subscribed by the members to such of them as might wish to borrow; and might, by lot, rotation, or purchase, become possessed of a preference. The freehold land societies were organised for the express purpose of buying and selling land. In all other respects the rules, constitution, and management were essentially the same. The shares were usually £30, each member being permitted to take any number of shares. The entrance fee was one shilling upon each share, and the monthly payment four shillings. There were no fines upon unentitled shares, that is, upon shares upon which no advance had been made, and interest was paid upon all deposits. These were the general arrangements of the best regulated societies, but in many cases the societies were broken up, or amalgamated with better managed societies; but the cases of failure were not in such a great proportion to the cases of success as in the limited liability companies, which are supposed to have been managed by men of capital, and of commercial experience. The freehold land societies, worked by men who looked upon the power of creating votes as a very subordinate advantage to the social and moral benefits conferred by

creating saving habits among the people, have been the most successful. In fact, the political object has now been entirely lost sight of. No political test of membership ever existed, and such would have been illegal. Some difficulties were thrown in the way by the revising barristers. They gave the most eccentric and contradictory decisions. This was not found to obstruct the progress of freehold land societies, the truth being, that except in periods of political excitement the majority of men take little care about the vote. Many of those who possess it display little interest in it. This is known to every registration committee in every constituency, and is further shown by the experience of freehold land societies, for it is found that those who are entitled, even when the registration fee is paid for them, and an agent's services offered, will not take the trouble by personal attendance to place their names upon the register. In my judgment it is an immense advantage gained that the societies have lost their political character, and now conduct their business on purely commercial principles.

In the working of freehold land societies there was one difficulty (arising from the state of the law) which had to be overcome. Although they were enrolled as permanent building societies under the Act, they had no power to build, nor to purchase or sell houses or land. Every such society was, in fact, a savings bank and mutual loan society. The freehold land societies had to accomplish their object by an evasion of the law. At the time of their formation, no society or corporation could become dealers in land, nor hold it for the purpose of making profit. The process therefore adopted by the societies was this. The estates were bought in the names of two gentlemen outside the society, having no visible connection with it, and after subdivision they were conveyed to the purchasers in the names of those gentlemen. It is scarcely necessary to say that such a method of doing business was inconvenient, and attended with risks to the trustees of the societies, and the gentlemen who acted for them, a responsibility being thrown upon them not shared in by the members. It was quite opposed to sound commercial principle, but such was the law, and such is the method adopted up to this day by freehold land societies to evade or get round it. The members could at any time, on giving twenty-eight days' notice, draw out the money paid in, so that under a panic, arising from one of the disturbances to which our commercial system is always liable, the members who had not obtained advances might escape, while the trustees might be seriously embarrassed by having to force a quantity of unsold land into the market under unfavourable circumstances.

No doubt this has operated prejudicially to the interests of the societies, as practical men have, in many instances, been deterred from joining them; but nevertheless the societies have prospered, and one—the National Freehold Land Society—had, in the first seven years of its existence, received, after deducting the sum of £204,532 which had been withdrawn, no less than £565,747. This includes a profit of £9,046. The society had purchased 113 estates in the home counties, comprising 3,419 acres, and amounting in value to £750,017. Land had been sold to the value of £456,789, and consequently at that period there was land in stock to the value of £293,228. During this period there had been several depressions in the money market, and these had the effect of forcing upon the attention of the management an alteration of the constitution of the society. It was first suggested that it would be well to convert the society into a Joint Stock Company, under the Limited Liability Act of 18 and 19 Victoria, cap. 133. There were several objections to this course, the principal of which was this, that it would destroy the original intention, and subvert the purposes for which such societies were founded. At that time Mr. Lowe was at the Board of Trade, and representations were made to him by Mr. Cobden, Mr. Wilkinson, then member for Lambeth, and Mr. Charles Gilpin, the chairman of the society, as to

the inconvenience encountered in this particular. Mr. Lowe paid great attention to this, and the result was the introduction of a Bill, which passed the legislature August 14th, 1855, the title of which is declared to be the Labourers' Dwellings Act. It is the 18th and 19th Victoria, cap. 132. That Act provides that, any number of persons not less than six may form themselves into a company for the purpose of erecting dwelling-houses, on signing articles in a form prescribed, which articles are to be registered with the registrar of joint-stock companies; upon being registered, such company to be deemed a body corporate with a common seal, but no registration to be made until the registrar is satisfied that three-fourths of the proposed capital has been subscribed, and that ten per cent. of the capital has been paid up; the registrar shall then grant a certificate, which is to be held as evidence of the incorporation. In the sixth clause it is provided that a company may not hold more than ten acres of land at one time without a licence from the Board of Trade, and there are other provisions, which place such company under the General Board of Health, for sanitary purposes. The Land Clauses Consolidation Act is to apply to it, and penalties are to be recovered under the 11th and 12th Vic. cap. 43; it is also provided that the Act does not extend to Scotland.

Under this Act a licence was obtained from the Board of Trade, and the British Land Company formed. The company bought all the unsold land held for the purposes of the National Freehold Land Society, and the two bodies became distinct. The National Freehold Land Society now confines itself to its legitimate business, that of receiving the deposits from its members, and lending the fund as it accumulates, to those members who wish to borrow, or to the British Land Company, making its profit out of the interest it obtains, and paying an interest of 5 per cent. to depositors. The British Land Company purchases estates in its own name, makes roads, executes works of drainage, and then sub-divides into suitable allotments for the district in which the property may be situated; they are then ready for sale. The estates are offered to the general public, and everything is reduced to commercial principles. Besides the Acts of Parliament I have mentioned, the company is brought under the 7th and 8th Vic. cap 110, known as the Joint Stock Companies' Registration Act, and also under the 19th and 20th Vic., cap. 47, the title of which is the Joint Stock Companies' Act, 1856.

At the expense of being considered tedious I have entered into these details, as they possess an historical interest, and are most important in relation to the suggestions I have to submit.

Now let me show what has been effected by these societies. I have not been able to obtain returns from all the building and freehold land societies, and must content myself by giving a few examples. In Birmingham I find that from the first commencement of building societies, in 1842, up to the present time, not less than £2,500,000 have been invested in them, and mostly by the working and lower portion of the middle classes. In six freehold land societies in that town, all held in one office,

There has been advanced on mortgage . . . . .	£561,500
Of which there has been repaid . . . . .	302,500

Leaving still to be repaid . . . . .	259,000
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so that considerably more than one-half advanced to the members by way of loans has been repaid. It is stated that in Birmingham about 9,000 persons have, through the means of these societies, become proprietors of their own dwellings.

In the town of Leeds a building society has been in existence for about seventeen years. In June, 1865, it had 6,872 members, and the weekly receipts at that time were about £3,624. The amount advanced to borrowing members has been £749,864. Altogether there have

been 24,589 members of the society, who have paid upwards of £1,200,598. There are several other societies in that town and neighbourhood.

To return to the metropolis. The Temperance Building Society has, according to its last report, received, in the ten years of its existence, £700,000, and lent upon property the sum of £509,000. The Conservative Land Society, according to the last report, has bought 66 estates, containing 620 acres, and making about 4,842 allotments. The total amount of subscriptions received by that society is £394,966.

The British Land Company, which originated from the National Freehold Land Society, has bought land to the value of £1,496,034, of which it has sold to the value of £1,246,234. The number of estates bought is 219, comprising 6,492 acres. As the average sub-divisions are about fifteen to an acre, I estimate that the British Land Company and the National Freehold Land Society together have created from 40,000 to 45,000 independent proprietors. Besides this the Society has been of great use as a savings bank. The interest, although variable, has generally been 5 per cent., and last year a bonus of one per cent. was added. A large number of small traders use the Society in the same way that merchants and manufacturers use the large banks, with the exception that they cannot use it for the purposes of honouring bills and cheques. The extent to which the Society has been made available in this way may be gathered from the fact that the total deposits from its commencement up to the present time have amounted to £3,074,907, and the withdrawals to £2,486,236; that is in fifteen years' existence. The capital of the Society in 1864 was £565,761 5s. 3d., of which £50,000 had been invested in securities, and the number of members at that time was about 12,000. The success of the British Land Company in its new business of buying and selling land has been most extraordinary. After an existence of about nine years it has been able to pay for the last two of those years a dividend of 15 per cent., and the shares are now selling at 75 per cent. premium.

I quote a few examples of societies, with the working of which I am familiar; but they are very numerous and are springing up in various directions. In 1860 the Messrs. Chambers computed the number of building societies at about 2,000, and the amount invested in them at about £10,000,000. Taking this as a tolerably correct estimate, the amount must have reached by this time £12,500,000. In Liverpool and Birkenhead I am informed that there are about 100 building societies, and in Manchester somewhere about 75. These general facts will suffice to show the importance of the subject in its social and political aspects, using the term political in its best and highest sense, especially when we ascertain that the great bulk of the members are men who live by wages. If these societies are working under a bad management or a defective code of rules, then it is quite clear that an immense amount of mischief may be done by them; if they can be properly directed, an equally large amount of good will inevitably arise.

I assert, however, that notwithstanding some failures, they have been attended by a great and unmistakable success, and this has been achieved in the face of great difficulties. The Act of Parliament under which these societies are enrolled, was not in the best way calculated to promote the object sought. It unfortunately happens that bills for such purposes are prepared to go before parliament by men who know very little experimentally of the industrious classes. The bills are brought up to meet emergencies, rather than based upon broad general principles, and are so fenced round by precautionary provisions, and provisions to meet the clauses of other Acts of Parliament, as to make them unintelligible to plain practical men, and they either dismay or become snares to earnest men who desire to adopt them. Many of the existing building societies are encumbered by rules extending over sixty

and eighty octavo pages. In the best conducted societies it has been a duty, involving constant labour and anxiety on the part of some of their leading men, to reduce the rules to a simple and working shape. The legislature did nothing, until the introduction of Mr. Lowe's Bill, a measure which, by the way, had to be amended by the 19th and 20th of Vict., to help on these societies. They have progressed in spite of the law, rather than by its aid, and some important but simple alterations are required to adapt the Acts of Parliament to the present circumstances of the societies.

Besides this difficulty there were others. Those among the middle and higher classes who felt a sympathy with the industrious did not look with favour upon building societies, nor in fact upon associated efforts of any kind. There were many causes for this. Certain communistic doctrines, about the period of their foundation, had been disseminated, and had taken hold of some of the more thoughtful of the working men, and Chartism was then playing some of its freaks and follies, so that all attempts at organisation among workmen were looked upon with great distrust. Besides this, the working of friendly societies and money clubs, especially the latter, had been so fruitful in disaster that it could only be expected that men of business knowledge and experience should shrink from a connection with societies in which working men constituted the large majority of the members. From this very cause the aid that might have averted mischief, in some cases of failure, and ensured success, was withheld. The apprehension was reasonable enough, and it was not seen that the turbulent and the noisy, who had become leaders in political societies and trade combinations, were, after all, not the representatives of the thrifty and sober working man. There is also this truth in connection with it, that the upper classes were then more in ignorance than they are now as to what the working classes can do for themselves. It was a common belief that the wealthy or that the Government must do what was necessary, and that little more could be expected of the people than that they should become willing recipients. Most of the proposals of that period savoured of that idea, and hence the failure of many well-meant schemes of improvement. This is a mere delusion. The true way of helping the people is, as I have already said, to remove obstructions out of the way, and leave them to rely upon their own energies for the remainder.

