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FIRES and FIRE INSURANCE CONSIDERED *under their* HISTORICAL,
FINANCIAL, STATISTICAL, and NATIONAL ASPECTS. By CORNELIUS
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Royal Historical Society, &c., &c.

[Read before the Statistical Society, 20th February, 1877.]

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IN the preparation recently of the history of fire insurance for the purposes of my "Insurance Encyclopædia," I have taken occasion to illustrate every part of the subject (where practicable) with statistics in the form of tables, or otherwise. As much of the data so brought together is the result of considerable research, involving alike time and labour, being drawn from sources not generally available, while portions of it have a direct bearing upon our national progress and prosperity, I have thought that a pretty full summary of such statistics, and of the historical notes necessary to their complete understanding, may be well adapted to the pages of the *Journal* of this Society. Some of the considerations presented, I venture also to believe, may afford fitting scope for profitable discussion in this assembly.

The general arrangement of this paper is chronological and statistical. After careful observation and experiment, I have been compelled to the conclusion that there is no other efficient method of recording actual facts. Where the two processes admit of combination, as they usually do, the greatest clearness should be attained; but where the materials are incomplete and disconnected, the processes employed can do no more than make the best of the facts as they stand. This observation particularly applies to the present case. The materials with which I have to deal have been collected and compiled by different individuals, at different dates, and for varying objects. There has been hardly any common standpoint; and the shape and connection they take here is that

which I have had to give them in view of their general usefulness. When the International Statistical Congress shall succeed in convincing the Governments of the world that the facts of which I here treat are worthy of systematic record, we may hope for better results.

I.—*Fire Protection.*

No survey of the leading incidents concerning fires and fire insurance can be regarded as complete which does not take into account the appliances for the extinguishment of fires; and not only these, but also the general measures for protecting against fire in regard to the construction of buildings, storage of inflammable and combustible goods, the water supply of towns and cities in this connection, the punishment for wilful fire raising, and other obvious considerations. And yet to deal with all or any of these in general detail, would constitute the basis for an elaborate paper in itself; I can, therefore, but touch upon this portion of the subject superficially.

Under the law of Moses wilful fire raising was punishable with death. It appears to have been so under the still earlier law of the Egyptians. The practice of wilfully firing buildings appears to have been very common with the ancient Romans; and those found guilty of it were burned to death, enveloped in the *tunica molesta*: a garment made of paper, flax, or tow, and smeared over with pitch, bitumen or wax; so that when brought to the place of execution, and the fire lighted, there was no chance of their escaping!

The Emperor Augustus, who wore the purple at the time of the birth of our Saviour, appointed seven bands of firemen in the imperial city, each of which had the care of two divisions (*regiones*); each band had a captain (*tribunus*); and at the head of the whole body was the prefect of the watch (*præfectus vigilium*).

Fire engines were known to the Romans. They are said to have been known in China long anterior to the founding of the Roman empire.

872.—All dwelling houses and buildings in Great Britain—after the Roman occupation—down to the time of Alfred the Great were built of timber, generally with a reed thatch. Alfred began to build his palaces of brick and stone; but the nobles did not follow the example for several centuries later.

This monarch ordered the inhabitants of Oxford to cover up their fires every night at the ringing of the bell at “curfew.” The fires being then open upon the hearths, an instrument of iron or copper was specially devised for the purpose.

900.—About this date Pope John IX ordered bells to be used in churches, as a defence, by ringing them, *against thunder and*

lightning! Du Fresnoy informs us that they were anointed and baptised in view of their holy office. They were also consecrated with most imposing ceremonies, being washed inside and outside with holy water, holy oil, &c. And it has been inferred, rather than directly asserted, that the ringing of such bells at nightfall was to be regarded as a religious offering for protection against fire during the hours of darkness. The curfew bell was not improbably associated with this belief.

1066.—William the Conqueror ascended the throne of Great Britain, and very speedily made general in this country the continental custom of the “curfew [*couvre feu*] bell,”—which was rung at eight o’clock, when all fires and lights had to be extinguished, under a severe penalty,—perhaps as much as a measure of good government as a protection against fire; but the latter was the plea. Some of our historians appear to regard the measure as aimed at the liberty of the subject, and speak of its introduction as the “odious tyranny of the Conqueror.” It is certain that the practice prevailed generally in the cities of Europe at this date, and in many of the English cities, which latter required measures of protection quite as much as any continental city. We regard it as clearly established now that the practice had been introduced into England by Alfred, or probably earlier.

1100.—The “tyranny” of the curfew is said to have been abolished—that is probably the fines and penalties attaching thereto. The practice of ringing the eight o’clock bell continued for many centuries later; and is even now practised in towns and villages in various parts of England. See recent discussion thereon in “Notes and Queries.”

1136.—At this date the greater part of London was still built of wood, and the houses were covered with straw, stubble and the like. Hence it happened that when a single house caught fire the entire city was endangered. The “*Liber Albus*,” which all who know its history regard as of great authority, says: “A thing that took place in the first year of the reign of King Stephen [1136], when by reason of a fire that broke out at London Bridge the church of St. Paul was burnt: from which spot the conflagration extended, destroying houses and buildings, as far as the church of St. Clement Danes.” After this, continues the chronicle, the citizens, to the best of their ability, to avoid such a peril, built stone houses upon their foundations, covered with thick tiles, and so protected against the fury of the flames; whence it has often been the case that when a fire has broken out in the city, and has destroyed many buildings, upon reaching such houses it has been unable to go further, and has there been extinguished.

1189.—The first reference we find to any legislative measures

for fire prevention in the city occurs this year, reign of Richard I. It was this monarch who appointed the first lord mayor of London; and this first lord mayor, Henry Fitz-Alwin, goldsmith, issued an order (this year) "concerning buildings between neighbours." The party-wall was to be at least sixteen feet in height, and three feet in breadth, and was to be built of stone, "for security "against fire." These walls, as well as gutter to receive and convey the water from their houses, were to be provided at the common cost. Also "concerning digging pits for water."—Stow's "Chronicle." Anderson says that the order was that "no houses "should be built within the city but of stone;" and that they "should be covered with slate or burnt tile."

The good example here indicated was taken up warmly, and we find it recorded that in the same year the wardmotes of the city arranged the following rules for preventing loss of life and destruction of property by fire:—

Item. That all persons who dwell in great houses within the ward have a ladder or two ready and prepared to succour their neighbours in case misadventure should occur from fire.

Item. That all persons who occupy such houses have in summer time, and especially between the Feast of Pentecost and the Feast of St. Bartholomew (24th August), before their doors a barrel full of water for quenching such fire, if it be not a house which has a fountain of its own.

Item. That ten reputable men of ward, with the aldermen, provide a strong crook of iron with a wooden handle, together with two chains and two strong cords, and that the handle have a good horn and loudly sounding. Of persons wandering by night, it is forbidden that any person shall be so daring as to be found wandering about the streets of the city after the curfew rung out at St. Martin's-le-Grand and St. Lawrence, upon pain of being arrested.

This may be regarded as the first *fire ordinance* of the city of London. (See 1246 and 1667.)

1240.—Under the custom of *Furnes*, prevailing in parts of Europe at this date, the whole property of a person wilfully causing a fire was forfeited, and he banished. His property was applied in restitution to sufferers.

1246.—An ordinance "previously issued" [? 1189] was renewed, to the effect that all houses within the city should be covered with tiles or slates instead of straw, more especially such as stood contiguous to the best streets, which were then but few. What is now the heart of the city about Cheapside was then a void place called Crownfield, from the Crown Inn there; the bulk of the city lay more eastward.—*Anderson*.

1268.—A night-watch for the city of London was first appointed.

1285.—In this, the thirteenth year of Edward I, an Act was passed against incendiaries, and night watchmen were ordered to be appointed in every town and city, between sunset and sunrise.

1302.—The first recorded instance of any steps being taken towards enforcing any of the measures of protection herein referred to occurred this year; and the following account of the same is still preserved in the records of the city as follows: Thomas Bat came before John le Blund, mayor of London, and the aldermen, on the Friday next before the Feast of St. Hilary (13th January), in the thirtieth year of the reign of King Edward, son of King Henry, and bound himself, and all his rents, lands, and tenements, to keep the city of London indemnified from peril of fire, and other losses which might arise from his houses covered with *thatch*, in the parish of St. Laurence, Caandelwyk Strete; and he agreed that he would have the said houses covered with tiles about the Feast of Pentecost then next ensuing; and in case he should not do the same, he granted that the mayor, sheriffs, and bailiffs of London should cause the said houses to be roofed with tiles out of the issues of his rents aforesaid.—“Memorials of London.”

1351.—In many of the cities and large towns on the continent it had long been the custom to place a watchman on the top of a large building or tower, to look out for fires, notice of which was conveyed by blowing a horn, firing a gun, or ringing a bell. In Germany a police ordinance which had previously existed was renewed this year; and it required that two watchmen should be posted in each steeple to look out for fires. The mode of indicating the direction of the fire is by holding out a flag towards it in the day, and a lanthorn at night. The practice is still continued.

1371.—The first police regulations regarding fires were made in Paris. Each householder was to put a hogshead of water at his door under a penalty of 10 sous.

1400.—In Leipsic, at this date, the town piper resided in apartments in the steeple, and took part in the fire-watch.

1429.—An Act of Henry VI declared that “If any threaten, by casting bills, to burn a house, *if money be not laid in a certain place*, and do after burn the house, such burning shall be adjudged high treason.”

1472.—Reign of Edward IV, a night bellman was employed in Exeter to alarm the inhabitants in case of fire.

1556.—Reign of Mary, bellmen were first appointed in London. They were to ring their bells at night, and call out, “Take care of your fire and candle; be charitable to the poor; and pray for the dead.”

1545.—By the 37th of Henry VIII, cap. 6, was inflicted the

"pains of death" on all found guilty of certain crimes, amongst which were the secret burning of frames of timber prepared and made by the owners thereof ready to be set up and edified for houses; burning of wains and carts loaden with coals or other goods; burning of heaps of wood, cut, felled, and prepared for making coals; cutting off the ears of the king's subjects, and divers other kinds of offences against property or the person.

1583.—Reign of Elizabeth, Fleetwood, the recorder of London, in a famous speech regarding the power of the sovereign to prevent the growth and extension of the city, said: "In London houses are to be pulled down with engines, hooks and ladders, provided for that purpose, and this is by the common laws of the realm. And this is for avoiding of the rage of fire. . . . By the law no man may build or make a reredorse for the fire of charcoals in any house. . . . Tallow chaundlers may not melt their tallow in their own dwelling houses. . . . Flaxwives for fear of fire. . . . are inhibited."—*Stow*.

1605.—James I issued a proclamation similar to those issued by Elizabeth against new buildings in the city, or within one mile thereof; and he also commanded "all persons henceforwards to build their forefronts and windows either of brick or stone, as well for decency as by reason all great and well-grown woods were much spent and wasted; so as timber for shipping waxed scarce."—*Stow*. This proclamation is said to have had little effect.

1607.—Proclamation was again made for the same purpose; and some were censured in the Star Chamber for building contrary to the tenor of the proclamation.

1614.—By a further proclamation all commissioners were required to proceed with strictness against all offenders in this sort. From this time, says *Stow*, began the new reformation of building. So rare appears to have been a good building at that period, that this old chronicler deems it necessary to record the first few good houses that were built in London. The first house of note thus built was a house in the Strand belonging to Colonel Cecil; after that a house near Drapers' Hall; next to that a goldsmith's house in Cheapside, over against Saddlers' Hall, and a leather seller's house in St. Paul's Churchyard, near the north gate, who was compelled thereunto, after he had set up his house, being all of timber. [Book I, p. 7.]

1615.—Fire engines were in use in Germany at this date.

1633.—Fire engines were introduced into London this year or earlier. At a fire which occurred at London Bridge there were three in use, but they speedily got disabled.

1637.—Charles I, through the lords of the council, drew the

attention of the lord mayor to the valuable services rendered by fire engines, and to their scarcity in the city ; also recommending that more “ frequent provision be made of them.”

1638.—In a memorial of Sir William Beecher “ of such business “ as were treated of in this month by the (Privy) Council and “ remained yet imperfect,” was a letter to the lord mayor for more frequent provision of engines to shoot water for quenching fires. The lords intimated that they would take order for *like provision in the parishes out of the city liberties.*

In a petition to Charles I presented this year by William Ryley and Edward Mabb, praying for leave to establish a scheme of fire insurance, it was stated to be part of that scheme to “ keep a continual “ watch in all parts of the city and suburbs all night, that if any fire “ should break forth it may presently be espied.” And engines were to be kept in every ward “ to be ready at hand for quenching of the “ same, and the watch brought speedily to the fire.” “ Reserves of “ water shall be made in convenient places for sudden use.”

1643.—There was printed in one sheet the following : “ *Season-able advice for preventing the mischief of fire that may come by negligence, treason, or otherwise* : Ordered to be printed by the lord mayor of London ; and it is thought very necessary to hang in every man’s house, especially in these dangerous times. Invented by William Gosling, engineer, how many several ways, houses, towns, and cities have been set on fire.” Next follows a list of causes of fires, which were the same then as now ; winding up with “ Some by warm sea-coal, cinders put in baskets, or wooden things as “ did burn London Bridge : and some have been burnt without fire “ or candle, as by wet hay, corn, straw, or by mill-wheels, or such “ like ; all which hath been by carelessness : and some have been fired “ of purpose, by villainy or treason.” Next follows orders to be observed that fire may not happen, and orders that if fire should happen, either by wild-fire or otherwise, to prevent the miseries thereof. Printed for H. B., at the Castle in Cornhill.—“ Harleian “ Miscellany,” vol. v.

1650.—I have already spoken of the value of the early fire engines in regard to fire protection. These were manuals ; but we appear to have had a narrow escape of having a steam fire engine at this date. Lord Macaulay is my authority, as follows :—

“The Marquis of Worcester had recently observed the expansive power of moisture rarefied by heat. After many experiments he had succeeded in constructing a rude *steam engine*, which he called a fire water-work, and which he pronounced to be an admirable and most forcible instrument of propulsion. *But the Marquis was suspected to be a madman, and known to be a Papist. His invention therefore found no favourable reception.*”—“History of England,” vol. i, chap. 3 (see 1829).

1660.—In the case of *Manby v. Scott*, before the Court of King's Bench this year, the principle referred to by Recorder Fleetwood in 1583 is directly affirmed. The judges laid it down that the law of necessity dispenses with things which otherwise are not lawful to be done; "as to throw down any neighbour's house for preventing "the spread of fire," &c.

1666.—*Great fire of London*. In view of preventing the further spread of this fire, the lord mayor ordered the destruction of buildings at certain points by means of gunpowder. The practice has been resorted to from time to time since. Most recently at the great fire at Boston, United States, 1872. It was afterwards held that the fire offices were liable for houses insured with them and so destroyed under proper legal authority.

1667.—The incident of the preceding year led to the passing of important measures in respect to fire protection in the metropolis, viz. (1) An Act of the Imperial Parliament, 19 Car. II, cap. 3, regarding the precautions to be taken in rebuilding the city. (2) A proclamation of the king as to measures of protection at the palace of Whitehall (afterwards destroyed by fire). (3) An Act of the common council as to the appliances for extinguishment of fires in the city, and laying down minute regulations regarding the same. These measures will be found in detail in the article Fire Protection in the "Insurance Encyclopædia."

1677.—Maitland, in his "History of Edinburgh," says, under this date: "Many disasters by fire having been occasioned in "Edinburgh by wooden buildings covered with thatch; for preventing the like thereafter, it was by the town council enacted "that no person presume to build a house of wood, or cover a new "building with thatch; but in time coming all houses to be built "with stones and covered with slates or tiles, under the penalty of "500 marks, and the house to be demolished!"

1681.—The corporation of London having undertaken the business of fire insurances this year, it proposed to procure fire engines "far more useful to the public than any that hath yet been "invented," as also a more powerful fire brigade than had existed, in view of protecting the property it insured from conflagration.

1683.—The Friendly Fire Office founded this year, announced in No. 18 of its regulations:—"Watermen and other labourers to "be employ'd at the charge of the undertakers, to assist at the "quenching of fires." This was the beginning of the system of the fire insurance offices undertaking the charge of providing at their own cost appliances for fire extinguishment, which is clearly a duty for the municipal government.