I should not refer at so much length to these false impressions, but from the knowledge that they still survive; that they restrain much voluntary exertion, and retard measures of sound legislative policy. As an illustration of these unsound views, I may quote the one put forward by the Messrs. Chambers, who, in speaking of the freehold land societies, thought it necessary to say a word of caution. "They recognised," to use their own words, "a certain good in giving to the working man the feeling that he is the proprietor of his own house, a portion of land, yielding (along with the franchise in England) a rent of forty shillings per annum, but at the same time they recognised a corresponding evil." When the evil came to be explained, it was this, that a portion of the working classes have precarious employments, and have consequently to remove from place to place, and, as heritable property is a fixture that a man cannot take with him, it might be a great trouble to dispose of that which he had made sacrifices to acquire. Therefore they recommend that the working classes should invest their savings to accumulate as moveable capital. What is all this but saying that freehold-land societies do not meet the circumstances of every working man? What society can possibly do that? There are thousands of working men, in all parts of the country, who are fixed in their place of employment, and who are little exposed to the accident of change, and to these men the facilities of obtaining a house of their own are most acceptable. Some other means of investing their savings must be adopted to meet the wants of those

who, from necessity or inclination, are often changing their place of employment. We are liable to make the mistake of generalising from isolated facts, and of applying a principle to the whole number of cases, when really it is only applicable to a part of them. Each individual must be left to his own selection as to what is best, but there is no reason why the clerk or the shopman, who has from long service become a part of the establishment into which he went as an errand-boy, should not seek a permanent investment in a house because a bricklayer may have to move about to all parts of the metropolis in pursuit of his employment. It unfortunately happens that very few of the workmen who, by the nature of their employment or from other causes, are often changing their residences, ever save at all, or care about investing in anything but articles of present and personal gratification. I entirely dissent from the advice which follows—that it is better for the workmen, as a rule, to invest in institutions where their capital can be moveable at pleasure. Were this always the best, then a building society offers a means of investment equal to any other, giving a higher rate of interest than a savings bank, and, if he be careful in his selection, with equal security. He can remain as a depositor rather than a borrowing member, and thus have the power of withdrawing his capital and interest at any time. The working man is literally oppressed with loads of advice. No good measure can be devised for his benefit but it is prefaced by a chapter of sage counsel, and it is fenced round by so many precautions that he is bewildered, if he be not driven away from the proffered boon. To my thinking, it would be far wiser to treat him as a rational being, and not overwhelm him with so much kindness and patronage. Like others, he is governed by ordinary motives of self-interest, and must learn by his mistakes. The sober and the abstinent may be safely left to negotiate a few shares in a building society, the purchase or building of a house; and I will venture to affirm that the per-centage of mistakes will not be greater among the working classes than are proved to be made by the middle classes, who enter upon all sorts of projects, the honest description of which would appear as a caricature. There is one thing, however, certain, that it is better for a struggling man to place his savings so that they may not be easily available to meet every temporary demand and every pressing temptation.

Looking then at the institutions as they stand before us, two questions have to be answered—What are the advantages they have conferred? and are they susceptible of further development? The advantages are, I think, apparent. They give to the artisan what no other means present, an opportunity of acquiring a plot of freehold land and a freehold house. They enable him to pay the purchase money by weekly or monthly instalments, and by the contract of the society with the solicitor he is relieved from heavy law charges, and he obtains a clear title. He can enter the society at any time, and wait a favourable opportunity to purchase his land, and while his choice is in abeyance he receives a fair interest upon his deposits. Mr. James Taylor, in one of his speeches, said "That 2s. 6d. per week in a building society would in twelve years become £120, in a savings bank, £92," a difference of £28. Then he says that "the £92 in a savings bank would take eleven years to make £120, while in a building society the same sum in the same number of years would reach £256." It will be seen by this calculation that there can be very few of the skilled workmen of the country who have not the means of becoming, through the agency of a building society, in the course of from twelve to fifteen years, proprietors of freehold houses, converting the rent they have to pay into the purchase money.

A second advantage accrues to a man from becoming owner of his own house, in the saving effected. A landlord has to cover in his rent the cost of collection, the insurance which good tenants have to pay for bad, and



the insurance also to cover risks of damage, and of the houses being unoccupied.

A third advantage will accrue to the proprietor himself, and also to the public. The principle of every man becoming proprietor of his own house will conduce to better construction, and to better sanitary arrangements. The society which purchases the estate in the first place attends to drainage, making roads, and providing sufficient width of streets, and imposes conditions as to general plans of building, so as to prevent obstructions of light and air, and the exercise of improper trades and employments. Such vigilance might be aided by alterations and amendments of the law as to the constitution of public administrative bodies. Our sanitary legislation is defective. No proper powers are given, and proper responsibility nowhere exists, especially in London. It has become a matter of necessity that our sanitary legislation should be entirely remodelled. The man who expects to be proprietor of a house will necessarily be more careful as to construction than if he merely expects to occupy it as a tenant. This point is of great moment to all classes of occupiers, for it requires no scientific knowledge to perceive that the vast majority of houses erected in the suburbs of London are of the lightest and frailest description, and that comfort, solidity, and convenience are sacrificed to mere external appearance. The practice prevails of building leasehold houses upon leasehold land. In some cases land is let for building purposes upon sixty years' leases, and houses are built thereon and let upon thirty years' leases. In most cases the ground leases extend to 99 years, and even in this case the interest of the builder is to do as little as possible, and therefore all but a universal system of "scamping" prevails. The builder must comply with the provisions of the Metropolitan Building Act, as interpreted by the district surveyor, but it is notorious that evasions and malpractices of a serious kind are permitted. Even in cases where the large owners of property are concerned, the surveyor employed by the estate very often only attends to substantial matters of construction, and the details, upon which so much depend, are left to the tenant, who has to pay a heavy tax during the first years of his occupancy for repairs upon bad work of carpenters, plumbers, and gasfitters. The true corrective for all this scamping will be to open facilities for every man becoming owner of his own house. This applies more especially to London, but in a lesser degree to many of our large towns. In the metropolis there is a lamentable defect in its municipal government. It is a conglomeration of large cities without the protection which other large cities in the empire possess, and is really suffering from the large amount of self-government which it enjoys.

Another advantage will accrue from the extension of building societies and freehold land societies. They will inevitably tend to attract men away from the various public-house clubs, in the shape of money clubs, clock clubs, furniture clubs, and a host of similar clubs, which have become the bane of working men in large towns, and impose fetters upon them which are rarely ever broken. A compilation of county court processes would tell a tale in relation to them infinitely more painful, because it is more extensive than the tally system, which has been the subject of so much public remark. Suitable investments for the humbler classes must have the effect of drawing them away from the public-house and its attractions.

I come now to inquire how we can strengthen these institutions, and promote their further progress and success.

I have shown that they are acting under several Acts of Parliament, and that freehold land societies are conducting their business by an evasion of the law. I am told by a very high authority that a great part of legal practice is now employed in evading the law in different matters. This may be a very pleasant exercise on the part of the profession, but it is not ere-

ditable to the legislation of the country, and cannot tend to increase our respect for the law itself, nor improve the moral tone of the people. At any rate our measures affecting the investments of the working classes ought to be clear, well defined and adapted to present exigencies. I ask, therefore, that the law should be revised and amended in relation to building societies and freehold land societies. It is absurd and mischievous to continue the present system, when the societies have outgrown the state of existence for which the law was made. What might be suited to them when they were small friendly societies, becomes a check and incumbrance when they have become large investment societies, with, as many of them have, an income of from £30,000 to £100,000 per annum. My judgment would be to incorporate them under the Companies' Act of 1862, giving them power to purchase land, build houses, or carry out any of the purposes for which they are embodied, on their giving the usual guarantees. I venture to suggest that it would be well to make it compulsory upon them to deposit at some public office, open to general inspection, a properly certified balance-sheet every year. I believe that this has been suggested as a proper precaution in the case of all limited liability companies.

The power does exist under the Act I have quoted—the 18 and 19 Vict.—to form companies on the limited liability principle; but it is most desirable to retain that part of the arrangements of a building society which enables the members to pay up the amount of their shares by subscriptions extending over a number of years. This might be done by sanctioning two or three classes of shareholders, and thus providing for those who can pay a few shillings a week more conveniently than paying the calls under the system of a joint stock company. If this were done, then I think that it would be better to render it obligatory for these societies to register under the Companies' Act, rather than under the Friendly Societies' Act; and this would greatly strengthen them, and increase their power of doing good.

It is desirable to grant to them a more simple mode of conveyance and transfer. At present, when a freehold land society purchases an estate the title is examined. Why should not the plan be deposited in the office established under Lord Westbury's Act, or any other properly-appointed office, after the subdivisions have been made, and why should not the lots be conveyed to the purchasers by a simple certificate, like that which a merchant obtains when he purchases bank or railway stock.

These alterations in the law would greatly facilitate the operation of freehold land societies and building societies, and give them increased power and freedom of action. I am prepared for the question—How does this apply to the condition of London, where the need is urgent, and the price of land so high as to place it beyond the reach of such societies for the purpose of finding dwellings for working men and men of small incomes. I will endeavour to supply the answer. There is a very large class who, by the aid of railways, could escape from London, and who would be glad to do so, and we shall have to look to this as one of our resources, for the erection of dwellings in the suburbs would lessen the competition in London itself, and consequently enforce improvement. Many thousands of clerks, warehousemen, book-keepers, and shopmen, who are not required to attend as early at their places of employment as the mechanic and artizan, would be removed, and make way for those who, by necessity or inclination, must be resident in the neighbourhood of their work. I am much amused by an objection which is raised to this suggestion very often, as if it ever was contemplated to make it a matter of police, and force the people out. It is only proposed to open a way for those who have the means and inclination to go a few miles from the busy centres of the London population, and the man would be left as much at liberty to select the locality in which

to find a home as he is left at liberty to go to what shop he chooses to buy his hat or order his coat.

There can be no doubt that, for the large majority of the working classes, we shall have to look to London itself for accommodation, and economise all the space within the police boundaries, and here again we shall have to invoke the aid of the legislature.

The difficulty that would meet a building society or a large commercial company, if even what I ask were conceded, would be that which now stands in the way of private enterprise, that of obtaining sites. Under present circumstances they cannot be obtained. We must, therefore, seek for compulsory powers to obtain land for building purposes. I ask for a power vested in the Board of Trade, the Privy Council, or any court established by the Act itself, by which any corporate body, on giving the usual guarantees, and depositing plans and proposals, and showing the want of dwellings for the people, may acquire land for their erection on the same terms that railway and dock companies now obtain it, without the necessity of going to Parliament in each case for a private bill. I ask also for a power to enfranchise leasehold property under certain conditions, and a power to compel the sale of such property as may be in the hands of incapacitated persons, or where circumstances prove the inability of the owner to comply with the laws laid down for the protection of the public health. I ask also that trustees of charitable and ecclesiastical institutions should be empowered to sell, exchange, or otherwise dispose of property tied up by trust, where such may be required for dwellings. And further that summary power should be given to the proper local authorities to remove from out of London prisons, workhouses, barracks, slaughter-houses, cow-houses, gas-works, and all noxious and dangerous manufactories, and to place the sites at the disposal of public companies, who would undertake to build dwellings upon approved models.

I ask also that freehold occupation may be further encouraged, by enacting in the same bill that, as in the case of Scotland, a man may become the proprietor of a flat or floor of a house. This should be done under the most stringent regulations as to sanitary arrangements. In a conversation with Mr. Waterlow, I am glad to find that he is in favour of this view, and he states that opportunities have occurred where he could have disposed of the fee simple of some suites of rooms much to the advantage of his own undertaking, and to the benefit of the purchaser. There will probably be some difficulty in such an arrangement, and it has been suggested to me that long leases might be granted, which would equally answer the wishes of the occupiers. I believe that a committee connected with the Society of Arts came, after much consideration, to the conclusion that the Scotch system was not desirable nor applicable to England; and they suggested that a plan by which the occupiers could become shareholders in the block of buildings in which they were tenants would be more acceptable and more convenient to our English tastes. Mr. Thomas Twining favours this view. I am quite content to leave it an open question, but I need scarcely say that my predilections are in favour of creating freeholds wherever it is practicable.

I submit these suggestions with all due deference, as I know that I am speaking in the presence of gentlemen who have given much thought and attention to the subject, but possibly I may possess the advantage that I have been for fifteen years engaged in working in the largest freehold land society in existence. I have no fear that the means will not be found among the people themselves, if the obstructions are removed, and fair facilities given. When I see that they cannot be found by the people themselves, I will make one to go to the Government and ask for a loan. At present I content myself with asking that the legislature will remove the difficulties out of the way.

I admit that my scheme of relief, through freehold land

societies, will only meet a comparatively small number of cases, but then it will not interfere with any other which aims at providing dwellings for the people, and all the measures I have asked on their behalf are equally necessary to every other enterprise. I hold there is only one difficulty. There is no want of capital, there is no want of the inclination to employ it in building houses for the people—the want is simply this, the sites on which to build them obtainable in places required by the occupants, and at a price which will render the undertakings remunerative. This is the one great difficulty which I desire to fasten your attention upon, and to enlist your exertions to remove.

I must now return to the commercial bearings of the general question. There have been several suggestions made as to what ought to be done to meet the present want. One of them is to make it a condition, in granting new railway Bills, that companies should erect accommodation for a number of persons, equal to the number they displace. A difficulty occurs to me at once. On whom is the power of supervision to devolve, as to the sites, construction, rents, and other matters relating thereto? Are the railway companies to be made proprietors of cottage property as well as of railways? If so, as the control of such is not within the scope of their legitimate business, it may be fairly assumed that it will be neglected. That which people are compelled to do against their inclinations and their interests is never done well, and this rule is of universal application.

Another plan is, as I stated at the outset, to borrow the money from the public loan commissioners, at a low rate of interest, to build houses. I understand that the Lords of the Treasury are prepared to recommend that course to Parliament, on condition that the corporations or public companies do not claim a profit above 5 per cent. I have promised not to oppose such a scheme, as it is shown that the state of London demands extraordinary efforts; but I may venture to point out the probable consequences. First of all, the case is altogether different from that which had to be treated recently in Lancashire, arising from the cotton famine. There we had a large branch of industry suddenly paralysed; but although the distress was severe, under the worst of circumstances, it could only be temporary. It was altogether an exceptional and extraordinary case. There the Government interference and aid were most legitimate, but here we have a permanent want that requires provision of another kind, and we ought to be satisfied that commercial enterprise, upon which we depend for the supply of every other want, is not ready or able to meet the demand for shelter, before we ask the Government for loans of money. First of all, the mere act of building houses by borrowed money at less than its market value will have the effect of checking that commercial enterprise upon which, whatever we may do at present, we shall have in the long run to fall back for the accomplishment of this great end. Then, again, why restrict to five per cent. the profits of those who may employ their capital in the undertaking? This is really destroying the virtue of their own proffered aid, and it will confine the undertakings within the range of benevolent exertion. The undertakings under such circumstances, even with the advantage of money at a small rate of interest, will not pay, as undertakings conducted wholly or partially from benevolent motives never do, and thus the tendency of the whole thing is to keep out of the field of operation the very men who are best able to work for the public benefit, and who will work under the powerful incentive of self-interest—in fact, that of making a fair profit out of the capital they employ. I think it is therefore better for us to look, in the first instance, at the existing discouragements to the employment of capital, and try to ascertain whether we cannot effect such changes as will invite it into this field of useful and necessary labour. I have never yet known that a departure from sound economical principles led to satisfac-

tory results in the long run. I believe that if we could satisfy the public mind that suitable sites were to be obtained, a company might be formed with a powerful and influential direction, and a sum of money raised fully adequate to the requirements of the case, so that in five years we should hear little or nothing of overcrowding or of deficient house accommodation.

This may be considered the language of enthusiasm. I can only assure you that the views given to-night are the result of deliberate conviction. I know that what I propose does not offer immediate relief, and in certain quarters it is objected to on that account. Let us not deceive ourselves. When an evil has become so large and so inveterate as that we seek to remove, we cannot find an immediate remedy, and we may waste much labour by an impatience in conquering the slow processes by which great ends can alone be accomplished.

I confess my inability, after twenty-five years' study of the subject, to point out a short road to the desired goal. Society is now reaping the harvest of a sinful neglect, and we must take care that the remedy we employ does not rise up afterwards in judgment against us, among the many other examples of ill-judged and wasted benevolence. Above all, let us not nourish that feeling of hopeless dependence which pervades so large a portion of the poorer classes. It is well to give to the man famishing of hunger to-day a basin of soup and a loaf of bread, but let us not neglect to put him in the way of earning it for himself to-morrow. This should be borne in mind in all our schemes of practical philanthropy. As to the argument to which I have referred, it belongs to the objectors, rather than myself, to offer a scheme for immediate relief, and when it is ready I will promise it my support. I offer mine as one among many—a plan that will reach thousands of the struggling classes, who, from their neighbourhood to and close contact with fever, indigence, intemperance, and want, are in danger of falling into the same gulf. I believe it is a sound philosophy to try to save those who are in danger of falling, instead of expending all our energies upon those who have fallen. Besides, by extricating those who are willing to make efforts to secure a home, we are lessening the amount of competition, which is very fierce indeed, for such accommodation as our towns now afford. Indirectly, then, we reach the most helpless class, and what more does any scheme now before the public do? It is well known that, in the blocks of buildings erected by the Peabody fund, as well as those by Mr. Waterlow and the several societies which have been working for many years for the same purpose, none of the places are taken, or even sought, by the lowest class. They are sought, accepted, and welcomed by those whose sense of delicacy and desire for comfort still survive, and this is very much to effect. However, my scheme, which has been largely successful, does not in any way interfere with any other. I am well aware that we must rely upon many schemes working simultaneously; but I believe that those schemes will be the most productive of good which are made to depend upon the exertions of the people themselves. The experience of a busy life has taught me to lay down this as a maxim, to do nothing for the people that they are able to do for themselves.

#### DISCUSSION.

Mr. WALKER (of Rugby) said, having had the honour of being a member of the Committee, appointed at the instance of the Council of this Society, on the subject of dwellings for the working classes, and having for many years taken a great interest in that subject, he would express his admiration and appreciation of the excellent paper to which they had listened, with nine-tenths of which he agreed; but there were some points, and those of considerable importance, with which he could not but disagree. One of the main points to be considered was, whether the labouring population should be

encouraged to become owners of their own dwellings? His own opinion was that it would be injurious to the community for that class to become owners of the cottages and rooms which they inhabited. If all these poor persons were what they ought to be—if we could realize our *beau idéal* of a peasantry and of labourers—if these persons were, as a rule, careful and prudent, nothing could be better than that they should be the owners of their dwellings. But, unfortunately, the contrary was too much the case. He had seen that both in the country and in towns the dwellings that were owned by this class were generally in the worst condition, and were a nuisance to the neighbours. They, too often, treated their dwellings as they did themselves. They were clean neither in their persons nor their apparel, and as with themselves, so with their dwellings; therefore, taking the poorer classes as they were, it was undesirable that they should become owners of their own dwellings. Another reason against this was that such dwellings would probably, in a short time, pass into the hands of speculators. The owners would find they had the means of raising money on their little tenements, and these would soon pass out of their hands into those of speculators, who would take no pride in their property, but who were among the worst class of owners of dwellings in London and elsewhere. It had been argued that vast numbers of the labouring classes were stationary, and therefore might, without inconvenience to themselves, be the owners of their own dwellings, but they composed but a very small portion; the large proportion of them were, of necessity, migratory. Another important point was lightly touched upon in the latter part of the paper—that was, the proposal to give compulsory power to purchase sites for labourers' dwellings. He objected to that most strongly. Compulsory powers had been stretched to the utmost already in England. In the case of great public undertakings, such as railways or canals, which must go in a certain line, the convenience of individuals must give way to the public interest; but he submitted there were no such grounds for compulsory interference in the case of sites for houses. There was plenty of space within half-a-dozen miles of St. Paul's on which they could erect dwellings for more than five times the number of those who were in want of them. There were many places in London now occupied by miserable tenements which might be covered with fine blocks of buildings. His own idea of the mode in which dwellings for the labouring classes might be multiplied and brought within the reach of that class, was by improved methods of building. The land might be bought sufficiently cheap within a moderate distance of the centre of London. Plenty of such land might be bought at £1,000 per acre, and even at a good deal less, and by building four-storied houses and giving fifty square yards to each tenement they might for £35 supply the site which, at 5 per cent., was only 35s. a-year, not a heavy rent to a London artisan or labourer. He thought he had himself, to some extent, solved the difficulty of providing labourers' dwellings at a sufficiently low cost in the country, where it had been the cry that landowners could not build cottages to yield them a fair per-centage upon the outlay. He had built them for £70 or £72 each, very good cottages indeed. The particulars of them were published some time since in the *Journal*,\* and he wished to repeat the statement he then made—that London possessed greater advantages for providing dwellings at a cheaper rate, in proportion to the income of the classes that would inhabit them, than the country. In London they had the advantage of water supply ready at hand, and domestic arrangements altogether could be carried out with far greater facility in an aggregation of dwellings in London than in the country, where all such matters must be specially provided for. He saw present a gentleman who had done much towards the solution of this question

(Mr. Alderman Waterlow), but he must be allowed to take this exception to what that gentleman had done, viz., that his buildings were rather too good. If his buildings had been of a simpler character, no doubt they would have paid better, and perhaps they would have been better suited on the whole to the class who were to inhabit them. At the same time he said, all honour to Mr. Waterlow for what he had done in this direction.