1690.—After the great fire at Marlborough this year, a petition was presented to the House of Commons, and is recorded in its

journals, to the effect that leave might be given to bring in a Bill that all the owners of the land whereon the burnt houses stand may be compelled at the rebuilding thereof to cover them with slate or tile, "and make an allowance to their tenants for so doing," and that all other persons when they repair thatched houses, may in like manner re-cover them with slate or tile. We do not find that any such Act was passed.

1697.—An ordinance of the mayor was addressed to the aldermen of the several wards, requiring them to prevent the throwing of squibs, serpents, and other fireworks in and about the streets of the city.

1698.—As a means towards fire protection, the Scottish parliament enacted that no future building erected in the city of Edinburgh should exceed five stories in height.

1700.—About the close of the seventeenth century there was laid before parliament by Mr. Alexander Cutting, a scheme for the protection of property by means of a rate levied upon all houses, which included a fire brigade, a salvage corps, and a scheme of compensation for property destroyed, all under one head. It proposed to do away with the system of fire insurances then recently introduced. The real aim was a scheme of municipal fire insurance under a new phase.

1704.—The scheme of fire insurance set on foot at the Lombard House, Duke Street, Westminster, this year, undertook for the first time the insurance of household goods and trading stock, and made the following announcement :

"The said corporation have provided a competent number of watermen, with coats and silver badges of the figures upon this paper; carmen, with carts, and porters, who give security for their fidelity, and are always to attend at fires, to help to remove insured goods to any place desired; and have also warehouses at convenient distances from all parts, to which those that have no other convenience may send them, and have them again when the danger is over, without paying anything."

This was really a species of salvage corps—the first actually established.

1707.—There was passed 6th Anne, cap. 58 (some editions of the Statute cap. 31), an Act for the better preventing the mischiefs that may happen by fire. Its preamble sets forth :—

"Whereas many fires have lately broken out in several places in and about the cities of London and Westminster, and other parishes and places comprised within the weekly bills of mortality, and many houses have frequently been burnt and consumed before such fires could be extinguished, to the impoverishing and utter ruin of many of Her Majesty's subjects, the rage and violence whereof might have been in part prevented if a sufficient quantity of water had been provided in the pipes lying in the streets, and if party walls of brick had been built between house

and house, from the foundation to the top of the roof, and less timber in the front of houses; For the preventing therefore the like mischiefs in the future, be it enacted :”

1. From 25th March, 1708, the churchwardens of each parish within the bills of mortality to fix on the mains and pipes of any water work, stop-blocks of wood, or fire-cocks, &c. A mark was to be fixed on the front of a house over against the place where the fire-cock lies.

Every parish was to “have and keep in good order and repair, “in some known and public place within each parish, a large “engine, and also a hand engine, to throw up water for the extinguishing of fires, and also shall provide, keep, and maintain one “leather pipe and socket of the same size as the plug or fire-cock, “to the intent the socket may be put into the pipe to convey “the water clean and without loss or help of bucket into the “engine.” A penalty is imposed upon the churchwardens in case of default.

A gratuity of 10s. was to be paid to the turncocks “whose water “shall be found on, or shall first come into the main or pipe where “the first plug shall be opened at any fire.” And the “first engine “keeper which brings in a parish engine to help to extinguish any “fire, if in good order and complete, with a socket, hose, and leather “pipe,” to be paid 30s. The keeper of the second parish engine 20s., and the third 10s.

2. Contains a reference to the services of the watermen of the insurance offices (*i.e.* firemen), and a provision that they should be free from impressment.

3. Servants who through negligence fire any dwelling house, out-house, &c., to forfeit 100*l.*, or be sent to the workhouse for 18 months.

4. All houses erected after 1st May, 1708, within the bills of mortality, to have party walls of brick or stone “of two bricks “thick at least in the cellar and ground stories, and 13 inches “upwards to the roof, and to extend 18 inches through the roof.” And that no “mundillion or cornish” of timber or wood under the eaves should thereafter be suffered in any new houses. The front and rear walls of all new houses to be built of brick or stone, to be carried 2½ feet high above the garret floor, and coped with stone or brick. Any houses built contrary to these regulations, the owner and head builder or workman to forfeit 50*l.*

5. On the breaking out of any fire, the constables and beadles of the parishes to immediately repair, with their staves and other badges of their authority, and be aiding and assisting, “as well in “the extinguishing the said fires and causing people to work at “the engines, as also in preventing goods being stolen,” &c.

6. No action to be prosecuted against any person in whose house or chamber any fire shall *accidentally* begin.

1711.—At this date the London theatres were provided with fire engines in case of fire arising during the performance.

1722.—The 9th Geo. I, cap. 22, threw the damages sustained by owners from (*inter alia*) the “setting fire to any house, barn, or “out-house, hovel, cock, mow, or stack of corn, hay, or wood, “which shall be committed or done by any offender or offenders “against the Act,” upon the Hundred wherein such offence was committed, upon notice being given within two days after the occurrence of the offence.

1763.—By 4th Geo. III, cap. 14, it is enacted (sec. 10): “And, “for the better preventing mischiefs that may happen by fire, and “to deter and hinder ill-minded persons from wilfully setting their “house or houses, or other buildings, on fire, with a view to gaining “themselves the insurance money, whereby the lives and fortunes “of many families are lost,” that the offices might expend the money insured in rebuilding or reinstating the premises “as far as “the same will go.” This could be done on request of persons interested; or on suspicion of fraud. This power has since been incorporated into the conditions of fire insurance policies, and has frequently been of value to companies in dealing with suspicious claims.

1774.—Was enacted 14th Geo. III, cap. 78, an Act for the further and better regulation of buildings and party walls, and for the more effectually preventing mischiefs by fire within the cities of London and Westminster, and the liberties thereof, and other the parishes, precincts, and places within the weekly bills of mortality; the parishes of St. Mary-le-Bone, Paddington, St. Pancras, and St. Luke at Chelsea in the county of Middlesex: and for indemnifying under certain conditions builders and other persons against the penalties to which they are or may be liable for erecting buildings within the limits aforesaid contrary to law.

This Act divided all buildings into seven rates or classes, and proceeded to define thickness of the external and the party walls for each class, with other details, such as what recesses and what openings may be in party walls; and how ends of beams may be laid into them; as also for what purposes they might be cut into; and regulations as to chimneys in same. Regulations as to party-walls not extended to the Inns of Court. Rules laid down as to hearths and ovens, &c. No bow windows to extend beyond the line of street. No stack of warehouses to be “above thirty-five squares, “including internal and external walls.” Stone doorcases and iron doors to all communications through party-walls of this class. No stable to contain more than twenty-five squares. Same provisions

as before as to turpentine. Every building not erected pursuant to the requirements of this Act to be deemed a nuisance, and to be taken down by order of the Court. The Court of Aldermen to appoint surveyors "skilled in the art of buildings" to fill the office of district surveyors in view of enforcing the provisions of this Act. Outside the city the Justices in Quarter Sessions to make the appointment (sec. 62). This appointment of building surveyors was a new and important feature.

This is usually regarded as the first Metropolitan Building Act. It remained in force seventy years; and upon it the present Act is based.

1803.—The Statute 43 Geo. III, cap. 58, after reciting that certain heinous offences, committed "with intent, by burning, to destroy or "injure the buildings and other property of His Majesty's subjects, "or to prejudice persons who had become insurers of or upon the "same," had been of late frequently committed, and that no adequate means had been hitherto provided for the prevention and punishment of such offences, enacts, that if any person or persons shall wilfully, maliciously, and unlawfully set fire to any house, barn, granary, hop-oast, malt-house, stable, coach-house, out-house, mill, warehouse, or shop, whether such house, &c., shall then be in the possession of the person or persons so setting fire to the same, or in the possession of any other person or persons, or of any body corporate, with intent thereby to injure or defraud His Majesty or any of His Majesty's subjects, or any body corporate, the person or persons so offending, their counsellors, aiders, and abettors, knowing of and privy to such offence, should be and were thereby declared to be felons, and should suffer death, as in cases of felony, without benefit of clergy.

1810.—Under the penal code of China at this date, according to the authority of Sir George Thomas Staunton, Bart., F.R.S., the punishment of a person who accidentally set fire to his house was forty blows; but if the fire spread to the gate of an imperial palace, then death. Wilfully setting fire to one's own house, a hundred blows; to any other house, private or public, death. But further, if a fire takes place in a city, the local municipal officers are called to an account for it, and in view of the authority delegated to them, they are given to understand such things as conflagrations are not to be tolerated. If ten buildings are burned, the highest official in the city is fined nine months' pay; if more than thirty are destroyed, a year's salary is forfeited; and if as many as three hundred are consumed, he is degraded one degree in his rank. It is grimly said that "this regulation induces a wonderful degree "of carefulness on the part of the officials."

1829.—The important event of this year in regard to fire protec-

tion was the manufacture of the *first steam fire engine*. This was manufactured in London, and although an event early in the following year (the fire at the Argyle Rooms) showed its value and efficiency, it was a long time before the invention was made further available in practice. (See 1650.)

1830.—Under the Lighting and Watching Act of this year (11 Geo. IV, cap. 27) powers were given to provincial towns to take legal measures for *fire protection*.

1833.—On the 1st January this year the London fire engine establishment came into existence. The records of its thirty-three years' working is given under another head in this paper. The number of fires in London in each of the intermediate years from this date downward is also shown.

1838.—There was enacted 1 and 2 Vict., cap. 75, an Act to amend so much of the Act of the 25 Geo. III, for the further and better regulation of buildings and party walls, and for the more effectually preventing mischiefs by fire within the cities of London and Westminster, as relates to manufactories of pitch, tar, and turpentine. The amendment is this, that under the Act of 1785 the buildings used must not be within 75 feet of any other building, it was made within 75 feet of a building in any other occupation.

1843.—The borough of Liverpool obtained parliamentary powers to regulate its buildings in view of fire protection.

1846.—There was enacted 9 and 10 Vict., cap. 25, an Act for preventing malicious injuries to persons and property by fire, or by explosive or destructive substances. It deals first with blowing down buildings by explosive substances maliciously, which it makes a felony, and then proceeds:—

“VII. And be it enacted, That whoever shall unlawfully and maliciously by any overt act attempt to set fire to any building, vessel, or mine, or to any stack or steer, or to any vegetable produce of such kind, and with such intent that if the offence were complete the offender would be guilty of felony and liable to be transported beyond the seas for his natural life, shall, although such building, vessel, mine, stack, steer, or vegetable produce be not actually set on fire, be guilty of felony, etc.” (See 1861.)

1847.—Under the Towns Police Clauses Act of this year, 10 and 11 Vict., cap. 89, sec. 30, where that Act may apply, any person wilfully setting fire to a chimney is liable to a penalty not exceeding 5*l.*, and this does not exempt him from indictment for felony.

1852.—There was enacted 15 and 16 Vict., cap. 84, an Act to make better provision respecting the supply of water to the metropolis, under section 15 of which is contained provision for a constant supply of water by every metropolitan company. This arrangement was not carried out, and hence the Amending Act of 1871.

1854.—About this date Mr. James Braidwood read before the Institution of Civil Engineers a paper on the Means of rendering large Supplies of Water available in Cases of Fire, and on the Application of Manual Power to the Working of Fire Engines. An abstract of this paper and the discussion upon it were afterwards published.

1855.—The new Metropolitan Building Act was passed. It superseded the Act of 1774.

1860.—Was passed 23 and 24 Vict., cap. 139, an Act to amend the law concerning the making, keeping, and carriage of gunpowder and compositions of an explosive nature, and concerning the manufacture, sale, and use of fireworks.

1861.—The great fire in Tooley Street, London Bridge, this year, led to the requirement by the fire offices of protective measures regarding the size and construction of warehouses and wharves, and the storage and classification of goods therein.

In the autumn of this year, Mr. Easton, the eminent hydraulic engineer, proposed to the chief commissioner of works the construction of a reservoir on Primrose Hill, N.W., to contain 1,000,000 gallons, with main pipes to lead down from it to Buckingham Palace, to the Royal Mews, and Wellington Barracks, to the Houses of Parliament, and to the Government offices in and near Whitehall. He stated that the water companies would gladly bear the charge of keeping the reservoir always supplied with water, provided this supply were exclusively appropriated to the extinction of fires—for under the then existing arrangements the water companies not only supplied water gratuitously for fire extinguishment, but had their arrangements for domestic supply sometimes greatly interfered with.

He afterwards developed his ideas into a plan embracing the whole metropolis, at an estimated cost of 3,000,000*l.*, that is 40 square miles at 72,000*l.* per mile, with 50,000*l.* a-year working expenses for staff and repairs. There would be reservoirs on Primrose and Norwood Hills, with mains permeating all the principal streets of the metropolis; valves or hydrants to any number might be connected with these mains; and as the water would always be at high pressure, hose screwed on to these valves would at all times obtain a jet powerful enough to go over the highest ordinary buildings. No fire engines would be needed, or only a few for special use. The mains would be entirely distinct from those which furnish the house or domestic supply of water; so that there would unfortunately be a double system of breaking up the roads and streets to lay and repair water pipes. Mr. Easton proposed that the police should be taught to manage the hydrants, insomuch that wherever a fire might break out, the *matériel* and

the *personnel* for its extinction would be close at hand. It was suggested that the work might be done by some public body, which could borrow the 3,000,000*l.* at 4 per cent. An instalment of 192,000*l.* per annum would pay off principal and interest in twenty-five years, and then there would only be the annual working expenses to provide for.

1862.—A select committee of the House of Commons was appointed “to inquire into the existing state of legislation, and of “any existing arrangements for the protection of life and property “against fire in the metropolis.” The results of the labours of that committee have already been published in a blue book, and are therefore available to all who desire to consult them.

1865.—This year marks an important epoch in the history of fire protection, for there was enacted the 28 and 29 Vict., cap. 90, *an Act for the establishment of a fire brigade within the metropolis*, which has this simple preamble, “Whereas it is expedient to make “further provision for the protection of life and property from fire “within the metropolis.” This meant in the first place a transfer of the London fire engine establishment to the Metropolitan Board of Works; and in the next place its extension to the growing wants of the metropolis. The Act contains thirty-five clauses.

It had been estimated that the cost of the London fire establishment had been 2*d.* per 100*l.* insured in the metropolitan district annually. The present contributions of the insurance offices are made a uniform charge on the sums insured in the metropolitan district of 35*l.* per million, or a fraction less than 8½*d.* for each 1,000*l.* insured.

It was estimated that to put the brigade, including fire escapes and other appliances, into thorough efficiency, so as to afford real protection to the metropolitan district, the expenditure would sooner or later have to be increased to 100,000*l.* per annum. The Metropolitan Board we believe determined the limit of its expenditure to be 50,000*l.* at starting. Towards this it was to receive say 10,000*l.* per annum from the Government in consideration of its protection of the Government or national buildings; the contributions of the offices, it was estimated, would yield another 12,000*l.* per annum, leaving 28,000*l.* to be raised from the rates, which would be about ⅓*d.* in the pound on the rateable value of 13,000,000*l.* included in the metropolitan area. But the metropolitan parishes were relieved of all charges for maintenance of fire engines, estimated at from 5,000*l.* to 10,000*l.*, and were soon to be relieved of contributions towards fire escapes.

Again, the insurance offices handed over to the Metropolitan Board, as a gift to start upon, the entire freehold and leasehold property, consisting of stations; also the stock of fire engines, manual,

steam, and floating; and all the appliances incident to the establishment. The estimated value of these at time of transfer was, stations 12,571*l.*; plant 11,449*l.* 14*s.* 5*d.*; total 20,020*l.* 14*s.* 5*d.*; against which, however, must be set off value of annuities and pensions allowed to disabled members of brigade, widows, &c., valued actuarially at 5,822*l.* 6*s.* 9*d.*; leaving balance 18,198*l.* 7*s.* 8*d.*

Captain Shaw, in his statistics of the London fire engine establishment, made up to the close of the present year, furnished the following table:—

Average Cost of Extinguishing Fires, &c.