Mr. Alderman WATERLOW agreed with the last speaker that they were much indebted to Mr. Beggs for the very excellent paper he had read. He disagreed with Mr. Walker in thinking it undesirable that the working classes should be the owners of their dwellings. If that object could be accomplished it would do more to elevate that class than anything else. If they gave a working man a stake in the country, depend upon it he would be the foe of all anarchy and of those mischievous combinations which paralysed commerce. He thought Mr. Beggs had pointed out a better plan than any he had heard before, by which the object they so much desired might to some extent be carried out. There might be some difficulty in adapting the usages of freehold-land societies to the metropolis, because it was impossible they could build small houses, so that each occupier could have his tenement on his own plot of ground. They could only build in large blocks—*usque ad caelum*. They could not utilise the ground sufficiently unless they built on that system. Then the difficulty was to separate one tenement from another so as to give a freehold right in each. If they could do that, instead of the picture of slatternly and dilapidated houses which had been drawn by Mr. Walker, he believed the scene would be changed as by the wand of a magician. A man naturally would not wilfully allow his own property to be destroyed; he would rather take all possible care of it; but if he lived in a highly rented house under a harsh and uncompromising landlord, he would have no interest in taking care of the property. As an illustration of this, he might state that in most of the tenements erected by the Improved Dwellings Company, of which Lord Stanley was chairman, they endeavoured to fix the rent at a sum lower than that of the surrounding tenements, and they did so upon this commercial principle—that if a man had got a tenement at a lower rate than he could get it elsewhere, he had such an interest in it as would induce him to take care of it, so that the landlord should not turn him out, and the 3d. or 6d. a-week he saved in rent the owners saved in wear and tear of the property, and both parties were mutually benefited. If the principles of freehold land societies were applied to separate tenements in blocks of buildings, there must be some alteration of the law to compel some constituted authority to maintain such parts of the building—such as the roof, the staircases and the foundations, which were common to all the tenements. No individual would be inclined to take that responsibility upon himself solely. He apprehended there would be no difficulty about that if some benevolent lawyer would give his mind to the subject. Perhaps it might be possible to entrust these repairs to some of the sanitary bodies who now took action in cases where tenements became a nuisance. If that were done, they would be in this position:—Suppose a freehold building society, with 500 members, paying one shilling a week each, that would be £25 a week, and thus every sixth week they could convey a tenement, because the tenements built by the Improved Dwellings Company averaged from £130 to £150 per tenement, some having two rooms with conveniences, and some three rooms with conveniences. The great difficulty, however, was the obtaining sites. The gentleman who first addressed them had objected to compulsory powers in this matter. He (Alderman Waterlow) did the same except under extraordinary circumstances; but when these did arise he thought the exercise of compulsory powers was called for. No man had a right to hold property which was a common

nuisance to his neighbours, or to have control of dwellings which were known to be typhus nests and fever dens. If the owner kept his property in that state it ought to be condemned by some constituted authority, and if the owner would not utilize it, let it be sold at a fair value to those who would do so. In no other way did he think many of the foul fever-dens of the metropolis could be rooted out. Then as to the suggestion that land could be got within a reasonable distance of London, on which dwellings might be erected for the labouring classes, all he could say was, his own experience proved the contrary. Within five or six miles of London they must give from £1,000 to £1,500 per acre. Mr. Walker stated that they could buy land so as to bring the ground rent to the tenant down to £35 a year. His own experience went to show it to be nearer £50 or £60 a year. He had lately taken a lease of some ground at the back of Victoria-street, and putting the largest number of buildings upon it, he was compelled to bring the ground rent of each tenement to above 1s. per week, and there was an additional 1s. 6d. per week in the shape of local rates. The trustees of the Peabody Fund, who had recently published a report of their work during the last three years, very properly adverted to the burden of local taxation as one of the greatest hindrances to the better accommodation of the working classes in London. No doubt it was so, but the discussion of that subject would employ more time than could now be given to it. He hoped Mr. Beggs would elaborate his scheme of applying the principles of freehold land and building societies to separate tenements in large blocks, and by so doing he would confer a great boon upon the working classes of the metropolis and large towns.

Mr. C. STUART BARKER remarked that his experience led him to coincide with the broad principles which had been advanced in the paper. They must be all agreed that there was no subject of greater importance at the present moment than the providing of healthy and suitable homes for the working classes, lying, as it did, at the foundation of the social and moral improvement of the people. Largely as building operations were now being carried on in and around London, the houses which were erected were beyond the requirements as well as the means of the working classes, and thus, with a rapidly-increasing population, and an extensive devastation of existing dwellings to make way for public works and improvements, there was no adequate provision made to supply the demand for other dwellings. On the subject of building societies, Mr. Barker remarked that the members of such societies consisted of two classes—the investing members and the borrowing members. The money which was advanced to the latter class might be repaid in small instalments spread over a number of years, and he did not agree with Mr. Walker in his views as to the owners of houses under such circumstances allowing them to go into a state of dilapidation; self-interest alone would prompt a contrary course. He agreed with Mr. Beggs in the conclusion at which he had arrived, that the best way of providing dwellings for the working-classes was to help them in providing for themselves. Building societies were doing a great deal in that direction, and he was happy to see they were multiplying on every hand; but those societies were circumscribed in their operations by the law. What they wanted was power to purchase land and build houses, with facilities for borrowing money at a low rate of interest. At the present time those who borrowed money from these societies paid from seven to ten per cent. for it, which went into the pockets of the investing section of the members. For his own part he saw no reason why the facilities which were afforded some years ago by the legislature for borrowing money for improvements in landed property, should not be extended to the erection of buildings in towns. That had been done in the country without any of those evils accruing which Mr. Beggs seemed to dread would follow upon government loans for this pur-

pose. His own opinion was that government loans would greatly facilitate the operations of these societies, and were calculated to do a great amount of good.

Dr. BREWER remarked that the great principle which underlies every effort to improve the condition of the people was self-reliance—that enlightened self-respect and self-conservancy which had given rise to the old maxim, that “the man who is most self-reliant is the most God-dependent creature in the universe.” Having on a recent occasion attended, with great pleasure, a *soirée* of the compositors employed in the printing-offices of Messrs. Cassell, Petter, and Galpin, and having witnessed their behaviour, and heard the sensible addresses which were made by members of that body; having afterwards visited the dwellings in Clerkenwell, where many of them were located, the impression was forced upon his mind that, with all the accumulations of wealth in this country, civilisation, in the highest sense of the term, appeared to be retrograding as regarded the home-accommodation of the working classes. There could be no doubt that a freehold title in bricks and mortar might be as readily accorded as in land, and whatever might be done in that direction upon the system advocated by Mr. Beggs, that gentleman might rest assured that it would not act to the disadvantage of any schemes which other persons might think more favourably of.

Mr. J. BAILEY DENTON begged to thank Mr. Beggs for the assistance which his paper had given to the more perfect understanding of this question. He agreed with the principle of each man becoming his own landlord, but went with Mr. Waterlow in the opinion that a man must not, necessarily, build his own house, but let him become the owner after it was erected. Let him do this gradually, and he believed he would become a better member of society, and would get just what he ought to have—viz., possession of a good house on the best terms. This would be facilitated by the use of money at a low rate of interest repayable by instalments in a certain number of years. If the privileges in that respect which were enjoyed in the case of land improvements and the building of cottages for the labouring population in the country were extended to the dwellings of the working classes in towns, he believed it would be a great boon. If 6 per cent. were paid for 30 years on the capital borrowed, the principal (with the interest) would be repaid. If the principal and interest were thus repaid in 30 years by such facilities as the legislature might give, he thought it would be an enormous boon to those who were desirous of building houses for the working classes. He wished emphatically to take exception to the observation that land could not be got in or near London at less than £1,000 per acre. He should be glad to receive an order to procure any number of acres at from £200 to £400 per acre; and if those who were philanthropists in this question would employ him, he would willingly do this gratuitously, because he loved the subject, and should be glad to assist in this good work. There was one view expressed in the paper which he specially wished to endorse; that was as to the giving compulsory powers to obtain building sites. He was also in favour of enabling powers, by means of which corporations, ecclesiastical bodies, and other incapacitated persons might be enabled to sell their land. He would go further, and say that those trades and manufactures which were so obnoxious in the metropolis ought to be expelled from it, and the spaces they occupied should be devoted to the building of dwellings for the people.

Mr. WHITE thought that there was little chance of that careless and improvident portion of the working classes to which Mr. Walker had alluded ever becoming the owners of their dwellings to any large extent. Building societies might do much, but the evil to be contended with was too gigantic for such efforts to entirely eradicate. He regarded proper dwellings as the third want of our existence, bread, water, and shelter being our three principal necessities, and the present

state of the dwellings of the poor was a stigma upon our boasted civilization and wealth. He maintained that the working man ought to be able to procure a proper dwelling at the same rate as he could obtain bread. He could now supply himself with bread for twopence a day: why should he not be able to live in a room for the same amount, viz., 1s. per week, or, if he were married, 2s. per week for two rooms? The reason why bread was cheap was that it was untaxed, and in like manner untaxed dwellings would enable the owners to reduce the rents 33 per cent.; but that could not be done under the present pressure of taxation, which was especially heavy on the poorer class. The chief suggestion which occurred to him was to untax the habitations of the poor, or if taxation was to be continued, let it be done on a system of greater equality than was the case at present.

Mr. THOS. WEBSTER, Q.C., F.R.S., said it was a very agreeable proposition to hear of untaxed houses, and they might be eloquent upon it without being able to bring it to a practical result. After all the discussion upon this subject here and elsewhere, he thought the real solution of it lay in a nutshell, viz., what was hinted at by Mr. Bailey Denton—compulsory and enabling powers. He would go to the extent of saying that compulsory powers were essential, but under proper restrictions. They knew with what jealousy compulsory powers were regarded by the legislature, and justly so, except in extreme cases, of which he thought this was one. The great desideratum was suitable dwelling accommodation for the people near their work. It did not do to talk of taking them into the country; cheap land in the suburbs and weekly railway tickets at a shilling per week were all very well in some cases, but it was essential to many of the classes of labour that suitable dwellings should be provided them near the scenes of their labour. Adam Smith and other political economists had stated that man of all others was the most difficult material to move, and he must live near the spot which was the scene of his labour. He (Mr. Webster) would point out what would take place in the metropolis if compulsory powers of a large kind were granted. A great many landlords had properties which were so many plague spots, and scarcely worth the having. They would be only too glad to combine with others in the removal of the evil if they could do so; but it might happen that there was a small amount of intermediate property which could not be dealt with except by compulsory powers. Such compulsory powers should be placed in the hands of one of the public departments, and by these means large plots of ground, now covered with buildings that were a disgrace to our age, would be cleared. By the combined efforts of ground-landlords, under private agreement, with enabling powers to those who at present could not give a title, together with compulsory powers to such an extent as was necessary in extreme cases, such plots of land might be put into the hands of individuals who had both means and inclination to provide for the working classes that accommodation on which their hearts were so much set. There was no doubt about the grievance or kind of remedy that should be adopted, nor was there any doubt that capital would be employed in this direction.

Mr. WEBSTER inquired whether Mr. Beggs was possessed of statistics from parliamentary returns, showing the percentage of building societies which had not succeeded, and the percentage of original holders who retained their property, because he could not help thinking that the great mass of the working classes, after they had provided food and clothing for those who were dependent upon them, had very little to invest in the way of possessing themselves of houses. In the *Clerkenwell News* he had seen a whole column of advertisements of appropriations in building societies for sale.

Mr. HILTON, having acted in the capacity of treasurer, trustee, and director of building societies, would say that nearly all the successful societies had been conducted by

gratuitous management with no paid officers. He believed it to be the fact that the working classes used the building societies as savings banks, and the per centage of houses bought by them was ridiculously small. The houses built by building societies were, as a rule, of the very worst construction; and to illustrate how easily a great number of these might fall into one person's hands, he might state that, within his own knowledge, 3,500 small tenements in London belonged to one man. As to the neglect of sanitary regulations, not long since the Vestry of which he was a member had occasion to issue twenty summonses against one person for offences of this kind. In such cases as these the observations of Mr. Webster applied very strongly. In all parts of London they would meet with property of that description which, in the absence of compulsory powers, would always form an effectual barrier to all attempted improvements. It was within his own knowledge that large areas of property belonging to the Ecclesiastical Commissioners at the east end of London were in a most disgraceful condition; and it would appear that there were several noblemen who had properties in the metropolis about which they were so careless and indifferent that they were sub-let in all sorts of ways, and became the most desperate fever-spots in the metropolis.