Year.	Number of Fires.	Yearly Expenditure.			Average Cost of Each Fire.		
		£	s.	d.	£	s.	d.
1833.....	458	7,988	7	7½	17	8	10
'34.....	482	9,277	8	6½	19	4	11
'35.....	471	10,410	3	10½	22	2	—
'36.....	564	11,765	12	2½	20	17	2
'37.....	501	14,252	10	9½	28	9	—
'38.....	568	12,186	14	4½	21	9	1
'39.....	584	11,925	8	8½	20	8	5
1840.....	681	13,606	4	11½	19	19	7
'41.....	696	12,498	12	8½	17	19	2
'42.....	769	12,646	4	11½	16	8	11
'43.....	749	12,518	9	10½	16	14	3
'44.....	762	13,019	6	2½	17	1	9
'45.....	707	12,804	2	6	18	2	3
'46.....	834	14,031	7	7	16	16	6
'47.....	836	18,119	1	9½	21	13	6
'48.....	805	14,228	7	4	17	13	6
'49.....	838	13,954	3	1	16	13	—
1850.....	868	13,801	11	1½	15	18	—
'51.....	928	15,976	4	5	17	4	4
'52.....	923	16,540	15	10	17	18	5
'53.....	900	14,913	5	6	16	11	5
'54.....	953	15,931	—	5½	16	14	4
'55.....	982	21,286	10	—	21	13	6
'56.....	957	17,777	12	8	18	11	6
'57.....	1,115	18,370	7	4	16	9	6
'58.....	1,114	18,326	17	—	16	9	—
'59.....	1,089	17,615	6	6	16	3	6
1860.....	1,056	25,108	1	9	23	15	6
'61.....	1,183	23,157	13	8	19	11	6
'62.....	1,303	22,964	16	10	17	12	6
'63.....	1,404	23,416	17	—	16	13	7
'64.....	1,487	24,120	9	11	16	4	5
'65.....	1,502	26,005	4	7	17	6	3
Total	29,069	530,545	1	8½	18	5	—

1866.—From the 1st January this year the protection of London

against fire passed under the control of the Metropolitan Board of Works, under the circumstances already stated.

Mr. C. F. T. Young, C.E., this year published his work: "Fires, "Fire Engines," &c., wherein he institutes the following comparison:—

London occupies 120 square miles, and has a population of 3,000,000. It has nineteen engine stations, with in the aggregate ten steam engines and thirty-three hand engines—total forty-three; number of men employed 130. Therefore London has one station to every 6 square miles, one engine to every 3 square miles, one (and a fraction) men to the square mile; and one man to 20,000 inhabitants.

New York occupies 23 square miles, has a population of 1,000,000, thirty-five fire stations, forty fire engines—thirty-five steam, five hand—and 1,478 men. Consequently New York has one and a-half engine stations to each square mile; one and three-quarter engines to the square mile; sixty-four men to the square mile, and one man to every 676 of the inhabitants.

Paris occupies 110 square miles, has a population of 1,700,000, has one hundred and thirty fire engine stations and 1,270 men. Therefore Paris has one and one-sixth engine stations to each square mile; nearly one and two-third engines to the square mile; has over eleven firemen to the square mile, or one man to every 1,338 of the population.

In the same work the author remarks upon the tendency of fires in London not only to become more numerous, but of greater extent, and therefore involving far greater losses upon the insurance offices; while the means of controlling them had not increased in the like proportion. "One great reason for this may be the tendency to "construct large buildings, which are not sufficiently subdivided "to render it easy to attack the fire as it were in detail; and in "spite of the Building Act this course seems to be persisted "in, especially in the case of large buildings called Manchester "warehouses. Mr. Vulliamy, architect to the Metropolitan Board "of Works, and who it is said has the means of collecting accurate information upon the subject, states that in London the "total loss," or fires in which everything is totally destroyed, "amounts to rather over 14 per cent. of all the fires during the "year."

There was enacted 29 and 30 Vict., cap. 69, an Act for the amendment of the law with respect to the carriage and deposit of dangerous goods.

This year there was founded that important association the *London Salvage Corps*. It is supported by contributions from the fire offices transacting business in London; and that it has been of

essential service in regard to its peculiar functions may be gathered from the following returns of its first ten years' operations:—

Year.	Number of Fires attended by Metropolitan Fire Brigade.	Attendance of London Salvage Corps.	Of which Services were Rendered at
1866.....	1,338	530	294
'67.....	1,397	996	327
'68.....	1,668	1,374	525
'69.....	1,572	1,420	692
1870.....	1,946	1,660	803
'71.....	1,842	1,659	746
'72.....	1,494	1,384	486
'73.....	1,548	1,343	564
'74.....	1,573	1,328	405
'75.....	1,529	1,221	486
'76.....	1,632	1,404	446

1867.—Another select committee of the House of Commons was appointed “to inquire into the existing legislative provision for the “protection of life and property against fires in the United Kingdom, and as to the best means to be adopted for ascertaining the “causes and preventing the frequency of fires.” The evidence taken by this committee was of a very important character, and will be found set forth in detail in the report of the committee.

One of the subjects considered by the committee was “the cost “of fires,” that is, the cost of attending them by the brigades. This varies very much in different countries, perhaps in consequence of the different system pursued. Captain Shaw produced these figures to the committee:—

Average Cost of each Fire.		Average Cost of each Fire.	
	£		£
Liverpool	12	Troy (United States)	63
London	over 18	Buffalo	85
Dublin	20	Baltimore	90
Montreal	over 32	San Francisco	118
Brooklyn	„ 35	St. Louis	125
Philadelphia	„ 48	Boston	157
Sydney	52	New Orleans	172

In order to test these results it would be necessary to have a return of the actual average destruction of property at each fire.

1872.—Mr. John M. McCandlish, F.R.S.E., manager of the Scottish National Insurance Company, read before the Actuarial Society of Edinburgh this year, an Address on Fire Insurance. He shows with admirable logic how the losses arising from insufficient means of fire protection fall on the public sooner or later:—

“It may seem superfluous to dwell on a point so unquestionable; and yet the contrary view is a very common one, and leads to unfortunate consequences. If losses by fires are in reality borne by the insurance offices, then they have the greatest possible interest in keeping down the number and magnitude of fires, and ought to bear the expense of the requisite machinery. *But if all losses really fall upon the insured, in other words, upon the public, then the preventing and extinguishing of fires is directly a matter of public interest, and ought to be done at the public expense.* The force of this truth, however, has not always been perceived by the offices themselves, and is even now recognised by a very small portion of the community. . . .

“In recent sessions of parliament Bills have been introduced on the recommendation of a select committee of the House of Commons to establish a judicial inquiry into the cause of every fire. These Bills have not been opposed by Government, but very considerable difficulty is found in adjusting a satisfactory machinery for making such inquiries. . . . The encouragement given to such a Bill is an acknowledgment of the principle that it is the public, and not merely the insurance offices, that have an interest to prevent fires; *and yet so inveterate is the opposite view, that in all probability no measure of this kind will be speedily agreed to, unless on the condition that the cost of the inquiries to be instituted into the origin of the fire shall be wholly or largely borne by the insurance offices.*

“These expenses, and those incurred in extinguishing fires, must in the end fall upon the public, in the same manner as all losses by fire necessarily do; and the only question for consideration is whether the insurance offices ought to be charged with them in the first instance, and left to recover them from the public in the form of an addition to such rates of premium as would otherwise be necessary. The offices might well complain of such an arrangement. The burden, if laid on them, ought to be borne in the several cities and towns throughout the country in some proportion to the business which each office derives from each locality; but this on any general scale is practically impossible. The system, too, is open to the same objection which was held fatal to the fire insurance duties, now happily abolished—that it increases the cost, and to that extent discourages the practice of insurances: *and indeed it is conceivable that the more perfect the system worked in the direction of keeping down fires, the less inclined would many persons be to insure.* But these are objections mainly from the point of view of the fire companies. On behalf of the public, it may be pleaded that at the best it is a clumsy method of taxing the community—when more direct and more equitable methods are available. It throws the cost entirely on the prudent section of the public which insures, while it promotes the security, and encourages the negligence of the imprudent, who do not insure at all, or insure inadequately. *Fire engines managed by local authorities, but supported wholly or in any considerable degree by insurance offices are sure to be kept in less efficient condition, and at greater cost, than when the public are the direct paymasters, and interested therefore in securing good value for money.* . . .

"There can be no question that the arrangement which is most sound in theory, and most for the public interest in practice, is that the owners of property, individually and collectively, should charge themselves with the duty and the cost of preventing and extinguishing fires. Losses by fire being thus reduced as much as possible in number and magnitude, may then be left, in the first instance, to be met by insurance companies, and ultimately to be distributed by them amongst the persons insured, in the form of rates of premium, which will inevitably in the long run bear a fair proportion to the losses."

This is one of the points which I especially desire to enforce.

1873.—There was again introduced to parliament, a Bill to make provision for investigation into the causes and circumstances of fire. The measure was brought in by Mr. Peter M'Lagan, who had been chairman of the select parliamentary committee in 1867, and who in that position, as also from other means of observation and inquiry, has come to the conclusion, as many others have done, that there should be an official inquiry into the circumstances attending every fire, irrespective of the actual sacrifice of life. I shall offer some further observations upon this subject at the close of the present paper.

1874.—The gas and water committee of the common council of London, appointed to report upon the water supply to the city in case of fire, presented an able and exhaustive report, in which they state that they were naturally desirous of obtaining every information upon so important and vital a question, and they were enabled by the courtesy of the Metropolitan Board of Works to obtain much valuable evidence upon the subject from Captain Shaw, the chief officer of the Metropolitan Fire Brigade. They had also the assistance of Mr. Muir, the engineer of the New River Company.

The report next refers to the present condition of the water supply of the city, and it appears that the city receives its water supply almost entirely from the New River Company. The engineer says that the company have now provision for a continuous daily delivery of more than 36,000,000 gallons of water, with a present daily demand of about 25,000,000 gallons; and they also have a right to pump to any extent from the River Thames below Blackfriars for any service of a "non-domestic" kind; also that exclusive of the ponds at Hampstead and Highgate, which hold together about 30,000,000 gallons, the company have high service reservoirs containing more than 20,000,000 gallons, and a further store at lower levels of more than 100,000,000 gallons. The company's engine power is now sufficient to raise water into their upper reservoirs at the daily rate of 50,000,000 gallons; and all the contents of these various reservoirs are available for use in the city,

in which they have 78 miles of pipes, 25 miles of which are constantly under pressure.

With regard to the water supply required for extinction of fire in London, Captain Shaw reported that in the whole of the metropolis it had not been much in excess of 8,000,000 gallons, and he distinctly stated to the committee that there had been no difficulty from any insufficiency of water supply for extinction of fire in the city, whatever occasional delay there might have been in obtaining the required service. It also appeared that the pressure of the present water supply of the city had sufficed hitherto, and might be greatly increased. The committee, however, express their opinion *that the system of street plugs, which makes the attendance of a turncock necessary before water can be obtained, is not suitable to meet sudden emergencies, which must necessarily occur in every case of fire*; and that, to secure a quick obtainment of water, it is absolutely essential, for the protection of public property, that a proper number of constantly charged hydrants be fixed which will represent an immediate supply of water.

Taking into consideration the important interests involved in the question, the committee were of opinion that every possible means should be provided for the rapid extinction of fires by an immediate supply of water; and that, although it had been shown that the supply and storage of water is ample, the present means of procuring it at fires were not equal to the emergency of the case, and that this difficulty might be met by the use of hydrants constantly supplied with water; and having in view the immense amount of property within the city, and the extensive fires which from time to time occur within its area, they thought that for the protection of the citizens of London it was highly desirable that the corporation should take the lead in establishing a system which there could be no doubt would be a most useful adjunct in preventing the extension of fires. If the court agreed with this, the committee asked that it should be referred back to them to consider the means of carrying it out.

The report was referred back to the committee, who subsequently (1875) reported that it was desirable to establish hydrants, to be kept constantly charged, at every 66 yards in the city streets, in order to maintain an efficient water supply for the rapid extinction of fire. Hydrants are now being generally erected throughout the city. It has been stated that the cost of 900 hydrants would not exceed 10,000*l*.

1874.—In the “North American Review” there was an article written by Mr. Bugbee, wherein he gave statistics:—

1. *Fire Brigades.*

Place.	Population.*	Area in Square Miles.	Number of Fires.	Number of Steam Engines.	Number of Firemen.	Expenses of Department.	Expense per Capita.†
						£	s. d.
London	3,340,000	122	1,494	28‡	396	68,617	— 5
New York	980,000	22	1,380	38	629	199,453	4 2
Philadelphia .	709,000	129	655	24	253	80,546	2 4
St. Louis	360,000	—	197	11	110	33,263	1 11
Chicago	380,000	23½	489	16	201	76,400	4 2
Baltimore	281,000	15	172	10	151	32,127	2 4
Boston	260,000	15½	389	21	459	80,000	8 5
Cincinnati	221,000	22	213	19	154	56,387	5 4

2. *Fire Losses.*

Place.	Number of Dwelling Houses.	Total Loss for Past Five Years.	Loss per Capita.†
		£	£ s. d.
New York	64,044	3,165,372	3 7 6
Philadelphia	112,366	2,294,188	3 4 10
St. Louis	39,675	824,826	2 13 6
Chicago	44,620	1,813,608§	6 1 7
Baltimore	40,350	354,474	1 6 8
Boston	29,623	654,423§	2 12 10
Cincinnati	24,550	715,353	3 6 5
San Francisco.....	25,905	559,077	3 15 6

* In the American cities the census of 1870 is taken, and the natural increase for two years added.

† The loss per capita (as also the number of houses) is based on the census of 1870, as it would be a fair average for the years covered in the statement of losses.

‡ Including three floating engines.

§ Exclusive of the great fire.

1875.—In the (London) “Times” of 30th October this year there appeared a letter signed “A Fire Office Manager,” in which was contained some most excellent suggestions for increasing the means of instantaneous communication through the metropolis. He proposed that there should be established guard-houses at suitable points throughout the metropolis, at which should be stationed a policeman, the fire escape conductor, the omnibus time keeper, &c. There should be from each guard-house means of telegraphic communication with the fire brigades and police stations of the metropolis. On the occurrence of a fire, the call would be delivered to the nearest guard-house, and hence would be known at all required quarters forthwith. The suggestion is a most excellent one, and should be forthwith adopted.

The letter also contains the following statement of the comparative forces in the great commercial capitals of Europe for the arrest of fire:—

	Population.	Engines.	Strength of Brigade.
London	3,254,260	95	396
Paris	1,851,000	203	1,500
St. Petersburg	667,963	37	1,149
Berlin	826,341	50	1,090
Hamburg	240,271	53	789
Lyons	323,417	48	475

1876.—Captain Shaw, in his new work, “Fire Protection,” puts the case as between fire insurance and fire protection very well:—

“A safe principle would be for the inhabitants of a town to consider first, what amount of insurance would cover their losses if they had no protection at all; secondly, what amount of protection would afford them almost complete security from loss; and then, working from these two points, to decide for themselves how much they would be inclined to spend *directly on defensive measures*, and how much indirectly on the payment of losses. There is no greater or more common delusion than to suppose that the intervention of an insurance company has anything to do with this matter. Every town has certain risks, and when losses occur, they are paid for by the town itself, either directly, or through an insurance company drawing its premiums from the town. The business of insurance companies is simply to receive premiums and pay losses, and of course they assess the former so as to cover the latter, and leave a margin for profit. Many persons insure, and it is most proper and praiseworthy that they should do so, as they may not have capital to repair such losses as they are liable to; but this does not in any way affect the principle here laid down, *that each community has in some way or other to pay for its own losses*, and should therefore take the necessary precautions for its own interests, which brings us back to the point from which we started—namely, the advantage of employing skilled professional persons to advise as to the several apportionments of direct and indirect payments, and to work and be responsible for all matters connected with the system of protection.”

Captain Shaw also published this year a pamphlet: “Fires in “Theatres,” wherein many practical suggestions are offered regarding fire prevention in these hitherto very combustible risks. His suggestions also extend to the protection of surrounding property.