The CHAIRMAN, in inviting the meeting to thank Mr. Beggs for his very able paper, which had elicited a discussion of considerable interest, would state one or two grounds on which he differed from several of the speakers, the first being on the question of freehold land societies, as applied to London. That which was applicable to the country districts was not applicable to London. They could not afford the space for each man to build his own separate house; they could not afford to pay the ground-rents which fell upon that house. They must, therefore, look to some other system by which they could cover plots of land with a large number of rooms under one roof and in one building, which, under improved legislation, might be held by working men as separate and distinct tenements. Then came the question already adverted to by Mr. Alderman Waterlow—How were they to keep the whole of that building in repair as regarded the roof, staircases, and foundations? Under a carefully-drawn agreement a certain charge might be placed on each tenement to cover such dilapidations, and such rules might be enforced as that if a tenant allowed his portion to get out of repair he might be subject to a penalty. That would overcome the difficulty with regard to that class of houses. He agreed that it was only by enabling and compulsory powers that they could succeed in obtaining sites for these purposes. He had no doubt money and land were to be had in plenty if the way were fairly opened to their employment. To this end compulsory powers were in some cases absolutely necessary. They did not ask for powers to take property without assigning any other reason than that labourers' dwellings were required to be built upon it, but they did call for compulsory powers with regard to those localities which were reported to the boards of health as being of a pestilential character, and detrimental to the public health, which were not only pernicious to the immediate neighbourhood, but tended to increase the death-rates of the whole metropolis. It was known that at the present time plague-spots existed which were irremediable by any means short of an entire sweeping away of the buildings upon them. He would only ask for compulsory powers in such cases as those. Having got those powers, let capital be employed upon buildings which would give a fair return upon the money invested. There was reason to believe that capital employed in this manner would now be more remunerative than was the case a few years back. He appealed to Mr. Waterlow whether such investments did not realize from 6 to 8 per cent.; and if that return could be made upon the capital, how much more would be obtained if half the amount were advanced by the government at a low

rate of interest? It had been argued by some persons that if they borrowed money from the government, there ought to be a limit to the rate of profit to the owner. From that view he entirely dissented. The object should be to afford such a return to those who supplied the first capital as would not merely induce them to erect a few buildings, but to provide habitations for hundreds and thousands. The thing could not be done in a small way. They must create some great organization or corporation which would go into it boldly, and which by its character would have some influence with the government, and induce them to give their assistance. There was one point on which he thought some misapprehension existed. They had heard a good deal about the destruction of houses for the purposes of railways. He confessed he did not regard that in so serious a light as some persons appeared to do, for by the last returns of inhabited houses the increase had been greater than the increase of the population; but, at the same time, the houses were not of the kind wanted, nor were they in the proper situations. They were getting farther from the great centres of employment. They wanted dwellings of the right kind in positions suitable for the working men who were to inhabit them. If a working man had to walk two or three miles to and from the scene of his labour, (this was in itself a great loss to his employer, and the value of his work was depreciated. Independently of the question of health, the employer was interested in having his workmen located near the site of their employment. At the present time houses were being built at a rate which was never known before. The metropolis was extending in a marvellous way. Still with all this increase of accommodation we were lamentably deficient in proper dwellings for the class who were at the base of all the prosperity of the country.

The vote of thanks was then passed and acknowledged.

### THE CATTLE PLAGUE IN THE LAST CENTURY.

The following is a reprint of the article\* on this subject referred to in the chairman's address at the opening of this session:—

(Concluded from Page 171.)

There seems to be a very material error in the regulation ordained in the late acts respecting the prevention of the removal of such cattle as may possibly have been exposed to be infected by the murrain, or to contract contagious matter on their skins from being near other beasts seized with the disease, which error may be productive of great inconveniences if the regulations be duly observed, or raise motives in those whom it concerns for not paying due obedience to the ordinance. This is the too great length of time required when the infection is supposed to be in the neighbourhood, for the purchasers of cattle to keep them before they sell them again. Forty days is the time prescribed, and when all the facts from which the determination of the proper period must be deduced are duly weighed, it will appear to be at least two-thirds longer than is necessary. The only reason that can be assigned for the expedience of a restriction as to the time of selling cattle in these cases is, that the seller may be able to give such a certificate to the buyer as affords the best assurance possible that the beast has not taken the infection, nor is likely to convey the contagion by any infectious matter adhering to its skin, though not affecting itself from any diseased beasts it may have approached to others which may come

\* The paper is entitled "Observations on the Murrain or Pestilential Disease of Neat Cattle: the Means of Preventing the Infection, and the Medicinal Treatment of the Beasts when seized with it," and is by Mr. Robert Dossie. It is extracted from his "Memoirs of Agriculture," Vol. ii., 1771.—Ed. J.S.A.

near it. This period of forty days is allotted because such a certificate could not be made by the owner unless the beast had been long enough in his possession to show it had not been infected before it came into his hands, and to afford time for the infectious matter, if any had been contracted by its skin, to have lost its virtue or been worn off, and because it was presumed a less space of time would not have been fully sufficient for this effect. As to what respects the having actually received infection, forty days possession is much longer than is needful to manifest whether or no such infection was taken by the beast before he came into the seller's hands, since the symptoms would have shown themselves, and the beast would have died of or recovered from the disease long before half that time was expired.\* As to what respects the contagious matter that may be contracted by the skin of the beast from others infected, the time in which such matter may lose its contagious power, or the skin becoming free from it, cannot possibly be ascertained, and there is reason to believe it might go much beyond forty days, but there are easy means to be employed of taking away the hazard of conveying the disease to other beasts in that way, with far greater certainty than can result from the waiting even a much longer space than forty days without the use of such means.

The time in which the symptoms appear to come on in the murrain after the taking the infection is, as we have above observed, almost generally on or before the fifth day.† But as there may be, though rarely, a variation that requires some latitude we may rate the longest time to be the seventh day. In a very few beasts, however, which have the disease in the most mild and gentle manner, we may also allow time for the ag-

\* It appears, from the experiments made at Utrecht in 1769, as above-mentioned, and from others of the inoculation of cattle for the murrain, that the longest period in the case of beasts so treated betwixt their receiving the infection and their death was not more than fourteen days. The observations on the same period, with relation to such beasts as have taken the disease from others without inoculation where it could be ascertained by the known time of their coming within the reach of the infection, show the longest extent of it in such cases to be about seventeen days. But this must be understood to be according to the course of the disease in Holland. For in our country the death of the beasts taking the disease naturally was found to happen almost always within twelve or thirteen days after the infection, the crisis or turn of it, as we remarked before, being about four or five days earlier here than in the United Provinces. It must be comprehended, also, that this period of death regards beasts which are carried off by the murrain, considered as an acute disease, for where they die, after their recovery from the proper symptoms of the distemper, of ulcers or abscesses in the viscera produced by it, no regular period can be fixed on, as those accidents or their consequences differ in every subject where they happen.

† There is a remarkable uniformity in the operation of the contagion of the murrain as to the time it produces sensible effects when communicated by exterior infection. In the above-mentioned experiment made at Utrecht twelve cows were put to six others that were inoculated, and kept with them in a confined place from the time of inoculation. The twelve were all seized with a cough and gnashing of their teeth the seventh day after the inoculation of the six, and did not exhibit the least difference in the period of their being affected by the infection, which may be concluded to have been taken five days before, as at that time, though it was but the second day after the operation, febrile symptoms began to appear in some of those inoculated, one of which, indeed, was so weak on the third day that she fell down, and had not strength to rise again. The same uniformity is not in the least found in the inoculated beasts, but in most of them the symptoms come on with much more celerity and violence than in those which have the disease by casual infection. Many other facts confirm this observation of the almost constant equality of time in which the visible effects are produced in the cattle which have the murrain by natural means, and they leave us no room to suspect the infection ever lurks after it is taken without revealing itself more than six or seven days, even where its action is the weakest.

gravation of the symptoms, till they become strong enough to be so clearly perceptible as to leave no room for doubt, and suppose in those instances they may not be very observable till the tenth day. But this is the utmost concession as to the extension of the time in which the infection can lie concealed without sensible effects, that facts will admit us to make, and if no appearances of the disease be found at or before that period it may be very safely concluded the beast had not taken the infection before the commencement of such time. If, nevertheless, we should go somewhat further to satisfy all scruples as to the inaccuracy of these observations, and stretch our caution to the utmost that can be deemed reasonable, the keeping the beasts twelve days after they are purchased is fully sufficient to determine with the most positive certainty that they were not infected before such purchase. There cannot be the least reason, therefore, to keep the beasts longer than twelve days before they are sold in order to avoid the hazard of their having received the infection before they came into the hands of the owner.

The other more specious reason for restraining the sale of cattle during so long a period has not, at the bottom, a more solid foundation in the reality of facts than the preceding. No precise limits can be assigned to the time that beasts, having the infectious matter of the murrain lodged on their skins in consequence of having come near beasts seized with disease, may communicate it by that means to others.

The contagious matter will preserve its infecting quality for a long space of time, as we have reason to conclude, as well from facts respecting the transmission of it into distant countries, and some experiments regarding inoculation with it, as from its analogy to the variolous matter of the small-pox, which retains its virulent power for many months. There is room to conclude that the contagion of the murrain has been conveyed by the raw hides of beasts, in particular, to places where it has taken effect at a considerable space of time after its production; and if it can be so preserved in the skins of dead beasts, why not in the hair of those which are living? It must be granted, indeed, that in the skins of the living it is more exposed to be accidentally carried off than in those of the dead; but there is no certainty, nevertheless, that it will be entirely cleansed away thus under a long time. Even forty days, therefore, do not give a security against the danger of a conveyance of the infection that way, where beasts are removed from the diseased cattle to the sound. I am aware, it will be advanced, in contradiction to this, that the skin of a living beast being exposed to the air, the contagion will be dissipated in the forty days, and not preserved, as in the parts of the hides of dead beasts, to which the air may not have had a like access. But I deny the truth of the principle on which this conclusion depends. It has, I grant, been a prevailing notion, borrowed from ancient writers, and delivered down by those of succeeding times without any examination of the relative facts, that the contagion of the febrile diseases resided in volatile effluvia, which exhaled in the air, and flew off in a short time from bodies that had received them. There is not, however, in reality a greater error subsisting than this established notion. Many experiments on the variolous matter have evinced the contrary by showing that it will keep its virtue, and serve for the purposes of inoculation, for a great length of time, though exposed to the air, provided it be defended from excessive cold, and such moisture as would render it mouldy. A less extensive field of observation, but sufficient to verify the principle, confirms to us that the analogy holds good as to this point, on the contagious matter of the murrain, and others of a similar nature. If, therefore, the virulent matter will not with certainty be taken off by accidental means from the skins of beasts, nor lose its infecting power by exposure to the air under a long time, the preventing for forty days the communications of cattle whose skins may have some

share of it on them, with any others, is not a full security against their conveying the infection, if afterwards they be suffered to mix with the sound. The establishment of this species of quarantine or prohibition of removal for forty days is consequently insufficient to the end in that view. But, besides the uncertainty of its effects, and the great inconveniences to particulars it may produce, it is less proper and expedient in this intention, because there is another method by which the same end may be answered in a much more easy and effectual manner. The method I mean is the cleansing the beasts by artificial means, which should always be practised where there is the least danger of their transmitting the contagion from those infected to the sound without having taken the disease themselves. This may be commodiously and efficaciously performed by scouring the skins of the suspected beasts by a proper brush with fine sand and water, and afterwards thoroughly washing off the remainder of what may adhere by water and a mop. By these means the skin of any beast will be more perfectly freed from infectious matter that was lodged in it than by the accidental wearing off in a very long space of time; and if it be duly executed there can be no reason to put the sale of cattle under any restriction on this score. The practice of it should, however, be strictly enjoined by authority, if the time of restriction of sale be reduced as proposed, and the performance of it should be also made a part of the matter of certification.