In order to give this section of my subject the completeness desired, I had hoped to be able to make an estimate of the cost of the fire departments of the different countries of Europe; but it is impossible to do so: there is no data. The cost in *France* has been estimated at 1,000,000*l.*, which is probably too much. For *Germany* I can find no data. In the United States the estimate is 5,000,000*l.*; this probably is very near the mark. Who can say what it is in the *United Kingdom*?

II.—*Amount of Property actually Burned.*

On this important head—the most important of all that I shall on this occasion submit to your notice—we have, I regret to say,

literally no reliable statistics. The losses paid by the fire offices are for reasons stated in a later part of this paper, no measure for the actual annual loss of property. A great deal of the property burned is uninsured; other portions are insured "subject to average;" and in fact the question of insurance rather complicates the problem than otherwise.

What seems strange beyond all power of expression is, that the constantly recurring devastations by fire have never yet sufficiently interested the Governments of civilised countries to have caused the adoption of a simple statistical record, if nothing more, of the aggregate annual number of fires, their causes as nearly as can be ascertained, and the amount of property destroyed thereby!

At the present moment *Russia* is the only country in Europe, and I believe I may say in the world (I am not certain about *China*), wherein such statistics as I have spoken of are really collected. The able men who govern that great country were not slow to discover the lessons to be learned from such returns.

In view of obtaining, if possible, some idea of the annual destruction of property by fire, I commenced the compilation of a table of the great fires of the world. This table I do not give here; first, because it would occupy as much space as the whole of this already lengthy paper, and second, because it was impossible, in the great majority of cases, to obtain any correct estimate of the actual loss of property occasioned. Then again it became apparent in the investigation that it is not, after all, the great fires which occasion the greater loss. The aggregate of the smaller fires, those which happen day by day so continuously that they cease to make any impression upon us—it is these which really constitute the data by which the aggregate loss from fire is to be measured or estimated. The great fires, properly so called, involving for instance the loss of 50,000*l.* and upwards, probably do not account for more than *one-fifth* of the losses of any average year.

I shall have occasion at the close of this paper to make some suggestions regarding the collection of statistics of fires, and of the lessons to be learned from them; I will not, therefore, dwell further upon the subject here, but proceed to present such feeble statistics as are available on this branch of the subject.

1666.—The great fire of London, which happened this year, first led to any notice of the statistics of fires. The total number of houses burned was 13,200; and the aggregate loss was estimated at 10,716,000*l.*

1680.—An estimate by Nicholas Barbon and others, founders of the first joint stock fire institution in London (and probably in the world!) established this year contained the following passage:—"The calculation of the houses burned by these several fires [in

"London since 1666] is 750 houses or thereabouts, which (at least "200l. a house, one with another) amount to 150,000l."

1806.—The fires in London for the year ending 29th September were 552, viz., 366 alarms, attended with little damage, 153 chimneys on fire, and 31 serious fires. Hone, in his "Table Book," says:—"The offices calculate on an alarm of fire every day, and about "eight serious fires in every quarter of the year."

1829.—Mr. Braidwood, in his "Fire Engines, &c.," published in Edinburgh in 1830, gave the following statistics regarding the fires, &c., in that city. The number of houses, shops, and assessable places within the bounds of the police was 29,000. The fires, &c., in the following years ending 30th September, were:—

Year.	Totals.	Entire Loss.	Considerable Loss.	Trifling Damage.	Foul Chimneys.	False Alarms.
1825.....	48	11	12	14	9	2
'26.....	80	7	18	31	17	7
'27.....	113	1	12	55	39	6
'28.....	94	1	18	43	28	4
'29.....	194	1	9	56	118	10

He says: "In examining the above table it will be observed "that serious fires decrease as the number of alarms increase. The "cause of so many false alarms in 1828-9 was that a considerable "number of fires having been observed to arise from foul chimneys, "the firemen were sent to every one from which the slightest "danger was apprehended."

In Paris the number of houses at this date was supposed to be 26,000. The fires over an average of twenty years had been 540 per annum, or rather more than two fires per hundred houses; but on account of the efficiency of the corps of Sapeurs Pompiers, it was believed that only one house out of every five hundred which caught fire was actually burned. (Braidwood, p. 132.)

1841.—An inquiry was instituted by Mr. William Baddeley, C.E. —well known in connection with his efforts in saving life from fire—into the proportion of burned properties in London, including the buildings and their contents, with the following results:—

In 1841.	Insured.	Not Insured.	Unknown.	Total.	Proportion Insured.
Buildings	914	197	10	1,121	Per cent. 81'53
Contents	609	404	12	1,015	60'0
	1,523	601	22	2,136	71'30

Thus 81½ per cent. of the number of buildings were insured, and

60 per cent. of the contents; and of either one or the other, out of the total cases by fire reported, about $71\frac{1}{3}$ per cent.; leaving $28\frac{2}{3}$ wholly uninsured. The *proportion of the value insured* was not reached by this inquiry. (See 1838 and 1850.)

1842.—The number of fires about this date in Liverpool had become so large, and their character so serious, that the rates of premium went up from 8s. to 30s., 40s., and in some cases to 45s. per cent. *It was calculated that the losses by fire from the commencement of the century in this borough had amounted to about $3\frac{1}{4}$ millions sterling.*

1844.—In Knight's "London" occurs the following passage :—
 "The statistics of London fires are by no means devoid of interest, and the time may come when they will form an index to the social advancement of the people; for in proportion as houses are built more and more fireproof, and habits of carefulness become more and more diffused, the number of destructive fires will assuredly lessen."

1856.—Mr. Braidwood, in his paper on "Fires," read before the Society of Arts this year, said that fires in London had doubled since the commencement of the London Fire Brigade in 1833; "and not only are the 'calls' doubled, but the fires at which it is necessary to put engines to work have increased in a much greater ratio, being nearly three times the number they were twenty-three years ago." He added :—

"Many reasons have been given for the increase in the number as well as in the serious damage caused by fires of late years. It appears to me that the many improved modes of heating, and the general use of gas, render spontaneous ignition much more common than formerly, and when premises do take fire, cause the fire to proceed much more rapidly. In 1833, of the number of premises which took fire, barely 21 per cent. (20.9) used gas; while in 1855 gas was used in upwards of 67 per cent. of the buildings which took fire."

1867.—Mr. Fletcher, the then secretary of the Sun Fire, stated in his evidence before the select parliamentary committee this year, that in the years 1864 and 1865, the losses of seventeen English offices were compared. They were in number 14,458, and amounted to upwards of 1,250,000*l.* Out of these fires, there were no less than 4,623 the cause of which could not be ascertained.

The question of the "loss to the nation"—the political economy aspect of the case—was considered by the committee; and the following is the substance of the evidence of Mr. S. J. Fletcher (Sun Fire) thereon :—

"1506. In looking to this question, do you think it is a serious loss to the nation that so much property is destroyed by fire?—Very considerable loss is incurred by the nation by intentional fires. In other similar cases an inquiry takes place, in cases of accident by railway or to shipping; but it is curious that

there is no inquiry on the part of the public by any public machinery with regard to the question of fires, by which so large an amount of property is annually destroyed. . . .

"1509. Have you ever noticed any distinction in the number of fires when trade is good, and when trade is bad?—That occurs continually. When there is a depression in any particular trade then the fires in that particular trade commence; that is one of the points which satisfies me that many fires are intentional: if the cotton trade is depressed, mills and cotton warehouses are burned down, and so with the hat or shoe trade, if there is depression, fires immediately follow.

"1510. That is a sort of fire-barometer?—Decidedly; it is a well-known fact.

"1511. Does that extend to farm produce?—I think it does; very many fires that are attributed to incendiarism, in the country, I am satisfied are occasioned by the farmers themselves.

"1512. The working of the law in question is peculiarly noticeable in Liverpool, is it not?—In Liverpool. Manchester, and every other place: and it is convincing to me that a much greater number of fires than we are apt to think are the result of intention."

The committee passed on to what may be designated a very natural question:—

"1579. Perhaps you are aware that there has been produced some impression in the country that insurance offices, so far from being averse to fires, do not at all object to a certain amount of fires?—(Mr. Fletcher.) If such an opinion as that is prevailing, it is entirely in contradiction to the convictions of my office. They are making every effort which can be made to prevent the increase of fires.

"1580. Do they not fancy that a certain number of fires, if not attended with too great a loss of property, rather give a spur to fresh policies?—It is a most mistaken notion."

Another point which engaged the attention of the committee was "whether fires were actually on the increase," that is, relatively to the number of the population, or to the number of buildings. Several witnesses were examined on this point. Mr. Swanton, superintendent of the London Salvage Corps, said the proportion was increasing, and handed in the following returns for London in support of his position.

Table Showing the Increase of Fires upon the Population and Number of Houses for the Years 1852 and 1862.

1852. *Population*, 2,362,263; fires, 923. There was one fire for every 2,559 persons, according to the number of persons shown by the census of 1851.
- „ *Houses*, 327,391; fires, 923. There was one fire for every 354 houses, according to the number of houses shown by the census of 1851.
1862. *Population*, 2,803,989; fires, 1,303. There was one fire for every 2,152 persons, according to the census of 1861, being an increase of nearly one-fifth.
- „ *Houses*, 379,222; fires, 1,303. There was one fire for every 291 houses, according to the number of houses at the census of 1861, being an increase of over one-fourth!

Mr. Swinton Boulton, the then manager of the Liverpool, London, and Globe Insurance Company, handed in to the same committee, a

Table Showing the Fires have Increased in an Undue Ratio to the Increase of Population and Houses.

In 1845 there was 1 fire to every 2,990 of the population, and to every 395 houses

" '50	"	2,673	"	347	"
" '55	"	2,585	"	333	"
" '60	"	2,613	"	335	"
" '61	"	2,370	"	303	"
" '62	"	2,188	"	280	"
" '63	"	2,064	"	265	"
" '64	"	1,980	"	255	"
" '65	"	1,900	"	250	"

He also handed in another table showing the increase in the number of fires recorded as of "suspicious, doubtful, or unaccounted " for " origin, which we have already given under " Causes of Fires " at this date.

Finally Captain Shaw was examined on the same subject, and he handed in returns of a more complete order, from which we compile the following table:—

Twenty-Five Years' Fires in London.

Year.	Fires.	Population.	Houses.	People to Each Fire.	Houses to Each Fire.
1840	681	1,907,036	258,425	2,800	379'47
'41	696	1,948,417	262,744	2,800	377'50
'42	769	1,989,719	267,062	2,588	347'28
'43	749	2,031,181	271,381	2,725	362'32
'44	762	2,072,563	275,700	2,720	361'81
'45	707	2,113,945	280,029	2,990	395'08
'46	834	2,155,326	284,338	2,584	340'93
'47	836	2,196,708	288,657	2,628	345'28
'48	805	2,238,090	292,976	2,780	363'94
'49	838	2,279,472	297,295	2,720	354'76
1850	868	2,320,854	301,614	2,673	347'48
'51	928	2,362,236	305,933	2,546	329'67
'52	923	2,406,411	311,281	2,607	337'24
'53	900	2,450,586	316,629	2,723	351'81
'54	953	2,494,762	321,978	2,618	337'85
'55	982	2,538,937	327,327	2,585	333'32
'56	957	2,583,112	332,676	2,699	347'62
'57	1,110	2,627,288	338,025	2,356	304'52
'58	1,114	2,671,463	343,374	2,398	308'23
'59	1,089	2,715,638	348,723	2,494	320'22
1860	1,056	2,759,814	354,072	2,613	335'29
'61	1,183	2,803,989	359,421	2,370	303'82
'62	1,303	2,851,145	366,045	2,188	280'92
'63	1,404	2,898,301	372,669	2,064	265'42
'64	1,487	2,945,457	379,293	1,980	255'08

1868.—The returns of the Manchester police for the year ending 29th September gave the number of fires which were attended within that city, viz. 301, which was an increase of 16 upon the previous year. The following details as to the proportions of buildings and stock insured and uninsured are valuable. Buildings insured 202, amount 251,922*l.*; not insured 95, amount 105,291*l.* Stock, number insured 127, amount 483,531*l.*; not insured 165, amount 103,721*l.*; total at rise 944,465*l.* The loss of the year was found to be but 2*l.* 3*s.* per cent. upon the entire property at risk within the city. The total cost of the brigade during the year was 3,523*l.* 17*s.* 1*d.* Here we have two-thirds of the buildings insured; but much less than half the stocks so protected. The larger number of stocks at risk arises from the circumstance of several persons occupying one building frequently.

1872.—The annual report of Captain Ingram, chief of the fire brigade for Dublin, stated the alarms in 1872 to have been 188; of which 5 were false, 111 were only chimney fires, 72 were more extensive. Two of the fires resulted in total destruction of buildings, 12 in serious damage, and 55 in slight injuries. Five persons were rescued by the fire escapes. The expense of the brigade amounted to 1,446*l.* 6*s.* 6*d.*

1872.—Mr. John M. McCandlish, manager of the Scottish National Fire and Life Company, in his address before the Actuarial Society of Edinburgh this year (already quoted), spoke as follows:—

“The principle which lies at the root of fire insurance is one sufficiently obvious when stated, but not unfrequently lost sight-of. Every time that property suffers damage by fire—unless in those rare cases where it is intrinsically worthless or noxious—*there is an absolute loss to some person or other.* This is often forgotten. The owner of the property is recouped by means of his insurance, and therefore does not lose; and the insurance company may be said to gain by its losses. It is by fires, as it were, that it makes its living; and if at the end of its year its balance is on the right side, the losses during the year are regarded as having been inevitable: they have been expected and provided for; and if the company does not feel them, still less do the public feel them on its behalf. *And yet the reality of the loss is beyond question.* The property destroyed has cost money, skill, labour, which now all go for nothing. To replace it (if it can be replaced) will cost money, skill, and labour, which might otherwise have been employed in increasing the quantity of property in the world, instead of merely leaving it as it was before. *The loss, in fact, is not felt, simply because it is distributed; and fire insurance is the machinery for its distribution.*”

“In some countries the damage done by fire to buildings, if not to other property, is made good at the expense of the State or the municipality, and provided for, like other general expenses, by a tax. This, in fact, is simply a mutual insurance managed by the public authorities, and is open to many objections. We prefer in this country the plan of distribution by means of joint-stock companies under private management. But this does not alter the incidence of the loss. I observe frequently an advertisement by one great office that it has paid

9 millions sterling on account of losses by fire. Its own capital is not stated; but it is unlikely to have exceeded 1 million sterling, and it still no doubt possesses all the capital it ever did, and possibly much more. It cannot therefore have paid the 9 millions out of its own funds. It has simply been the medium by which they have been transferred from the pockets of one set of people to those of another."

1875.—Herr Ludwig Jung, director of the Munich Fire Department, and of the Bavarian Firemen's Association, published this year a work on "Protection of Property against Fire," wherein he gives (*inter alia*) the following important statistics: During the twenty-five years from 1843 to 1868, no less than four thousand insured buildings were destroyed by fire in Bavaria alone, exclusive of the Palatinate. During the fifty years from 1821 to 1871 the Bavarian company for the insurance of buildings against fire paid 61 million gulden for losses, and the whole of this large sum was supplied by the premiums levied on house owners. During the years from 1870 to 1872, inclusive, 34 million thalers were paid by the insurance companies in Prussia, and 11 million gulden are paid annually, upon the average, by the sixty-six companies of the German Empire which insure upon real property.

1875.—The losses in the cotton trade alone in the Manchester district this year were estimated at 1,100,000*l.* The premiums received on these risks were estimated at 800,000*l.*; but from these the expenses had to be deducted, in order to determine the amount available to meet losses.

1876.—The following are the details of the fires in Manchester for the year ending 29th September, 1876: Fires attended by the brigade 328. Estimated value of property (buildings and stock) at risk 2,771,385*l.* Of this amount 118,178*l.*, or 4·2 per cent. was destroyed. Compared with the preceding year there was an increase of 36 fires, of 668,934*l.* in amount at risk, and of 55,480*l.* in the amount destroyed. The estimated value of the property saved (*i.e.* not destroyed) was 2,653,207*l.*, or 95·7 per cent. The annual average for ten years of the property jeopardized and not destroyed by fires, was 1,630,998*l.*, or 96·2 per cent. of the amount at risk. Nine lives were lost, and 15 fires were attended beyond the limits of the city during the year.

Supplemental—Fires in London.

Almost the only uniformly collected statistics which are available on the subject of fires, are those of the *London Fire Engine Establishment* (of which I give some account under head "Protection "against Fire"), kept by Mr. Braidwood from the year 1833 down to the year of his death (1862); and by his successor from that date down to the close of 1865, when the protection of London against fire ceased to be a matter of private enterprise, and assumed more of

the form of a municipal responsibility. These statistics extend over a period of thirty-three years, and embrace such a number of events as to entitle the results which they indicate at least to reasonable confidence. I guard myself in this way, because a supplemental table which I have compiled from the returns of later years present results differing in some respects from those immediately before us. In 1870 Captain Shaw published the detailed "Records," from which the following facts are drawn :—

The total number of calls received during the thirty-three years was 35,145. Of these 2,769 were false alarms; 3,307 proved to be only chimney alarms; and 29,069 were for fires, of which 9,635 resulted in serious damage, and 19,434 in slight damage. Here are the details for each year of the period, compiled from Captain Shaw's Table No. 107 :—

Calls.

Year.	Total Number of Calls.	Alarms.			Fires.		
		False.	Chimney.	Total.	Total Number of Fires.	Seriously Damaged.	Slightly Damaged.
1833.....	592	59	75	134	458	166	292
'34.....	651	57	112	169	482	144	338
'35.....	643	66	106	172	471	156	315
'36.....	756	66	126	192	564	167	397
'37.....	717	82	134	216	501	144	357
'38.....	755	79	108	187	568	185	383
'39.....	755	70	101	171	584	182	402
1840.....	863	84	98	182	681	230	451
'41.....	855	67	92	159	696	258	438
'42.....	912	61	82	143	769	248	521
'43.....	911	79	83	162	749	260	489
'44.....	926	70	94	164	762	260	502
'45.....	875	81	87	168	707	276	431
'46.....	1,022	119	69	188	834	258	576
'47.....	990	88	66	154	836	300	536
'48.....	1,011	120	86	206	805	296	509
'49.....	1,003	76	89	165	838	256	582
1850.....	1,038	91	79	170	868	247	621
'51.....	1,159	115	116	231	928	276	652
'52.....	1,105	93	89	182	923	263	660
'53.....	1,062	72	90	162	900	261	639
'54.....	1,123	79	91	170	953	339	614
'55.....	1,154	91	81	172	982	370	612
'56.....	1,104	75	72	147	957	393	564
'57.....	1,302	96	91	187	1,115	471	644
'58.....	1,320	94	112	206	1,114	417	697
'59.....	1,282	91	102	193	1,089	421	668
1860.....	1,241	69	116	185	1,056	422	634
'61.....	1,409	89	137	226	1,183	385	798
'62.....	1,543	109	131	240	1,303	321	982
'63.....	1,624	81	139	220	1,404	349	1,055
'64.....	1,715	101	127	228	1,487	402	1,085
'65.....	1,727	99	126	225	1,502	512	990
Total ...	35,145	2,769	3,307	6,076	29,069	9,635	19,434

A continuation of this table will be given later. It is desirable to leave the numbers undisturbed, as they form the base of other tables.

The following is a monthly summary for the thirty-three years 1833-65 of fires, false alarms, and chimney alarms. [Compiled from Captain Shaw's Table No. 106.]

Monthly Summary.

Month.	Alarms.			Fires.			Total Calls.
	False.	Chimney.	Total.	Seriously Damaged.	Slightly Damaged.	Total.	
January	194	339	533	857	1,694	2,551	3,084
February....	199	325	524	748	1,570	2,318	2,842
March	208	374	582	836	1,604	2,440	3,022
April	207	334	541	752	1,483	2,235	2,776
May	189	242	431	716	1,651	2,367	2,798
June	234	245	479	748	1,581	2,329	2,808
July	301	188	489	770	1,719	2,489	2,978
August	277	187	464	847	1,708	2,555	3,019
September .	244	195	439	810	1,523	2,333	2,772
October	252	250	502	738	1,487	2,225	2,727
November .	242	267	509	883	1,580	2,463	2,972
December ..	222	361	583	930	1,834	2,764	3,347
Total	2,769	3,307	6,076	9,635	19,434	29,069	35,145

It is here seen that while *July* is the month which produces the greatest number of "false alarms," *December* is the month which has the greatest total of calls, as also of serious fires. *June*, which has been regarded as a most fatal month for London fires, only stands No. 8 in regard to total calls, and No. 10 in regard to "seriously damaged." A further reference to this subject will be found.

We next have a weekly summary of all fires, false alarms, and chimney alarms, from 1833 to 1865, being Captain Shaw's Table No. 72.

Weekly Summary.

Week.	False Alarms.	Chimney Alarms.	Fires.	Total Calls.	Week.	False Alarms.	Chimney Alarms.	Fires.	Total Calls.
1st, endg. Jan. 7	40	77	563	680	28th, endg. July 15	61	49	593	703
2nd, " " 14	38	69	584	691	29th, " " 29	70	40	553	663
3rd, " " 21	42	78	583	703	30th, " " 29	72	38	533	643
4th, " " 28	57	77	576	710	31st, " Aug. 5	55	36	610	701
5th, " Feb. 4	46	80	595	721	32nd, " " 12	62	42	571	675
6th, " " 11	44	84	540	668	33rd, " " 19	75	53	587	715
7th, " " 18	54	78	575	707	34th, " " 26	56	42	548	646
8th, " " 25	51	91	568	710	35th, " Sept. 2	65	37	544	646
9th, " Mar. 4	48	69	591	708	36th, " " 9	65	44	551	660
10th, " " 11	56	98	558	712	37th, " " 16	53	61	549	663
11th, " " 18	54	87	557	698	38th, " " 23	62	42	546	650
12th, " " 25	42	93	559	694	39th, " " 30	51	35	541	627
13th, " Apl. 1	33	68	525	626	40th, " Oct. 7	63	59	528	650
14th, " " 8	40	74	481	595	41st, " " 14	66	48	492	606
15th, " " 15	42	70	517	629	42nd, " " 21	52	62	480	594
16th, " " 22	56	85	560	701	43rd, " " 28	50	56	530	636
17th, " " 29	61	82	528	671	44th, " Nov. 4	48	63	523	634
18th, " May 6	41	57	501	699	45th, " " 11	63	63	632	758
19th, " " 13	37	64	542	643	46th, " " 18	49	57	591	697
20th, " " 20	45	69	521	635	47th, " " 25	57	73	543	673
21st, " " 27	43	44	543	630	48th, " Dec. 2	50	67	514	631
22nd, " June 3	48	48	592	688	49th, " " 9	43	65	548	656
23rd, " " 10	56	48	525	629	50th, " " 16	47	86	600	733
24th, " " 17	40	59	542	641	51st, " " 23	56	81	649	786
25th, " " 21	52	61	547	660	52nd, " " 31	64	102	819	985
26th, " July 1	79	54	550	683	Total	2,769	3,307	29,069	35,145
27th, " " 8	69	42	571	682					

In this table the year is divided into fifty-two periods of seven days each, except the last week, which has eight days. Making allowance for this additional day, the last week of the year is still the most fatal as regards fires, the preceding week next, then the second week in November, and next to that the first week in August. It is not easy to follow the operation of the causes which produce this last-named result.

But in view of carrying the observations still further we have a daily and hourly summary for the thirty-three years 1833-65 inclusive, giving fires only, and omitting false alarms and chimney alarms. [This is Table No. 38 of Captain Shaw's summary.]

Daily and Hourly Summary.

Hour.	Sunday.	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.	Total.
A.M. 1....	334	193	243	283	242	286	233	1,814
" 2....	291	188	237	221	225	213	190	1,565
" 3....	224	159	201	171	194	203	164	1,316
" 4....	213	120	151	152	174	140	137	1,087
" 5....	121	82	111	119	108	116	135	792
" 6....	95	69	88	87	76	89	88	592
" 7....	92	71	65	63	80	70	99	540
" 8....	96	65	78	86	82	70	76	553
" 9....	81	76	81	76	87	79	77	557
" 10....	90	81	90	97	70	81	84	593
" 11....	101	107	95	101	106	90	98	698
" 12....	104	106	118	102	122	114	104	770
P.M. 1....	108	109	145	135	124	113	105	839
" 2....	100	115	124	113	139	104	115	810
" 3....	102	115	123	111	116	81	121	769
" 4....	102	132	144	127	112	99	129	845
" 5....	128	148	149	138	145	126	145	979
" 6....	162	187	188	197	188	156	147	1,225
" 7....	240	266	260	240	260	247	221	1,734
" 8....	296	317	277	289	292	279	294	2,044
" 9....	308	386	331	354	348	327	344	2,398
" 10....	294	382	370	384	363	400	356	2,549
" 11....	247	348	340	318	306	299	246	2,204
" 12....	221	279	243	262	261	231	299	1,796
Total....	4,150	4,101	4,252	4,226	4,220	4,013	4,107	29,069

Here we have *Tuesday* as the greatest *day* for fires, whilst "unlucky Friday" has the least. Regarding the hours, 10 o'clock P.M. is the worst; 7 o'clock A.M. the best.

The *hours* which have most fires are 8, 9, 10, and 11, P.M.—10 occupying the first place; 12 o'clock P.M. is heavy; while 1 o'clock A.M. is still more so. All the heavy figures run from 6 P.M. to 4 A.M. It has been said of fires as of births, that about two-third of them occur in the night.

Trades of Occupiers.

Trades.	Seriously Damaged.	Slightly Damaged.	Total.	Trades.	Seriously Damaged.	Slightly Damaged.	Total.
Ale and porter merchants } Almshouses } Apothecaries and dealers in drugs, no chemical works carried on } Arsenal } Artists' colourmen } Asphaltum works } Auctioneers }	1 1 60 1 — 3 1	— — 63 — 1 4 1	1 1 123 1 1 7 2	Carvers and gilders..... Cement makers } Cemeteries } Chandlers } Charcoal and coke, dealers in } Charcoal manufacturers } Cheesemongers } Chemists, including all places in which are laboratories for chemical purposes } China and glass, dealers in } Chocolate and chicory manufacturers } China and glass manufacturers }	4 4 1 184 15 — 55 55 3 3 3 1 17 45 — 11 10 96 23 1 62 49 97 1 6 32 4 2 — — 1 1 21 36 — 1 34 3 6 3 29 11	4 — — 246 27 1 74 69 18 4 3 — 28 45 1 5 31 218 27 — 96 1 1 1 8 37 16 4 1 — 1 1 32 1 1 1 1 1 1 25 2 2 — 13 19	8 4 1 430 42 1 129 124 21 7 6 98 16 1 45 90 1 16 41 314 50 1 157 104 134 2 1 8 68 1 1 59 5 8 3 42 30
Bacon dryers } Bagnios } Bakers } " biscuit } Barge and boat builders } Barges } Basket makers } Baths and wash-houses } Beershop keepers } Berlin wool warehouses } Bird dealers } Billiard rooms } " table makers } Blacking makers } Bleachers } Booksellers, binders, and stationers } Bottle merchants } Boot and shoe makers } Brace and belt } Brewers } Brickmakers and kilns } Bridges } Brokers and dealers in old clothes } Brushmakers and bristle merchants } Builders } Butchers } " pork } Button makers }	10 28 183 10 15 5 22 7 116 — 1 1 — 3 2 186 2 35 — 20 3 1 153 14 146 23 9 —	14 90 350 8 23 5 16 7 178 2 — 3 1 7 — 256 7 51 2 26 5 — 175 12 104 68 21 1	24 118 533 18 38 10 38 14 294 2 1 10 2 442 9 86 2 46 8 1 328 26 250 91 30 1	Carvers and gilders..... Cement makers } Cemeteries } Chandlers } Charcoal and coke, dealers in } Charcoal manufacturers } Cheesemongers } Chemists, including all places in which are laboratories for chemical purposes } China and glass, dealers in } Chocolate and chicory manufacturers } China and glass manufacturers }	4 4 1 184 15 — 55 55 3 3 3 1 17 45 — 11 10 96 23 1 62 49 97 1 6 32 4 2 — — 1 1 34 3 6 3 29 11	4 — — 246 27 1 74 69 18 4 3 — 28 45 1 5 31 218 27 — 96 1 1 1 8 37 16 4 1 — 1 1 32 1 1 25 2 2 — 13 19	8 4 1 430 42 1 129 124 21 7 6 98 16 1 45 90 1 16 41 314 50 1 157 104 134 2 1 8 68 1 1 59 5 8 3 42 30
Cabinet } Calenderers } Camphor makers } Cane, dealers in } Cap makers } " peak makers } Carpenters and workers in wood, not cabinet makers } Card and pasteboard makers } Carriers }	316 1 1 21 1 — 557 12 4	237 1 2 9 3 1 607 7 7	553 2 3 30 4 1 1,164 19 11	Cabinet makers..... Calenderers } Camphor makers } Cane, dealers in } Cap makers } " peak makers } Carpenters and workers in wood, not cabinet makers } Card and pasteboard makers } Carriers }	1 1 1 21 1 — 557 12 4	237 1 2 9 3 1 607 7 7	553 2 3 30 4 1 1,164 19 11

Trades of Occupiers—Contd.

Trades.	Seriously Damaged.	Slightly Damaged.	Total.	Trades.	Seriously Damaged.	Slightly Damaged.	Total.
Drapers, woollen, } linen, and mercers ..	360	420	780	Glass manufacturers	10	15	25
Drysalters	9	12	21	Glue and size makers....	6	7	13
Druggists, wholesale	14	20	34	Gold and silversmiths ..	—	1	1
Dyers.....	16	35	51	Granary keepers	11	8	19
Eating houses	37	141	178	Greengrocers and } fruiterers	19	49	68
Egg merchants.....	—	2	2	Grocers	219	177	396
Elastic web manufac- } turers	—	1	1	Gun manufacturers	1	1	2
Emery and black lead } manufacturers	3	4	7	Gunpowder, dealers in	1	—	1
Engineers, mechanical....	44	47	91	Gun makers	1	1	2
Engravers	—	7	7	„ barrel makers.....	1	—	1
Envelope makers	1	—	1	Gutta percha works	1	2	3
Fancy box „	15	11	26	Glass and emery } paper makers	4	2	6
Farming stock	181	49	230	Hay and straw sales- } men	12	4	16
Feather merchants } and dressers	19	17	36	Haberdashers	17	23	40
Fellmongers	23	6	29	Hairdressers	5	12	17
Felt makers	7	1	8	Hairpin makers	—	1	1
Firewood merchants	6	9	15	Harness „	1	—	1
Fire Preventive Com- } pany	1	—	1	Hardware, dealers in ...	3	9	12
Firework makers	64	22	86	Hat makers	142	86	228
Fire annihilator ma- } nufacturers	1	—	1	Hearthrug manufac- } turers	2	—	2
Fishing tackle makers....	1	1	2	Hemp and flax mer- } chants	2	—	2
Fishmongers.....	2	14	16	Hemp dressers	12	3	15
Fish curers	4	10	14	Herbalists	1	1	2
Flax dressers and mills .	5	11	16	Hop merchants	2	6	8
Flour mills, steam	12	5	17	Horse slaughterers.....	1	—	1
„ water	1	1	2	Horsehair merchants ...	12	15	27
Flower, artificial, makers	20	11	31	Hospitals.....	3	5	8
Floorcloth manufac- } turers	33	7	40	Hotels, including club } houses	39	155	194
Founders	29	59	88	Hosiery	5	7	12
French fancy warehouses	26	30	56	Ice merchants	1	2	3
„ polishers	3	2	5	Indiarubber manu- } facturers	16	9	25
Fried fish shops	1	6	7	Ink makers	5	8	13
Furriers, skin dyers, } and dressers	37	30	67	„ (printers) ..	13	1	14
Furniture stores	2	—	2	International exhibi- } tion	—	17	17
Galvanised iron ma- } nufacturers	1	—	1	International bazaar ...	—	1	1
Gaming houses.....	2	4	6	Iron bedstead makers....	1	2	3
Gasworks	22	47	69	Ironmongers	1	1	2
Gas fitters.....	1	—	1	Italian warehousemen ..	1	2	3
Ginger beer and soda } water makers	3	5	8	Japanners	48	17	65
Glass and lead mer- } chants	1	2	3	Jewellers and watch } and clock makers	9	8	17
Glass and lamp mer- } chants	3	4	7	Jute and hemp manu- } facturers	4	—	4
				Kamptulicon works	2	—	2

Trades of Occupiers—Contd.