As twelve days appear, from the above-given reasons, to be fully sufficient to show that beasts have not received the infection before, and as the keeping them much longer is not so effectual a means of taking away the hazard of their transmitting the disease by contagious matter adhering to their skin as artificial cleansing, the term of forty days' restriction from sale ought most evidently to be changed to that of twelve days, which saves more than two-thirds of the time. This shortening the term will be found a matter of very great moment, if ever the occasion for such a restriction shall again offer. The great inconveniences and embarrassments that would attend the obligation to keep cattle, however detrimentally to the owner, for so long a time as forty days, would, if it were largely extended, besides the injuring individuals, conduce, along with the other necessary regulations respecting the removal of cattle, to the causing a scarcity of them in the London markets, and others which are supplied from distant places. But, what is of still greater consequence, the loss and trouble that would result from it to individuals in some cases would furnish such motives for a non-compliance with the injunction as would in all probability defeat the intention of it. It therefore highly merits the consideration of those on whom the direction of this matter depends to weigh well the premises, for a few failures of obedience to the orders of council respecting this restriction may render them wholly ineffectual.\* There

\* It may be speciously said that in a case of so much moment as the prevention of the murrain, the interest of particulars must give way to the good of the public, that it is best to err on the safe side by taking a full scope of time, which has been deemed forty days, to render the matter entirely clear, and that if the cleansing be a further security it should be added to the restriction of sale for that term. This way of reasoning must be allowed to be right as to the general principles, and ought to be adopted where the facts give just occasion for it, but it fails in that point to be applicable to the present case. The extending the length of time of the restriction so much as forty days does not render the effect of the prohibition more certain, but evidently the contrary. It is shown above that if the cleansing be put in practice along with it twelve days will be as effectual as forty, and there is a great probability, when the time is not required to be longer, it may be complied with, there being few cases where it would then be considerably detrimental to the owners of the cattle. Whereas there is the strongest reason to apprehend the longer term would not be generally complied with, and therefore the ordaining it must counteract its own purpose, as the security proposed from it wholly depends on a general conformity to it.

is no maxim more true than that a law of this kind should be void of everything strongly repugnant to its own operations, or it will prove a dead letter.

To evince more forcibly the extreme great consequence of guarding against the introduction of the murrain into our country, I will here subjoin an account of its late effects in the United Provinces, whence the deplorable havoc it makes there will appear in the most striking manner. The source of the information respecting the facts I shall advance is the registered lists\* of the cattle in the south and north divisions of Holland, which I shall incorporate, and these provinces taken together are nearly equal to one-half of the whole United Provinces. In order to give this account in the most clear manner consistent with brevity, I will enumerate all the particulars of the state of the cattle for the nine months preceding the 1st of July last, because they are completely exhibited in the registers during that term. To this I will annex the total numbers of those that died and recovered in one year, commencing the 1st of April, 1769, and also the number which died and recovered in each of the three succeeding months, as this latter detail leads to some as well curious as useful conclusions:—

Persons keeping cattle in South Holland and North Holland during the term of nine months, commencing the 1st of October, 1769 .....	17,379
Cattle in the possession of these persons during that term .....	224,999
" infected with the murrain .....	141,273
" died of the murrain .....	98,995
" recovered after taken the infection† ....	39,613
" escaped the infection.....	77,850

When obedience to any matter ordained is enforced by a penalty such penalty will ever fail of its full effect when the gain accruing from disobedience is more than equivalent to the risk of the forfeiture, as we daily see in the great multiplicity of contraband trade. But this principle must hold good still more strongly here where numbers of persons are unavoidably subject to loss without a disobedience than were, as in the case of smuggling, the occasion of it arises only from a voluntary pursuit of profit. The obliging people to keep their cattle so long as forty days when the injunction suddenly and unexpectedly takes place in cases when they are not provided with fodder to maintain them, nor possibly may be able to procure it without the most distressful difficulties, or where they may lie under a necessity of selling the beasts to raise money they instantly want, will of course create temptations to risk the penalty that can scarcely be withstood by the weaker part of those who may lie under these circumstances. Whence it is both against reason and observation to form expectations of a general conformity to such an injunction. But if the chance of the loss and inconvenience that may casually attend the keeping the cattle be almost wholly taken away by reducing the forty to only twelve days, the motives will be proportionably removed for running the hazard of incurring the forfeiture by a non-compliance with what is required, and there is just ground to hope that the regulation would be then fully effectual.

\* The copies of these lists did not come to my hands till after most of the foregoing part of this dissertation was printed, otherwise I should have made use of the contents of them in support of several matters I have advanced there, which the inferences to be drawn from them greatly tend to confirm.

† It may be inferred from this account that considerably more than half of all the cattle in the United Provinces took the infection of the murrain in nine months, and that almost two-thirds of those which were infected died. The number, both of those which caught the disease and of those which were carried off by it, is proportionably far greater than was found here, while the disease raged most, and even than has been usually known in Holland, at least one-half of the infected having generally recovered. This evinces the present excess of power in the predominate cause, or disposition of the cattle to be affected, and verifies by glaring facts what I ventured to assert relating to it, from theoretic reasons, in the foregoing part of this dissertation, which was printed some months ago, before I had any particular information respecting these facts, and, indeed, before the report of them could be made and registered.



Cattle died of other diseases and casualties . . .	6,488
„ remained ill of the murrain at the end of the term . . . . .	2,053
Cattle infected in the term of a year commencing the 1st of April, 1769 . . . . .	
„ died of the disease during that term . . .	210,819
„ recovered in that term . . . . .	159,128
„ recovered in that term . . . . .	61,691
„ infected in the summer season of that term, commencing the 1st of April and terminating the 30th of September, 1769 . . . . .	86,423
„ died in the summer season . . . . .	63,281
„ recovered in the summer season . . . . .	32,142
„ infected in the winter season ;* commencing the 1st of October, 1769, and terminating the 30th of April, 1770 . . . . .	134,696
„ Died in the winter season . . . . .	95,947
„ Recovered in the winter season . . . . .	38,749
„ Infected in the term of three months preceding July, 1770.† . . . . .	3,912

Cattle Died in that term . . . . .	3,048
„ Recovered in that term . . . . .	864
„ Died in April of that term . . . . .	1,254
„ Died in May . . . . .	1,325
„ Died in June . . . . .	469
„ Recovered in April of that term . . . . .	452
„ Recovered in May . . . . .	303
„ Recovered in June . . . . .	109

\* The number of cattle infected in the winter is, in this account, above two-fifths more than in the summer. The reverse of which appears with respect to the plague in the eastern countries, where the contagion of it, for the most part, ceases, or at least greatly abates in that season. But the principle whence this seemingly great variation arises does not, nevertheless, lie in the nature of the diseases, nor even in that of the predominate cause of infection in the subjects, which is in fact the same in both, but in the local difference of circumstances with respect to the production of that cause. It is the weakness of the subject in both cases that constitutes the susceptibility of infection, and that weakness is induced in different seasons from each other by a diversity in the climate and other circumstances attending the places in which the respective disorders, as here compared, prevail. In those eastern countries where the excess of temperature lies in the heat of the summer, mankind, the subject of the plague, are in a too relaxed state, and the juices so putrescent in many individuals as to render them much weaker than in the winter, which is there mild and salutary. In the United Provinces, on the contrary, the excess is in the cold of winter, which, being attended with great moisture in the air, makes the cattle the subject of the murrain much weaker than in summer, to which the housing them, as is there practised from necessity during that season, much contributes. The increased violence of it in winter and remission in summer did not subsist here while the disease prevailed in our country in any proportion to what it now does in Holland, the less damp state of the air, and the keeping the cattle more out in the fields, having prevented them from being weakened by the inclemency of the winter as there. On the contrary, this was so far from being the case, that Dr. Legard says, "This disease being a contagion of the pestilential kind, is susceptible at all times and seasons. In autumn and summer it will rage most, in spring and winter least, according to the alterations commonly happening in those seasons." He carried it much too far, as is evident by the facts here exhibited, in saying generally the disease will rage most in summer and least in winter, but he spoke from theory only. For supposing, as he intimates, the murrain to be analogous to the plague, he concludes the same effects would always attend the contagion of both without considering the predisponent cause on which the operation of it depends may vary in different places. A more close inquiry perhaps into the course of the distemper here would have prevented this error. The whole, however, concurs to demonstrate there is no intrinsic difference in this point betwixt the contagion of the plague and that of the murrain, but that the variation of the effect of them depends on the variation of circumstances respecting the predisponent cause in different places.

† The number of cattle infected in these three months is only in the proportion of about an eighteenth-part of those in the winter season, and yet of them near four-fifths died. These beasts may, therefore, be presumed to be such as laboured under some constitutional or other peculiar cause of weakness, from which the favourable temperature of the weather could not free them. In June the number infected was not one-sixth part of that of either of the two preceding months, nor consequently in the proportion of so much as one-hundredth part of those of the winter season, the number which died were, nevertheless, still more in proportion than in two preceding

It appears from the finance accounts that the province of Holland, if the two divisions of North and South, from the separate lists of which this account is formed, be taken together, may, as was before intimated, be considered as one half of the Seven United Provinces, at least with respect to the cattle. So that if we admit the supposition, for which there is good ground, that the ravage made by the murrain was nearly the same in the other six provinces as in that, we may conclude that the loss of cattle destroyed by it in the whole was not less, in one year commencing April 1st, 1769, and ending March 31st, 1770, than three hundred and eighteen thousand beasts. And there is little room to hope from appearances that the disease will be less violent this year than it was the last.

If we reflect that this immense loss is, in some degree, annual at present in the United Provinces, we cannot but deem the being afflicted with the murrain a most deplorable calamity, and this uncommonly strong prevalence of the contagion there ought to be equally an object of our dread as of our compassion. It shows a very great predisposition in the cattle to be affected by this disease, and that predisposition is owing to causes which, from their very nature, are extended over all the neighbouring countries in some proportion, as is further manifested by the actual progress the contagion is now making in parts where there is no epidemic or local cause in the cattle of the susceptibility of the infection. We see, by his Majesty's late proclamation, that it has passed into Flanders, and is now spreading thence to the adjacent countries of France,\* where there are no unfavourable circumstances, as in the United Provinces, for the beasts to be more particularly subject to the disease, unless, in common with those of the neighbouring countries, from the accidental influence of bad seasons. This cause subsists alike with us, and we are equally exposed to all the mischievous consequences of the contagion if it be introduced into our island, which, without the greatest care in the exercise of due preventive means, is extremely liable to

months. This evinces that the heat of the weather, though favourable to the beasts in health as to preserving them from infection, was injurious to those whose weakness made them take it, which may be easily accounted for from the greater tendency that the animal fluids have to putrify in hot seasons. Whence it may be inferred that it is not a greater disposition in the humours to putrify independent of weakness, which causes the susceptibility of infection, but weakness only; and that, therefore, unless the degree of this disposition be such as induces weakness, it does not contribute to the reception of the contagion though to its stronger operation when received. This confirms what I have above advanced, that putrescence has not primarily any concern in the cause of the murrain, but in the consequences of it, as being either before subsisting or produced by the operation of the infection, it aggravates the fatal effects as a secondary cause.