Trades.	Seriously Damaged.	Slightly Damaged.	Total.	Trades.	Seriously Damaged.	Slightly Damaged.	Total.
Lace manufacturers.....	—	1	1	Painters, plumbers, } and glaziers	36	42	78
Lamp makers	2	5	7	Panoramas	—	2	2
„ black makers	17	14	31	Paper stainers.....	19	22	41
Laundresses	43	97	140	„ hangers.....	2	1	3
Lath renders.....	1	—	1	Paper mills, makers, } and warehouses	9	3	12
Leather, patent, makers	15	8	23	Paper collar makers	1	—	1
„ embossers	—	1	1	Parchment „	2	—	2
Leather sellers and } dressers	4	7	11	Paraffin light company ..	1	—	1
Leather bag makers.....	2	—	2	Pawnbrokers	26	21	47
Lime wharves and } merchants.....	4	3	7	Perfumers	5	4	9
Linen manufacturers	1	—	1	Perambulator makers....	4	3	7
Lodgings	295	2,532	2,827	Pewterers	1	1	2
Looking glass and pic- } ture frame makers	17	13	30	Photographers	12	12	24
Lucifer match makers.....	94	74	168	Photographers' appa- } ratus manufacturers	1	1	2
Lucifer match box } makers	2	2	4	Pianoforte makers	13	6	19
Lunatic asylums	3	5	8	Pitch makers	2	—	2
				Picture dealers	3	2	5
				Pipe makers.....	4	7	11
Maltsters	11	10	21	Pickle manufacturers....	1	2	3
Manure manufacturers ..	2	5	7	Portmanteau makers	1	2	3
„ dealers in	7	11	18	Potteries	10	11	21
Markets	1	1	2	Poulterers	3	—	3
Marine stores, dealers in	62	111	173	Printers	84	139	223
Mast and block makers ..	5	6	11	Printers, copperplate } and lithographic	17	23	40
Masons	2	2	4	Printers, calico	4	2	6
Mat makers	12	11	23	Private.....	1,189	6,132	7,321
Mattress makers	11	14	25	Prisons.....	4	5	9
Metal perforators	—	2	2	Provision merchants	5	11	16
Milliners and dress- } makers	64	128	192	Public buildings, not } warehouses	16	50	66
Mineral teeth manu- } facturers	—	1	1	Public places of en- } tertainment, not } theatres.....	11	17	28
Mills	1	1	2	Quill merchants	1	1	2
„ steam	5	3	8	Rag „	61	58	119
„ wind	2	—	2	Railways	25	59	84
Mill makers	1	—	1	Retail shops and } counting houses	13	20	33
Musical instrument } makers	48	26	74	Revelenta arabica } food merchants.....	1	—	1
Musical string makers....	1	—	1	Ribbon dressers	—	1	1
Mustard makers	2	2	4	Rice mills, steam	3	—	3
Music halls	1	1	2	Rope makers	50	25	75
				„ wire	—	1	1
Naphtha manufacturers	3	1	4	Sack makers	14	17	31
Newsvendors	2	4	6	Saddle tree makers.....	1	3	4
Nuts, dealers in	—	12	12	Safe makers	1	—	1
Nurserymen	4	2	6	Saltpetre refiners	2	1	3
				Sale shops and offices....	397	790	1,187
Oakum manufacturers....	2	2	4				
Offices	2	30	32				
Oil works	30	11	41				
Oil and colourmen	187	235	422				
Opticians	2	1	3				
Organ builders.....	1	5	6				

Trades of Occupiers—Contd.

Trade.	Seriously Damaged.	Slightly Damaged.	Total.	Trades.	Seriously Damaged.	Slightly Damaged.	Total.
Sail makers	16	4	20	Trimming, dealers in	1	1	2
Salt merchants	—	2	2	" weavers	2	4	6
Saw mills, steam	80	57	137	Tripe dressers	1	1	2
Scale board cutters	8	—	8	Tube drawers	1	—	1
" makers	—	2	2	Type founders	2	2	4
Schools	25	38	63				
Scum boilers	1	7	8	Umbrella makers	10	3	13
Sewing machine makers	—	1	1	Under repair buildings	126	186	312
Ships	56	88	144	Unoccupied	45	137	182
" steam	18	25	43	Upholsterers	60	80	140
Ship builders	25	33	58				
" chandlers	18	11	29	Varnish makers	26	24	50
" breakers	—	1	1	Victuallers	410	915	1,325
Shirt and collar makers	1	3	4	Vinegar works	3	2	5
Shot makers	1	—	1	Vitriol " 	—	1	1
Silk dressers	1	3	4				
" weavers	23	14	37	Wadding makers	26	20	46
Smoked meat, dealers in	—	1	1	" gun, makers	—	1	1
Snuff mills	1	—	1	Waggon on the road	3	4	7
Soot merchants	3	48	51	Warehouses	43	64	107
Spice " 	2	2	4	Warehouses, Man- }	36	65	101
Splint cutters	1	—	1	chester }			
Stationers, wholesale	3	2	5	Waste paper dealers	—	1	1
Stables	235	312	547	Waterproof canvas }	32	12	44
Starch makers	10	2	12	makers }			
Statuary, dealers in	1	—	1	Watch glass makers	1	—	1
Stay makers	2	7	9	Waterworks	3	2	5
Steam mills	1	—	1	Water gilders	1	—	1
" engines	1	—	1	Weavers, carpet	4	5	9
Straw hat and bonnet }	26	26	52	Wharfingers	21	41	62
makers }				Wheelwrights	4	7	11
Sugar refiners	19	17	36	Whiting makers	—	3	3
Surgical bandage makers	—	2	2	Whip " 	1	—	1
				Willow bleachers	1	—	1
Tailors	145	199	344	Window blind makers	2	2	4
Tallow chandlers, wax }	77	75	152	Wine coopers	1	—	1
chandlers, and soap }				Wine and spirit mer- }	42	140	182
boilers }				chants }			
Tanners	25	16	41	Wire workers	1	4	5
Tarpaulin makers	14	10	24	Wool staplers and }	13	6	19
Tea merchants	1	1	2	manufacturers			
Telegraph company	1	—	1	Wool warehouses	1	1	2
Theatres	7	43	50	Workhouses	11	20	31
Timber merchants	24	22	46	Workshops, no ha- }	22	24	46
Timmen, braziers, and }	95	209	304	zardous goods or }			
smiths }				process }			
Tobacco manufacturers	21	22	43				
Tobacconists	76	141	217	Zinc works	1	—	1
Tool merchants	—	1	1				
Toy warehouses	17	28	45	Total	9,635	19,434	29,069

Causes of Fires.

This is in many respects one of the most instructive tables of the entire series. It enumerates the causes of 29,069 fires happening in London during the thirty-three years, 1833-65.

Causes.	Total.	Causes.	Total.
Accident	25	Burning pitch off a cask.....	2
Alteration	1	„ out cistern to pitch it .	2
Airing beds	8	„ out paint pots	1
„ linen	83	„ rubbish	10
„ stable	1	„ sawdust	1
Ashes falling from furnace	1	„ shavings	7
Asphalte boiling over	3	„ soot falling.....	1
Benzoin, drawing off	1	„ straw	1
Bleaching basket	1	„ waste paper	5
„ ginger	2	„ white fire	1
„ hops.....	1	„ wood placed in cellar .	1
„ nuts	10	Bursting of kiln	1
„ pot	1	Camphine boiling over	2
„ spice	1	„ exploding	3
„ straw	1	Candle	3,218
Blue light, making	1	Canvas ceiling	2
Boiler.....	7	Carboy of muriatic acid bursting	3
„ exploding	4	„ French polish „	1
„ funnel.....	1	Carelessness	106
„ heat from	44	Cask of spirits falling	1
„ improperly set	1	Casting blowing	2
„ leaking	3	Cats	34
Bonfire	8	Chafing pan	3
Bottle, ether being broken	3	Charcoal fire.....	2
„ electric fluid bursting	1	„ overheating	2
„ essential oil „	1	„ pan	6
„ whisky „	3	„ stove.....	9
„ nitrous acid exploding.....	1	„ sweepings.....	1
Boy drawing beer in cellar	1	Chair falling into fire	3
„ lighting a fire	2	Chandelier falling	1
Boys playing with fireworks	1	Chemicals boiling over	1
„ gas	1	„ exploding	7
„ gunpowder	3	Chemical process	1
Boys smoking	1	Chicory put away on fire.....	3
Brazier's fire	1	Children playing with fire	471
„ stove.....	1	„ lucifers ..	95
Breaking still pipe	1	„ fireworks	2
Breaming boat	4	Child reaching over fire	1
Broken windows	1	Chimney shaft, heat from	8
Bude light.....	1	Chinese fire	2
Burning a basket	1	Cigar thrown down area.....	7
„ bedding	1	Cleaning dress with camphine	1
„ a bed	1	„ gas cock.....	1
„ a cask	1	„ pots	1
„ cork	4	Clothes coming in contact }	4
„ a hole with hot iron	1	with fire.....	

Causes.	Total.	Causes.	Total.
Clothes drying	3	Eau de Cologne	1
" on stoves	3	Emptying powder on fire	1
Clothes horse falling on fire	3	Escape of hydrogen gas	1
" upset by monkey	1	Essence pot leaking	1
Cooking	16	Examining rockets	1
" apparatus	8	Experiment	7
" on roof	1	Explosion	44
Cooper's devil	1	Fat, boiling of	3
Copper	13	" over	3
" boiling over	7	Fat falling in steam consumer	1
" fire	43	" thrown on fire	1
" fire, timber under	2	" upset	2
" heat from	5	Falling of rocket stick	1
" heating, without water .	2	Fire adhering to coffee pot	2
" portable	1	" at Rotherhithe	1
" set on floor	12	" basket	1
Coke fire	7	Fire dropped in letter box	1
Cork ashes	1	" through flooring	1
" put away on fire	1	" through hole	1
Cotton waste	4	Fire from locomotive	1
Covering pipes with millboards	1	" street	1
Crinoline	3	" grate adjoining	1
Cutting away party wall	1	" grate, heat from	6
Curtains	2,822	Fire from grate improperly } constructed	1
Defect in refining pan	1	Fire, heat from	12
" wall	1	" in next house	1
Dipping sleepers, hot	1	" in workshop	3
Doubtful	190	" in vault	1
Dogs	9	" left burning	1
Drawing off from boiler	1	Fire made on bricks	3
Dress taking fire	1	" in saucepan	2
Drying bags	3	" on floor	3
" cellar	1	" on sheet iron	1
" fibre	1	Fire on wharf	1
" flax	1	" on iron kettle	1
" herbs	3	" pan	1
" house	2	Fireplace blocked up	7
" jute	1	" built against shed	1
" lace	2	" defect in	10
" millboards	2	" set on timber	2
" paper	6	Fireworks	58
" room	1	" explosion of	3
" salvage	1	Fire in cask	5
" stove	199	Fits	4
" umbrellas	1	Flue	32
" waste	1	" blocked up	153
" wood	10	" boiler	1
" room, overheat of	4	" defect in	301
" stove,	5	" descending	3
Dustbin under shed	2	" heat from	13
" falling into fire	1	" hot air	18
Easing stopcock	1		

Causes.	Total.	Causes.	Total.
Flue, hot plate	2	Heat from retorts	1
„ foul	1,946	„ sun	14
„ overhear of	18	Heating by steam	1
„ kitchen	1	„ cement	1
Flue, copper	87	„ coffee	1
„ defect in	2	„ ether	1
Flue, furnace	14	„ gold size	1
„ defect in	7	Heating solution	8
„ heat from	12	„ tan	1
„ overhear of	4	Hearth, defect in	26
Flue adjoining	101	„ fire on	141
„ blocked up	8	„ improperly set	1
„ copper	1	„ laid on timber	21
„ defect in	43	High tide	1
„ furnace, defect in	6	Hot ashes	259
„ foul	2	„ air pipes	10
„ heat from	12	„ air stove	1
„ furnace, heat from	1	„ coals	2
„ hot plate	1	„ coke	21
Flue, hot air, overhear of	1	„ charcoal	9
„ forge, „	1	„ grease	1
Furnace	150	„ metal	3
„ overhear of	18	„ oven	41
„ set on timber	1	„ plate	29
„ shaft	1	„ rivets falling	1
Fumigation	81	„ water stove	2
Friction	39	„ water pipes	7
Fusees igniting	17	„ gridiron among sawdust	1
„ case of, falling	3	Horsehair falling on fire	1
Gas	1,682	Hurdle falling on cockle	1
Gas burner	5	„ wharf fire	1
„ too near ceiling	1	Illumination	4
Gas cock, defect in	1	Incendiarism	133
„ cooking apparatus	1	Insanity	5
„ company's men at work	2	Intoxication	155
„ escape of	364	Ink boiling over	1
„ explosion of	44	Ironing	1
„ from street	5	„ stove	62
Gasfitters at work	20	Iron foundry adjoining	1
Gas, lighting	74	„ plate fixed on timber	1
„ pipe, defect in	4	„ hanger put away hot	1
„ stove	17	Japan boiling over	3
„ swing bracket	5	Kiln	22
Galley fire	1	„ overhear of	6
Glue boiling	14	„ furnace, overhear of	1
Gauge glass bursting	1	Kitchen range	7
Gunpowder	4	Lamp	51
Hand grenade	1	„ camphine	2
Hatter's stove	1	Lamp, naphtha	70
Heat from casting	8	„ upset	4
„ kiln	3	Lamp, paraffin	11
„ malt	1	„ upset	8

Causes.	Total.	Causes.	Total.
Lamp, petroleum	1	Naphtha upsetting	1
„ black, overheating	8	Night lights	2
Lightning	12	Oil, boiling of	24
Lighting fire	7	„ over	6
„ lamp	1	Oil cask bursting	1
„ oven	2	Oil lamp	1
Lighted paper	25	„ upsetting	1
„ shavings	1	Oil thrown on dung heap	1
„ sawdust	1	Old age	3
Light in vault at funeral	1	Opening a pipe	1
„ thrown in yard	1	Oven	13
Light thrown into ventilating } opening	7	„ adjoining	3
Light thrown down area	63	„ defect in	7
„ under door step ...	1	„ falling in	2
„ from omnibus	1	„ fire, spark from	1
Lime slacking	93	„ flue	3
„ by rain	14	„ improperly set	2
„ by high tide	2	„ overheat of	5
Lime unslackened	2	Overheat of gas in ventilator	1
Linseed oil leaking	1	Packing	4
Lucifers	306	Painters at work	1
„ friction of	1	Pan slipping	1
„ case of, dropping	1	„ head blown off	1
„ jackdaw playing with	1	„ of composition igniting	1
Making polish	4	Paper used to fan fire	1
„ pomatum	1	Paraffin oil upset	1
„ varnish	2	„ drawing off	3
Mattress placed before fire to dry	1	Pasting charts	1
Meat falling into fire	1	Pitch boiling	9
Melting beeswax	3	„ over	41
„ gum	1	Pitch, drawing off	1
„ lead	12	Pitching a back	1
„ pot	2	Pipe stove	181
„ pan bursting	1	„ for ventilating gaslight	1
„ sulphur	1	Plumbers	10
„ sealing wax	1	„ fire adjoining	3
„ varnish	1	Poker falling out of fire	2
Metal gas pipe	1	Phosphorus	7
„ overflowing	1	Proofing, boiling of	1
„ upsetting	2	Railways	1
Men fighting	1	Rats gnawing matches	1
Mould bursting	1	„ gas pipe	1
Mistake of exciseman	1	Reading in bed	34
Mixing composition	10	Removing	1
„ colour	2	Repairs	12
„ sulphur	1	Repairing gas meter	1
Muriatic acid, boiling	1	„ gas pipe	3
Naphtha	5	„ organ	1
„ boiling	3	Retorts bursting	2
„ bottle of, breaking	1	„ leaking	1
„ cask of, exploding	3	Refusing to admit firemen	1
		Roasting coffee	2