\* This rapid progress of the contagion, and extending of its effects into places where it spontaneously extinguished a considerable number of years ago, and has never before revived since, is, together with the great epidemic prevalence of the disease in Holland, displayed in the above-given account, a strong confirmation of the truth of the principles, whence I formed a judgment *a priori* of the present susceptibility of the infection in the cattle throughout all these parts of Europe. As my prediction relating to the consequences of it, given in the foregoing part of this dissertation, is verified by these facts, which have happened since the printing it, the certainty of those principles ought to excite the greatest apprehension of our danger from them, and the most powerful motives for our very earnest attention and care to guard against this menacing evil.

happen from the proximity of the place where the infection now prevails, conspiring with the susceptibility of it that attends the cattle at this period. It therefore highly behoves every individual to exert his utmost endeavours, according to his situation, to avert this impending danger of one of the most heavy calamities that can befall any European country, and more especially our own, where the luxurious habits of the common people, the difficulty of obtaining a supply of cattle from other places, and the high prices of the necessaries of life, would render the effects of a scarcity of horned beasts, and consequently all other provisions, peculiarly grievous and intolerable.

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### Manufactures.

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**NITROGLYCERINE FOR BLASTING.**—The *Berg-und Hüttenmännische Zeitung* states that among other disadvantages of Nobel's nitroglycerine is the fact that it freezes at a temperature very probably above 92° Fahr. It is said that even at a temperature of 43°—46° Fahr. the oil solidifies to an icy mass, which mere friction will cause to explode. It is probable, however, that the freezing point of the oil lies somewhat lower than is here stated, though as yet no exact determination of the freezing point of the oil has been made. A newspaper from Hirschberg, in Silesia, gives a sad account of an accident caused by the frozen oil exploding by friction. Nitroglycerine is there being used in making a railway tunnel. It was kept in glass vessels, packed in straw and placed in baskets, each vessel containing one-fourth to one-eighth of a hundredweight of the oil. For several days the oil had been frozen. It was carefully handled, and pieces were separated by means of a piece of wood and put into the bore-holes, and it was found that the frozen nitroglycerine exploded quite as well as the fluid. One day an overseer at the shaft hit upon the unlucky idea of breaking into pieces with a pick a seven or eight pound lump of the frozen nitroglycerine. The blow caused the mass to explode, and the unfortunate man was blown up into the air, and fell back into the shaft, some forty or fifty feet deep, whilst two workmen who were making cartridges a short distance from him luckily escaped with slight injuries.

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### Publications Issued.

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**THE HOMES OF THE WORKING CLASSES: SUGGESTIONS FOR THEIR IMPROVEMENT.** By James Hole, HONORARY Secretary to the Yorkshire Union of Mechanics' Institutes; Author of "The History of Mechanics' Institutes"; "On the State of Education in Leeds," &c. (*Longmans*.)—This work is published under the sanction of the Society of Arts, who, in 1853, awarded to the author the Society's Medal and the Premium of £50 offered for the best Essay on the History and Management of Literary, Scientific, and Mechanics' Institutes. The present work is dedicated to Edward Akroyd, Esq., M.P. It will be remembered, that in the year 1864, the Society of Arts held a conference on the subject of the "Dwellings of the Working Classes," to which representatives of the Institutes in Union with it were invited. The committee of the Leeds Mechanics' Institution, feeling the importance of the question, decided to aid the discussions by the experience of their own town. The Mayor of Leeds (J. D. Luccock, Esq.), as President, offered a prize (ultimately awarded to the author) for an essay on this subject. This essay was publicly read in January, 1865, and its publication in the local newspapers at the time directed public attention to the sanitary condition of a large portion of the dwellings of the working classes, and to the moral evils

connected therewith. Since then the scope of the essay has been enlarged, so as to form the present book. The facts relating specially to Leeds have been transferred to the Appendix, and the experiences of other towns have been given. The experience of the writer, as director of a large building society, and as a member of the Leeds Model Cottage Association, has given him some insight into the various difficulties with which this topic is surrounded. The work treats of the principal causes of the bad state of the dwellings of the poor, and gives the proper conditions for rendering their dwellings healthy; it speaks of the undue mortality of the poor, and the pecuniary loss thus caused to the community, and touches upon the various moral evils caused by the present state of things; the neglect by local authorities, and the means of preventing this; the evils caused by the smoke nuisance and by the building of houses back to back, as well as other questions of a similar character, are treated of, and the author then proceeds to give descriptions (illustrated by capably drawn plans and elevations) of many of the principal model dwellings that have been erected or recommended. The advantages of building societies; the means of removing impediments to the acquisition of building sites; and the influence of small freeholds, are among the subjects treated of in this work, which will doubtless be read with interest by those, now becoming a numerous class, who feel that this subject is one of the great questions of the day, and who are anxious to apply some really efficient and effectual remedy for the present state of things.

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### Forthcoming Publications.

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**A DESCRIPTIVE TREATISE ON MATHEMATICAL DRAWING INSTRUMENTS,** their construction, uses, qualities, selection, preservation, and suggestions for improvement, with hints upon drawing, colouring, and drawing material, by *Wm. F. Stanley*, 5, Great Turnstile, will be published in March, price 5s. The above work will contain a description of all the drawing instruments in general use, also the best instruments to be employed for producing every description of geometrical form, as the ellipse, helix, parabola, conchoid, arcs of high radii, geometrical ornaments, &c., with many important and popular instruments, of which an adequate description has never appeared in print, as the edigraph, centrolinead, computing scale, geometrical pen, &c. It is to be illustrated by over two hundred engravings, especially prepared.

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### Notes.

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**LIGHTING THE BRITISH MUSEUM AT NIGHT.**—"A Gasman," writing to the *Times*, says:—"There could hardly be a building more unsuitable for being generally lighted at night than the British Museum; but this admission certainly does not apply to the reading-room, which could be easily and safely lighted from the outside; and when it was first proposed for construction I heard a very high authority advocate its building, and its very mode of building of iron and brick, on the very ground that it could be lighted for evening use without the slightest risk. The light would be from a top lantern outside. Then there are proper precautions for cutting the reading-room off from all the rest of the building; and I feel satisfied that Mr. Panizzi, had he remained in office, would have advocated its being lighted. Readers would have to be satisfied with books deposited or brought specially into the reading-room during the day. And what a boon it would be to students of all classes!"

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## Correspondence.

THE SYSTEM AT SOUTH KENSINGTON MUSEUM.—SIR,—The lateness of the discussion on the 24th ult. prevented me from replying to my excellent friend, Mr. Chester, who said, "If Mr. Cole were succeeded by an obstructive system would not be found the best in the world." No doubt an obstructive may damage any system; but if there be one system which is better than another it is that which makes clear who the obstructive is, and that he is an obstructive: and the system at South Kensington does this, because in it the responsibility is clear and well defined. Parliament has a responsible minister who can be made to answer for his subordinate, and if this subordinate be an obstructive Parliament can insist upon his removal. The system of "single-seated responsibility," as Bentham called it, is the only one which affords a quick means of remedy. If Parliament does not complain, and the public do, then it is the work of the public to make Parliament listen and act. The master in Russia thrashes his coachman when he wants him to get on, and the coachman flogs the horse, and thus the machine moves forward. So at South Kensington. Parliament can thrash the responsible coachman, and the coachman can flog the secretarial steed; but all this is unattainable under any board or other system of that character.—I am, &c., HENRY COLLE.

MUSEUMS AND PUBLIC GALLERIES.—SIR,—Permit me to contrast the statement that "Professor Owen had proposed a museum which would cover ten acres (that was what he stated before the House of Commons)"—(*Journal of the Society of Arts*, No. 688, p. 166), with the following facts:—In the "Parliamentary Return," 11th March, 1859, a "plan" is appended, which "I desired to be understood as designed merely to convey to the eye the relations of the assigned galleries to the several departments and classes of natural history," in order "to illustrate a calculation of the proportionate space which should be allotted to each department and class in a national collection, with a view to probable additions to the present collection for thirty years to come."—(p. 22.) In the "Parliamentary Report on the British Museum" of 10th August, 1860, "Minutes of Evidence" (p. 42), I am asked:—"Q. 538. How much space altogether does this plan of 1859 require?—A. If the mode of architecture involved two stories, it would require, in respect of exhibition of specimens, five acres." The same amount of space is testified to in my replies to questions 555, 572, 590, 596, and finally to 647,—(By the Chairman.) "You want five acres for your own department, but as I understand?—A. Yes." But then I stated that I wanted this amount of space, not for a "five-acre museum," but for ground on which future extensions to the "two-and-half-acre museum required for present collections" might be made. In reply to question 553, I state explicitly, "I do not contemplate the immediate carrying out of such plan. I suppose that if we were to proceed increasing our collections at the ratio at which they have been increasing for the last ten years, in thirty years from the present time such a building as this would, upon that basis, certainly be required." The "Plans and Sections of a Museum of Natural History," ordered by the House of Commons to be printed in the "Return" of the 25th June, 1863; the "premiated designs" for a museum of natural history, by the late lamented Capt. Fowke, R.E.; and the "plan" by Prof. Kerr, adjudged the second in degree of merit, severally meet the doubts entertained by the late Mr. Fuller, M.P., as to acquiring the requisite exhibiting space in a building of two stories, "ultimately extending over five acres."—(Questions 729-733.) This forecast of space relates to the view criticised (*Journal of the Society of Arts*, p. 160) by Lord H. G. Lennox, M.P., of the main end of a national museum of natural history, as given in the reply to Q. 632:—"Do you think that the object of the British Museum is to provide people with

amusement or with instruction?—A. With both, secondary to the main end of a national collection, viz., to exhibit series of created works;" and, in replying to a similar question (No. 524), "to give such a view of the works of creation as might be reasonably expected in the museum of a great nation." Doubtless, to "amuse," a selection of specimens remarkable for colour, shape, or size, would suffice; and, to "instruct," a selection of specimens, illustrative of the elements of natural history, as the science exists, would also suffice. For either of these purposes Parliament need not be called upon to provide such accommodation as I have estimated for and recommended. A famous Englishman, who wrote a book "On the Advancement of Learning," complained that the ways and means thereof had been, up to that time, exclusively for "amusement" and "teaching," not for "augmentation of science;" and he gives rules for the latter object, from which the world has derived some profit. In regard to natural history, Bacon notes as needful and deficient in his day a national museum of the kind, viz., "of all sorts of beasts and birds, not only for view and rareness, but likewise for dissections and trials" ("New Atlantis," quoted in my address to the British Association, 1858); and for the aim which, to the bewilderment of some minds, I have testified to be the chief. For to add to old truths that most precious of all acquisitions, new truths, it is essential to the cultivators of the various branches of natural history to have at command as complete a series of natural history objects as can be acquired; and such completeness can only be had or expected in the museum of a nation. For the full development of the idea, I must refer (not to trespass unduly on your pages) to my "Discourse on the Extent and Aims of a National Museum of Natural History," 8vo., 1862. Why, after such repeated and explicit published statements of my views, I should continue to be misrepresented, I know not. To gain a verdict an advocate may make a telling point, as by masking the truth behind the cry, "a ten-acre museum;" but this is not business-like, and the question at issue merits other treatment.—I am, &c., RICHARD OWEN.  
January 30th, 1866.