Causes.	Total.	Causes.	Total.
Roasting chestnuts.....	1	Steam boiler, overheat of	20
" machine	1	" engine	19
" nut gall	2	" furnace flue.....	8
Rosin, boiling of.....	6	" gauge bursting	1
Rubbish too near furnace	1	" jacket	1
Sack falling on fire.....	1	Steam pipe	1
" placed near fire.....	1	" bursting	1
Sewing in bed.....	3	" overheat of	5
Seeking for leaking gas pipe } with candle	1	Still	1
Shavings near oven	1	" bursting	10
" taking fire	5	" boiling over	2
Sheet iron under stove	1	" exploding	1
Shooting birds	2	" overheat of	1
Singeing a horse.....	1	" head blown off	15
Smoking in bed	2	" heat from	1
" fish	1	" head, leakage of	9
" hams	3	" leaking.....	4
" rats	1	Stove	297
" sausages	2	Stove adjoining	7
" tobacco	406	" set on timber	1
Smoke hole.....	11	Stove, cabin.....	13
Smothering iron.....	1	" defect in	6
Soldering pot	1	" heat from	65
Solution boiling over.....	1	" improperly set.....	7
Soot	12	" overheat of	30
Spark from chimney	4	" on floor.....	3
" casting	2	" pipe	57
" engine	1	" portable	3
" forge	6	Sugar, boiling of.....	2
" flue	5	" over	2
" furnace	15	Sunlight burner	2
Spark from furnace of thresh- } ing machine.....	1	Sulphur	1
Spark from fire	1,225	Suspicious	5
" hot plate flue	2	Tar, boiling of	33
" locomotive	7	" copper leaking	4
" moulding.....	1	" light thrown into	3
Spirits boiling over.....	2	" pot boiling over	21
Spirit cask leaking	1	" pipe bursting	1
" filling of	1	" taking fire	2
Spirit falling on fire	1	Tarring a water butt	7
" gas stove.....	1	Tarpauling falling against stove .	1
Spirit lamp	18	Tallow boiling over	6
" overflowing	5	Thawing water pipes	4
Spirits of nitre	1	Timber under hearth.....	32
" wine	1	" funnel	2
Spirit thrown on fire	1	Tinman's stove	1
Spontaneous ignition.....	274	Tiring wheels	5
Steam	2	Trade	1,132
Steam boiler	11	Trying annihilators	1
" exploding	2	" signal lights	1
		Turpentine	5
		" boiling over.....	2

Causes.	Total.	Causes.	Total.
Turpentine, drawing off	5	Wax and turpentine boiling } over	1
„ leaking	5	Woman falling into fire	3
„ upset	5	Wood left burning in stoke hole	1
„ warming	3	Working late	4
Turning off gas	1	Working late on Sunday	1
Varnish boiling over	31	Workmen	17
„ drawing off	3	„ cooking	1
„ using, by candle-light	1	Workmen's fire	8
Valve of cylinder not fitting	1	„ spark from	1
Waggon driven too near lamp	1	Workmen trying if camphor } would burn	1
Warming bed	2	Workshop fire	2
„ tap of tank	1	Unknown	9,557
Wax boiling over	4		
„ of	2		
Wax taper	17	Total	29,069

Here is a short abstract of the leading cases deduced from the preceding table:—

	Number.	Per Cent.		Number.	Per Cent.
Candles	3,218	11'07	Sparks of fire	1,299	4'47
Children playing, &c. .	463	1'59	Spontaneous ignition .	274	0'95
Curtains	2,822	9'71	Stoves	489	1'67
Flues	2,268	7'80	Other causes known....	5,639	19'40
Gas	2,225	7'65	Unknown	9,557	32'88
Lucifers	409	1'41			
Smoking tobacco	406	1'40	Total number....	29,069	100'00

It will be understood that the above tables present (generally) but abstracts of the results of the complete records. These are sufficient for our present purposes. I assume all who desire further details will gladly consult “Records of the late London Fire “Engine Establishment, by Captain Eyre M. Shaw,” 1870, London, Effingham Wilson.

The following is a return of the London fires by way of continuation to the table given under date 1865:—

Year.	Total Number of Calls.	Alarms.			Fires.		
		False.	Chimney.	Total.	Total Number of Fires.	Seriously Damaged.	Slightly Damaged.
1866.....	1,532	—	—	—	1,338	326	1,012
'67.....	1,591	111	83	194	1,397	245	1,152
'68.....	1,858	100	90	190	1,668	235	1,433
'69.....	1,784	120	92	212	1,572	199	1,373
'70.....	2,246	133	109	242	1,946	276	1,670
'71.....	2,046	—	—	204	1,842	207	1,635
'72.....	1,671	104	73	177	1,494	120	1,374
'73.....	1,703	83	72	155	1,548	166	1,382
'74.....	1,750	89	88	177	1,573	154	1,419
'75.....	1,668	90	49	139	1,529	163	1,366
'76.....	1,787	91	64	155	1,632	160	1,466

This last table presents several points for remark. While for the preceding thirty-three years, 1833-65, the fires of London had shown a steady progressive increase, governed apparently by the increase of the number of houses, this table shows some remarkable fluctuations. Thus in 1868 the fires show an increase of 267 over those of the preceding year. In 1869 they fall back to something like the normal ratio of increase. But in 1870 there is again a serious jump, the calls of that year being no less than 462 more than those of the preceding year. Since then they have shown considerable signs of decrease: the calls for 1875 being no less than 578, or nearly 25 per cent. below those of 1870. Captain Shaw in his annual report to the Metropolitan Board of Works refers to the fluctuations, but does not explain them. A careful survey of the figures seems to indicate that the "false alarms" and "chimney" calls are less numerous since 1870. Is not this to be traced either to the introduction of the electric telegraph as the means of call, or to the change of the system in paying for calls, since the discovery of the "Anthony frauds" in 1871?

There is another aspect of the case which is really encouraging: for it shows the progressive efficiency of the fire brigade. This is the decreasing percentage of serious as against slight fires, during the period embraced in the last table. Here are the percentages, as presented by Captain Shaw:—

Years.	Percentages.		Total.	Years.	Percentages.		Total.
	Serious.	Slight.			Serious.	Slight.	
1866	25	75	100	1871	11	89	100
'67	18	82	100	'72	8	92	100
'68	14	86	100	'73	11	89	100
'69	13	87	100	'74	10	90	100
'70	14	86	100	'75	11	89	100

1876.—A select parliamentary committee was appointed to inquire into the efficiency, &c., of the Metropolitan Fire Brigade. The labours of that committee are not yet terminated. The following results from a return laid before this committee may be given here, as they differ in some respects from those previously given. For the last ten years the month in which the largest number of fires occurred in London was *July*, and next to it in the return stands *August*, and then *December*. The days on which the largest number of fires happened were *Saturday* and *Wednesday*. The hours at which the largest number of fires broke out were from 7 P.M. to 11 P.M.

It was part of my plan to have given under this head something

like an authentic summary of the amount of property annually burned in the various civilised countries of the world. This I have not succeeded in doing. In the absence of any national statistics there is literally no base for an accurate estimate. The aggregate of the insurance premiums paid to the fire insurance companies of the world—even if this important fact could be completely ascertained, which it cannot [I give a partial estimate at end of Division V]—would afford but an inefficient test, from the fact that only a varying proportion of the combustible property of any country is insured.

III.—*Introduction and Development of the Practice of Fire Insurance.*

While the early Saxon guilds had distinctly recognised the principle of affording specific compensation to such of their members as should suffer from the calamity of fire; and while several attempts had been made to introduce it into general practice—notably that made to Count Anthony Gunther von Oldenburg in 1609, but which that worthy refused to adopt, on the ground that it seemed liked flying in the face of providence; or again, the scheme of William Ryley and Edward Mabb, laid before Charles I in 1635 and 1638, and which obtained that monarch's sanction, and seemed in a fair way to be carried out, when the king's own troubles turned men's minds into another direction; or a still later proposal (1660) of "several persons of quality and eminent citizens of the "city of London" to the corporation of London, in view of inducing the city to undertake the business of insuring houses; the system did not come into practice in Great Britain until the year following the GREAT FIRE OF LONDON of 1666; and in all probability would not have then come into use but for that event.

It is to be noticed that each of the three schemes here so briefly referred to—but the details of which I have set out in my *History of Fire Insurance*—took the shape of State or municipal insurance, *i.e.*, that the business of insuring houses was to be conducted by the State, or in the last case by the municipality, *as a scheme of finance*, and not for trading profit merely.

Mr. Frederick Hendriks has expressed an opinion that the law of *Cora* (or *Keure*), which was promulgated by Count Thomas of Flanders, as early as 1240, contained a provision for meeting the case of destruction of property by fire, by a community of liability, something after the manner of a mutual insurance compact which should apply to a whole community. In Russia at the present time, and for long past, it has been the practice for the nobles, *i.e.*, the landholder to insure the villages of his (late) serfs, by paying such a sum in case of fire as would rebuild the log hut, and perhaps

contribute to replace its scanty contents. But after a careful investigation, I have been unable to trace the actual practice of fire insurance by way of indemnity in respect of a premium or contribution *pro rata* prior to the great fire of 1666. If there had been any insurances on the houses in London at that date, I do not think the fact could have escaped record. I now proceed chronologically.

1667.—Dr. Barbon (said to be a direct descendant of Praise-God-Barebones of the Cromwellian commonwealth) opened an office in London for the insuring of houses. In the same year the *Fire Casse* in the city of Hamburg was founded. This latter was a system of municipal insurance.

1669.—During this year the attention of the corporation of London was again drawn to the question of fire insurance. Various discussions were entered upon and resolutions taken. Counter propositions and rival schemes were also advanced; and it was not until the 17th June, 1681, that the corporation of London finally resolved upon undertaking the business of fire insurance as a scheme of municipal finance. On the 16th September that year the advertisement announcing the scheme was promulgated, and business was immediately afterwards commenced. But such commencement of business was the signal for war with a body of gentlemen who had in 1680 taken up Barbon's scheme and converted it into a joint stock undertaking. To such an extent was the warfare carried, that the honesty of the corporation in the matter was openly attacked; and finally, on 13th November, 1682—just one year and one month after it had been resolved “to undertake ye insuring of all houses within the city and liberties”—the enterprise was abandoned by resolution of the common council, and the contracts already entered into were cancelled on the best terms possible. These contracts had been for terms varying from one to one hundred years.

Those who desire to become acquainted with the details of this remarkable “chapter in the history of the corporation of London,” may consult the “Insurance Cyclopædia,” article, *Fire Insurance*, *History of*, where the facts and official documents are all set forth.

1683.—The corporation of London was no sooner out of the contest, than there enters upon the scene the promoters of the Friendly Society—a scheme of mutual fire insurance. However fierce the warfare had been with the corporation, that with “the new interlopers” was still more severe and personal; and was finally only adjusted by being referred to the king (Charles II) in council. From this period dates the origin of those mutual contribution fire insurance associations, of which the Hand-in-Hand,

the Westminster, and, in a modified form, the Union, are the sole survivors. The origin of these, and other associations of this period, is set out in detail in the article previously referred to.

1697.—By this date the practice of fire insurance had become very general in London; but the provinces generally, including the larger provincial cities and towns, were still without such means of protection. They had still to rely, on the occasions of great calamities by fire, upon the bounty of the nation in the way of response to “Briefs” issued under authority, but open to the greatest possible abuse. The history of “King’s Briefs,” in use certainly in the fifteenth century, but probably of much earlier origin, forms a curious chapter in our national history, and it is wonderful that a so fruitful topic almost of romance should have escaped the keen eye of Macaulay. It was from events which occurred during this year that the abuses attending the system became exposed. This led up to a legislative enactment (in 1705), and finally to their abandonment.

1710.—It was by the establishment of the “Company of London Insurers” (now the Sun Fire) this year, that the advantages of fire insurance became extended to the provincial towns of the kingdom.

1720.—During this year—fruitful in so many projects of insurance, some of them of a very remarkable character, but outside our present consideration—the establishment of the “Friendly Fire” in Edinburgh, gave to Scotland the advantages of fire insurance. The establishment of the “General Insurance from Fire in Ireland” gave the same advantages to that country.

1780.—Of twenty-two fire insurance associations which had been founded in the United Kingdom prior to this date, there were nine remaining, viz.:—Hand-in-Hand (1667); Sun (1710); Union (1714); Westminster (1717); British and Irish (1720); Friendly of Edinburgh (1720); London Assurance Corporation (1721); Royal Exchange (1721); Liverpool (1777). Of these six still exist (1877).

I now proceed to indicate the decennial progress of fire insurance in the United Kingdom, as revealed by the progress or otherwise of its number of fire offices.

1790.—Of the nine fire offices which existed at the commencement of this decennium, and three since founded, making a total of twelve, all were in existence.

1800.—During the decennium now ending there had been founded seven new fire offices; one of which had died out, leaving six, which, added to the twelve existing in 1790, made a total of eighteen then existing fire insurance offices.

1810.—The new fire offices of the decennium were both numerous and important. In London there were founded the Globe (1803); Imperial (1803); Albion Fire and Mutual (1805); County (1807); Eagle Fire and Life (1807); Hope Fire and Life (1807); Atlas Fire and Life (1808). In the provinces the Essex and Suffolk (1802); Kent (1802); Hants, Sussex, and Dorset (1803); Finchfield (1804); Liverpool, No. 2 (1804); Birmingham (1805); West of England (1807); Sheffield (1808). While in *Scotland* there were founded the Caledonian (1805); the Hercules (1809) and the North British (1809). In *Ireland* the Hibernian (1808). Total new offices, nineteen. Of the eighteen existing at the commencement of the decennium, one (the Liverpool, No. 1) had passed away. The total number of fire insurance offices in the United Kingdom at this date therefore appears to have been thirty-six.

1820.—The new fire offices of the decennium were almost *nil*. There was the Bristol Union Fire and Life (1814); and the National Union Mutual and Fire. Nearly all the thirty-six offices existing at the commencement of the decennium were still existing; so that we have a total of thirty-eight fire offices in the United Kingdom.

1828.—At this date was founded the Royal Standard Friendly Society, and among its features was that of granting to its members protection against loss of their effects by fire to the extent of 15*l*. each. In taking this step the society was but following the example of the earlier guilds. It will be remembered that these societies could not have undertaken this branch of insurance but from the fact of being exempted from all stamp duties.

1830.—The changes among the fire offices during the decennium now ending were considerable. The new offices were: *England* (town), the Beacon (1821); Guardian Fire and Life (1821); Alliance Fire and Life (1824); Palladium No. 2 Fire and Life (1824); *Ægis* (1825); Protector (1825). In the provinces the Norwich Union [based upon the Norwich Union of 1797] (1822); Canterbury and East Kent (1823); Berkshire and Gloucester Fire and Life (1824); Essex Economic (1824); Herts, Cambridge, and County Fire and Life (1824); Leeds and Yorkshire Fire and Life (1824); Manchester Fire and Life (1824); South Devon Fire and Life (1824); Sussex County and General Fire and Life (1824); Yorkshire Fire and Life (1824); Surrey, Sussex, and Southwark Fire and Life (1825); Sheffield Fire and Life (1826); Shields, North and South (1826); Suffolk Amicable and General (1826); Norwich Equitable [new] (1829). In *Scotland* the new fire offices were Insurance Company of Scotland (1821); Forfarshire and Perthshire (1823); Scottish Union (1824); Aberdeen Fire and Life (1825). In *Ireland*, National Assurance Fire, Life and Mutual

(1822); Royal Irish (1823); Shamrock (1823); Patriotic (1824); Alliance, Irish, Fire, Life and Mutual (1825); Phoenix, Irish (1825). In all (not counting Norwich Union as new) twenty-nine.

The fire offices which had passed away were fourteen, among which we may specify the British Commercial (founded 1820); Palladium No. 2 (1824); Bath, old (date of establishment not known); Finchfield (1804); Gloucestershire (date of establishment unknown); Canterbury and East Kent (1823). The gain in the decennium appears to have been fourteen, leaving a total of fifty-three fire insurance offices existing. We suspect the number is slightly understated. In future we shall have the duty returns to help us.