TRADE MARKS.—SIR,—I have read with much interest Mr. Henry's sensible letter on the subject of the law of trade marks, and certainly the necessity for further legislation on that subject, in the direction of the establishment of a registration system, and the enforcement of rights as to registered trade marks—by some means less transcendently moral and "draconic," as he aptly terms it, than the Merchandise Marks Act (1862) has provided for trade marks without registration—are subjects that all who bestow any thought upon the matter will readily recognise as of great importance. Having been called upon to deal with the practical application of the Act referred to, I have found that its very character, as a highly penal and strictly criminal piece of legislation, is, in reality, an objection to its general adoption; for, except in such cases as those in which, from long-continued usage, a man's right to a particular trade mark as his peculiar means of denoting articles of his manufacture or in which he trades, is clearly established—it is open to serious discussion as to whether such particular mark is so well defined and distinctively appropriated to him that another man, who may adopt a mere imitation of it, can be shown, with that undoubted certainty required, and very properly required, by our criminal law, to have wilfully invaded some right specifically vested in some known individual, so as to place a person complained against in the same category as a criminal wrongdoer only one remove from an ordinary forger. The Court of Chancery, it is true, can and does afford the means of remedying improper invasions of trade marks without regard to proof of any criminality in the invading parties, but I apprehend that the expense of a Chancery suit must always be a great drawback to the utility of this kind of remedy. If all trade marks were registered,

and every one unlawfully using a registered trade mark after notice were subjected to a fine of moderate amount, and to the confiscation of the dies and means of producing marks unlawfully, at the requirement of the parties registered as exclusive possessors or adopters of the marks, and without entering upon any question of criminal intent—a simple and effectual means of preventing the piracy of merchandise marks would be available for the protection of manufacturers and traders—it being understood that the Merchandise Marks Act, 1862, and the Court of Chancery should still be open, where needful, after due registration of the mark.—I am, &c.,  
F. W. CAMPBELL.

Temple, January, 1866.

### MEETINGS FOR THE ENSUING WEEK.

- MON.....Society of Arts, 8. Cantor Lectures. Mr. Fleeming Jenkin, F.R.S., "On Submarine Telegraphy." (Lecture II.)  
Entomological, 7.  
Medical, 8.  
R. United Service Inst., 8½. Mr. W. Saunders, "Gunpowder, and Gale's plan for rendering it inexplosive."  
Farmers' Club, 5½. Discussion on "British tillage, present and future."  
Society of Engineers, 7.  
Odontological Society, 8.  
Royal Inst., 2. General monthly meeting.  
TUES.... Civil Engineers, 8. 1. Discussion on "The Craigellachie Viaduct." 2. "The Grand River Viaduct, Mauritius Railways."  
Pathological, 8.  
Anthropological, 8.  
Royal Inst., 3. Professor Tyndall, "On Heat."  
Geologists' Assoc., 7.  
WED.....Society of Arts, 8. Renewed discussion on Mr. Hawes' paper "On the Proposal that the Railways should be purchased by Government."  
Geological, 8. 1. Mr. W. T. Locke Travers, "On the Mode of Formation of the Lake-basins of New Zealand." 2. Mr. Robert Dawson, "On the Occurrence of Dead Littoral Shells in the bed of the German Ocean." 3. Mr. T. F. Jamieson, "On the Glacial Phenomena of Caithness."  
Pharmaceutical, 8.  
R. Society of Literature, 4½.  
Archaeological Assoc., 8½.  
THURS..Royal, 8½.  
Antiquaries, 8½.  
Royal Society Club, 6.  
Royal Inst., 3. Prof. Tyndall, "On Heat."  
FRI.....Astronomical, 3. Annual meeting.  
Royal Inst., 8. Mr. Archibald Smith, F.R.S., "On the deviation of the compass in iron ships."  
SAT.....R. Botanic, 3½.  
Royal Inst., 3. Prof. Westmacott, R.A., F.R.S., "On Art Education."

## Patents.

From Commissioners of Patents Journal, January 26th.

### GRANTS OF PROVISIONAL PROTECTION.

- Breech-loading fire-arms, &c., cartridges for—137—E. M. Boxer.  
Bridges—47—W. Clark.  
Copper and nickel ores, treatment of—86—G. Chetwynd.  
Fabrics, looped or knitted—111—W. Comery and H. Webster.  
Felt hats—147—W. C. Mann.  
Fibres and tissues, bleaching—84—R. A. Brooman.  
Fire bricks—155—C. J. Crondace and J. Field.  
Flasks, bottles, &c.—60—F. Wise.  
Friction matches—3383—W. E. Newton.  
Furnaces—80—E. B. Wilson.  
Furnaces, charging—6—W. Barningham.  
Gas-burners—133—G. White.  
Grain and seeds, assorting—55—J. Kerridge and W. Peverett.  
Harvesting machines—117—C. S. Baker.  
Hydraulic presses—161—E. Cottam.  
Hydro-carbon oils, treating—3345—J. Young, jun.  
Kitchen stoves and ranges—3144—G. F. Russell.  
Lamps—113—W. R. Lake.  
Leather, utilization of waste—3054—A. V. Newton.  
Liquids, measuring—93—J. C. Angus and G. Stuart.  
Motive power, obtaining—62—E. Perré.  
Moulds for casting in metals—56—A. Gibb.  
Nail and brad cutting machine—74—J. Sadler.  
Photography, finishing impressions produced from plates by—105—W. B. Woodbury and G. Davies.  
Pile shoes—99—W. Eassie.  
Power looms—28—R. Willan.  
Printing—73—A. Leighton.  
Railway and tramway carriages, breaks for—67—J. M. Macrum.  
Railway carriages, stopping or retarding—2595—G. Voight.  
Railways, preventing accidents on—149—W. Lyne.  
Railways, securing the rails of—82—J. Clutton.

- Railway wheels, moulds for casting the tyres of—103—J. T. Smith.  
Rice starch—88—J. W. Gray.  
Rotating motion, producing—3272—J. W. Carr.  
Safes—3321—S. Chatwood.  
Saws, grinding—3223—G. E., and A. A. Atkin.  
Sewage, treatment of—101—F. Sutton.  
Signalling apparatus—22—W. Buckley.  
Spoon rest—3050—J. Roberts.  
Spring tops—119—R. A. Brooman.  
Steam, discharging the water resulting from condensed—163—J. L. Norton and F. L. H. W. Bunger.  
Tape-sizing machines, making leashes in warps for—159—J. Wyld and J. Kershaw.  
Tea leaf, treating and curing the—131—F. Campbell and W. Burgess.  
Telegraph standards, fencing and signal posts—24—G. S. Robertson.  
Temperature, apparatus for recording—76—R. Shaw.  
Tetra-chloride of carbon—97—C. Crump.  
Textile fabrics, washing, &c., of—64—R. A. Brooman.  
Toothed wheels—95—R. Mathers.  
Turntable and weighing machine—78—J. Ireland and S. Davies.  
Type distributing and composing machines—16—A. and W. Young.  
Watches, &c., protectors for—123—H. Gottheimer.  
Water-closets and commode pans—135—H. E. Newton.  
Weaving, looms for—1—J. Bullough and W. Rossetter.  
Weaving, looms for—52—T. Sagar, G. Keighley, J. Clegg, and T. Richmond.  
Weights, lifting and lowering—13—T. C. Fawcett and H. Wilson.  
Wheels, tyres for—30—T. E. Vickers.  
Windlasses—42—E. Walker.  
Woven fabrics, printing—151—M. Henry.  
Wrench and cutter—68—W. D. Grimshaw.

### INVENTION WITH COMPLETE SPECIFICATION FILED.

Wood and marble, graining in imitation of—186—G. T. Bousfield.

### PATENTS SEALED.

- |  |                         |
|--|-------------------------|
| 1961. R. Clayton, J. Raper, and J. Goulding. | 2029. H. A. Bonneville. |
| 1972. B. Robinson and J. Varley.             | 2036. H. Geering.       |
| 1991. F. Ransome.                            | 2041. C. H. Simpson.    |
| 2007. J. H. Tyler.                           | 2062. H. Cartwright.    |
| 2015. E. L. Ransome.                         | 2090. J. Knowles.       |
| 2021. W. Clark.                              | 2925. H. A. Bonneville. |
|  | 2958. J. R. Cooper.     |

From Commissioners of Patents Journal, January 30th.

### PATENTS SEALED.

- |                                 |                              |
|---------------------------------|------------------------------|
| 1978. A. Applegath.             | 2039. J. Petrie, jun.        |
| 1988. W. Singleton.             | 2048. W. Clark.              |
| 1990. L. E. C. Martin.          | 2063. S. and J. Law.         |
| 1992. M. F. W. Boulton.         | 2191. J. Moule.              |
| 1996. J. McEwan and W. Neilson. | 2197. J. Symmons.            |
| 2002. W. W. Burdon.             | 2210. P. Polain.             |
| 2004. C. Hodgson.               | 2211. A. V. Newton.          |
| 2006. H. Allman.                | 2231. J. H. Johnson.         |
| 2008. J. W. Perkins.            | 2248. W. E. Newton.          |
| 2011. W. H. Brookes.            | 2273. A. V. Newton.          |
| 2014. H. D. P. Cunningham.      | 2286. W. Clark.              |
| 2020. A. Sleigh.                | 2356. W. Clark.              |
| 2024. E. Wild and W. Wessel.    | 2369. H. A. Bonneville.      |
| 2025. F. G. Mulholland.         | 2474. A. Moore.              |
| 2034. H. C. Baudet.             | 2674. C. G. Lenk.            |
| 2037. T. Smith and J. Brook.    | 3106. F. Braby and A. Moore. |

### PATENTS ON WHICH THE STAMP DUTY OF £50 HAS BEEN PAID.

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|----------------------|--------------------------------------|
| 210. F. N. Gisborne. | 254. W. Conisbee.                    |
| 227. J. B. Fell.     | 270. N. Clayton and J. Shuttleworth. |
| 296. W. C. Barnes.   | 292. F. G. Grice.                    |
| 250. C. Mace.        |                                      |
| 251. R. Ward.        |                                      |

### PATENTS ON WHICH THE STAMP DUTY OF £100 HAS BEEN PAID.

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|---|---|
| 216. J. Fowler, jun., R. Burton, D. Greig, and J. Head. | 249. H. Rawson.                           |
| 222. H. Owen.   | 262. G. F. Bradbury & J. J. King.         |
| 224. R. Bodmer.   | 304. J. Hirst, jun., and J. Hollingworth. |

## Registered Designs.

- Part of a Travelling or other like Bag—January 10—4762—E. Hensser, 2, Jewin-crescent, E.C.  
The Desideratum Decanter and Jug Cleaner—January 11—4763—D. Sealter and Co., 4, John-street, Commercial-road-east.  
A Perpetual Mouse Trap—January 13th—4764—C. Pullinger, Selsey, near Colchester.  
Improved Joint for a Lefauchaux Action Double or Single Barrelled Gun—January 15—4765—T. Turner, Fisher-street, Birmingham.  
Improved Tri-coloured Signal Lantern—January 19—4766—G. Burt, Birmingham.  
A Waist Clasp Fastening—January 24—4767—H. Foster, Wood-bridge-street, City, E.C.  
Bezel for Clocks, Pressure and other Guages, and other similar articles—January 25—4768—T. E. Evans, Birmingham.