1840.—The changes in this decennium are numerous rather than important. Some offices had passed out of existence altogether; others had sprung up to take their places. Thus, while there were but fifteen town offices returned in 1831, there were now twenty; while as against twenty-five country offices in 1831, there were now but twenty-three. But twelve *Scotch*, and four *Irish* offices were now brought into the returns—making a total of fifty-nine.

The new offices in *England* embraced the District (1834); York and London (1834); Leicestershire (1834); Licensed Victuallers (1835); Newcastle and North *England* (1835); Nottingham and Derby (1835); St. George No. 2 (1835); Coventry and Warwickshire (1836); Independent and West Middlesex (1836); Licensed Victuallers Fire and Life (1836); Liverpool and London (1836); Protestant Dissenters Fire and Life (1837); Shropshire and North Wales (1837); Benevolent Fire and Life (1838); English and Scottish Law Fire and Life (1849); London, Edinburgh and Dublin Fire and Life (1839); Church of England Fire and Life (1840); Royal Farmers Fire and Life (1840). In *Scotland*, County and City of Perth (1836); Glasgow (1836); Metellus (1838); North of Scotland (1837); Morayshire (1840). Total, twenty-four. Four of which were strictly class offices.

The offices which had passed out of existence were the Independent and West Middlesex (1840); Protector (1835); Bath Sun (1838); Berks, Gloucester and Provincial (1831); Bristol (1839); Bristol Crown (1837); Coventry and Warwick (1839); Hereford, Cambridge and County (1831); Newcastle and North of England (1838); Norwich Equitable (1834); Salamander (1835); North and South Shields (1836). In *Scotland*, the Metellus; and in *Ireland*, the Commercial (1837); and the Hibernian (1838). Total discontinued, fifteen; leaving gain of nine on the decennium.

1850.—The new fire offices established in *England* in the decennium were:—

1841. South of England Fire and Life	1846. Legal and Commercial
1844. Burnley Mutual	1847. Architects and Builders Fire and Life
" Cambrian Fire and Life	" Defender Fire and Life
" Kent Mutual	" North of England Fire and Life
" North of England Fire and Life	1848. British Empire Mutual
" Preserver Fire and Life	" National Mercantile
1845. Cambrian and General Fire and Life	1849. Anchor Fire and Life
" Halifax, Bradford, &c., Fire and Life	" British "
" Law	1850. Equitable
" Preston and North Lancashire	" Brighton and Sussex Mutual
" Royal Fire and Life	" English and Cambrian Fire and Life
" Sheffield, Rotherham, &c.	" National Guardian Fire and Life
" Star	

In *Scotland* the new offices were:—

1841. National and Scottish Fire and Life	1844. Western Fire and Life
	1845. Bon Accord Fire and Life

The offices which ceased to exist in the decennium were, in *England*, the Benevolent (founded 1831), Brighton and Sussex (1841), British Union (1844), British (1843), English and Scottish Law (1843), Leicestershire and Midland (1843), Preston and North Lancashire (1848), Reading (1841), Winchester, Hants, &c. (1847), York and London (1842). In *Scotland*, County and City of Perth (1844), Friendly (1847), Glasgow (1841), Western (1847). In *Ireland*, the British and Irish (1843). Total fifteen, leaving a gain of thirteen in the decennium. It is noticeable that two of the offices which passed away dated from 1720, viz., the Friendly of Edinburgh, and the British and Irish of Dublin.

1858.—The leading British insurance offices combined this year—after repeated attempts in the same direction—in view of regulating rates, &c., and became what is now known as the Tariff Association, or the Association of British Fire Offices. Its services have been very considerable not only to the offices, but to the public; for uniformity of operation in a business of such extended ramifications as fire insurance must be held to be of great value.

1860.—This decennium shows many changes. First, whereas there were thirty-two town offices included in the list in the previous decennium, there are now but twenty-five, several of which are new. The town offices which had passed out of existence were the Monarch, Legal and Commercial, Defender, Star, National Mercantile, British Empire Mutual, British Anchor, Equitable, National Guardian, Times, English and Cambrian, British Provident, Cambrian Universal. Of the country offices there had passed away the Newcastle-upon-Tyne, the Halifax, Bradford and Keighley, the North of England, Essex Economic, Kent Mutual, and the Brighton

and Sussex. Of the *Scotch* offices there had passed away the Forfarshire and Perth; and no new one had been created. In *Ireland*, there was no change in the native offices.

The new offices of the decennium were :—

1851. Brewers and Dis-	1852. Protestant	1854. London Mercan-
tillers.	„ Provincial (Welsh)	tile
„ Lincolnshire	„ Sceptre of Eng-	„ State
„ Sceptre	land	„ United Brothers
„ Times	„ Unity	1855. Emperor
1852. Absolute Security	1853. Beacon	„ Hull and London
„ Adamant	„ Eclipse	„ Saxon
„ Athenæum	„ General Indem-	„ United Friendly
„ Counties Union	nity	Brothers
„ English and Fo-	„ Realm	1856. Bank of London
reign	„ Self-Reliance	1857. Queen
„ Era	1854. Durham and Nor-	1858. }
„ Lancashire	thumberland	1859. } None
„ National Provincial	„ Law Union	1860. }

1861.—The great fire in Tooley Street, London Bridge, this year, introduced some important changes into the practice regarding mercantile insurance in London, alike in the rates charged, and in the storage of goods.

1870.—The leading incident in the history of fire insurance this year carries us back to the origin of fire underwriting in the United Kingdom. A plan was set on foot in Manchester by which individuals were to underwrite fire risks, much as marine insurance policies are still underwritten at Lloyd's, and as fire insurance may have been conducted for a few years after the fire of London, 1666. There is, however, this differing feature in the modern scheme, viz., that the policies are underwritten by one man, holding a power from all the underwriters standing upon the risk; thus 3,000*l.* written by him would probably mean 100*l.* for thirty different individuals. The parties have adopted a legal organisation, which is known as the Mutual Fire.

The number of changes among the fire offices during the decennium had been considerable. Now that the duty has been abolished and there is no longer any need for distinction between town and county offices, we shall abolish such distinction here, and speak of the English offices generally. The Scotch and Irish offices we shall speak of distinctly, and also of the foreign offices established agencies in the United Kingdom.

The offices which had passed away were the Globe (1803), Leeds and Yorkshire (1824), Unity (1852) [these three by transfer to Liverpool, London and Globe]; the Birmingham (1805) [by transfer to the Lancashire]; the District (1834) [Birmingham];

the Sheffield (1808); the Hants, Sussex and Dorset (1803) (these three last by transfer to the Alliance).

The new offices of the decennium in *England* were:—

1861. Commercial Union	1865. Hercules (No. 3)	1868. Britannia
„ Mercantile	„ London and North-	„ British Alliance
„ Volunteer Service	„ ern	„ Masonic and Gene-
1862. London and Lan-	„ Non-Tariff	„ ral
cashire	„ Provincial Union	„ National Provin-
„ Prince	1866. Household (No. 1)	„ cial (No. 2)
1863. Alexandria	„ Industrial	„ United Ports (Ma-
„ British Nation	„ London and Man-	„ rine, &c.)
„ City and County	„ chester	1869. Artisan
„ Friend-in-Need	„ Manchester Pro-	„ Commercial In-
„ Hercules (No. 2)	„ vident	„ demnity
„ Mercantile Union	„ Planet	„ King's Lynn
„ Western	1867. English (Fire and	„ Monarch (Marine,
1864. Albert (Marine, &c.)	Life)	„ &c.)
„ Birmingham Alli-	„ Permanent	1870. Beehive
ance	„ Primitive Metho-	„ Industrial
„ Home and Colonial	„ dist	„ London and Mid-
(Marine, &c.)	„ Progress (Marine,	„ land
„ Independent	„ &c.)	„ Mutual (Manches-
„ London and South-	„ Reinsurance	„ ter)
wark		„ Staffordshire

The new offices in *Scotland* were the Stewarton, Dunlop, and Fenwick Mutual (1861); Town and Country (Dundee) (1862); Scottish Fire (1864); Scottish Commercial (1865); Scottish Imperial (1866); Northern Counties (1869); Border Counties (Dumfries) (1870).

In *Ireland* the Etna (1868) had been founded.

The *foreign* fire offices having agencies in the United Kingdom were the Azienda Assecuratrice (of Trieste); the Netherlands; the Concordia; Rotterdamsche and Nederlandsche; and Messrs. Dormiel. There were also registered in England two companies (fire, life, &c.), intending mainly to trade in France, viz., the International Union and La Gauloise.

1872.—There was revived in England for the first time during nearly two centuries, the idea of municipal fire insurances. In the Manchester city council, on the 2nd October this year, Mr. Alderman Hopkinson moved for a committee, “to inquire into the “desirableness and feasibility of the corporation undertaking to “insure owners of real property within the city from loss by fire.” The mover thought that it was quite within the province of the corporation to undertake such a task, and that it would carry out the work better than private individuals. Fire insurance, on that ground, he argued, ought to be left in the hands of the corporation

just as they were already entrusted with parks, libraries, cemeteries, water, gas, and abattoirs, with respect to which they had given satisfaction to the community. He went on to say :—

“The Council had already a great deal to do with the prevention of fires by the regulations which they laid down as to the construction of houses, and also by the arrangements which they had made for subduing fires by their fire brigade. He found that in the five years from 1846 to 1850, the number of fires in Manchester was on an average 116 per year; the damage done to buildings averaged 12,000*l.* per year; and the rateable value of property in the city was 980,000*l.* The number of fires had gradually increased year by year, in something like proportion to the extension of the city and the increase of population; but the average of damage remained about the same. Thus in the five years from 1850 to 1855, the number of fires was 179; in the next five years it was 184; in the five years ending 1865 it was 238; and in the five from 1866 to 1871 the average per year was 293. On the other hand, the average yearly damage to real property from 1846 to 1850 was 12,000*l.*; the average in the next five years was 12,280*l.*; in the third, 11,062*l.*; in the fourth, 12,600*l.*; and in the fifth, 11,700*l.*; while the rateable value of the city had increased from 981,000*l.* to 1,700,000*l.* The reason of this he attributed to the increased efficiency of the fire brigade. Property in Manchester, in consequence of the excellent arrangements prevailing for the prevention and extinction of fires, was subject to less risk of loss than property in the surrounding towns, and he claimed for the citizens of Manchester to have the advantage of that state of things. . . .

“*His proposal was to insure real property, not stock.* The average risk may be set down at about 12,000*l.* per year. The greatest loss that had ever taken place in one year was 36,000*l.*, which was in 1866. It might be said that some such calamity might happen to the city as had devastated Chicago. Such a fire, he contended, could not take place in a city like Manchester, where the houses were widely spread; where every effort was made in their construction to prevent the extension of fire; and where the fire brigade was so efficient. If, however, such a calamity should occur, he would leave the case of Manchester to the sympathy, or, rather, the gratitude of other towns and of other countries; for wherever there had been a disaster, Manchester, in past times, had been forward in the liberality with which it had afforded relief. *He would let a man insure in any office he pleased, or in as many offices as he pleased, but he would always have him insure in the corporation, whether he would or not.* They might ask, how could he enforce this, or compel any one to pay the premiums? He answered, by not having premiums or any payments as such at all. He would have the case simply stand in this way, that if a man had real property in the city, therefore he was insured. He would have no payments of premiums, no expenses of competition, no advertisement, no collectors. All the corporation office would have to meet would be expenses which attended losses, and the sum required out of the rates to meet those expenses, calculated on an average of the last twenty-six years, would be from 1½*d.* to 2*d.* in the pound. But he contended that, in all probability, the average yearly damage caused by fire would, under the new system, be very much diminished, because of the greater attention which would be given to the efficiency of the fire brigade. It might, perhaps, be contended that the scheme was unfair, because one man's property was subject to a great deal more risk than another's; but that objection was common to the whole system of municipal government.

What he proposed was, not that they should at once adopt his scheme, but that a committee should be appointed to inquire into the subject."

Nothing came of the proposal. I have since learned that a previous proposal of a like nature had been brought before the same body. Various schemes of State and municipal insurance will be mentioned in our sketch of the history of fire insurance in foreign countries, which forms another section of my paper.

1873.—There was founded in Manchester, the insurance institute, the objects of which are: "the reading of papers on subjects "connected with fire and life insurance; the discussion of all "questions relating thereto; and generally the promotion of a good "understanding amongst the members of the insurance profession "in Manchester." Nothing can be more laudable than such a combination of purposes. The belief has been very general that fire insurance does not afford to its students as many problems of interest as does life insurance. I trust the present paper may tend to remove such an impression.

1875.—There were quite an unusual number of fire offices founded in this and the preceding year.

The new fire offices registered in *England* during the quinquennium were as follows:—

1871. Belfast	1873. Equitable (Manchester)	1874. Household (No. 2)
„ British Workman's	„ Leicestershire and	„ Middlesex
„ „ National	„ North of Eng-	„ National
„ Great Britain	„ land	„ Provident
„ Southern and	„ Norwich Provi-	„ Pudsey Mutual
„ Western	„ dent	„ Standard
„ Universal	„ Sovereign	1875. Church and Em-
„ Universal Non-	1874. British, Colonial,	„ pire
„ Tariff	„ and Foreign	„ Crown
„ Western Alliance	„ Property	„ Federative
„ (Plymouth)	„ Cotton Waste	„ Fire Guarantee
1872. Morley Mutual	„ Dealers	„ Government Secu-
„ Wesleyan Metho-	„ Economic	„ rity Co-operative
„ dist Trust	„ Fire Reinsurance	„ Hecla
1873. Artisan's Co-ope-	„ Great National	„ Industrial
„ rative		„ Millers'

The following fire insurance companies intending to transact business in France and elsewhere were registered in England:—1871, Guernsey Mutual; 1873, Gallia; L'Etoile Française; L'Union Internationale.

The following foreign offices opened branches in England:—Agricoles Caisse General; Jakor (anchor) of Moscow; Le Monde; L'Universe.

The fire offices which have passed out of existence during the quinquennium are: English (founded 1867); Industrial Fire (1870);

Universal Non-Tariff (1871); Southern and Western (1871); La Gauloise (1869); Northern Counties (1869); Town and Country (1869); Artisans' Co-operative (1873); London and Midland Fire (1870); London General Reinsurance (1873); Norwich Provident Fire (1873); Provincial (1852); Border Counties (1870); British Colonial and Foreign Property (1874); British National (1871); Great National Fire (1874); Leicestershire and North of England (1874).

The following foreign offices have withdrawn their agencies from Great Britain; Atlas, of Vienna; General, of Grünberg; Frankfurter.

The total number of British fire offices existing at the end of the year was sixty-six.

I may conclude this section of my subject with the following passage from the "Spectator" of New York, June, 1875:—"The business of fire insurance has grown to be one of the mightiest commercial forces of the age. It employs a vast capital, and enrols under its banners, in this country (the United States), an army of more than 30,000 workers. Its beneficent influence for the security, and therefore the happiness of mankind, is too great to be weighed and measured in figures. There is hardly an interest, commercial or social, that is not in some way connected with or dependent upon it; and the fire underwriter has now become as necessary a part of the machinery of civilisation as the lawyer, the teacher, or common carrier. Such being the case, the loftiest intellect may not unworthily interest itself in the scientific problems which underlie the business, and in the methods by which it is accomplished."

IV.—*Amount of Property Requiring the Protection of Fire Insurance.*

This question can only be treated in regard to the various countries in regard to which reliable estimates have been made.

GREAT BRITAIN.

1675.—The first estimates we have relate to London only. Thus Mr. Deputy Newbold presented a petition to the corporation of London this year, wherein he states, "There are 12,000 new brick houses in the city, of the average value of 250*l.* These insured at 3 per cent. would produce a fund of 90,000*l.*"

1739.—Maitland, in his "History of London," published this year, endeavours to form an estimate of the value of house property within the bill of mortality, and, in doing so, gives us the following interesting details:—

The number of houses within the bill of mortality at present insured in the Hand-in-Hand Fire Office amounting to 42,676, the

same are insured at 9,231,400*l.*; and the number within the said district in the Westminster Fire Office being 7,852, they are insured at 2,059,121*l.*, which makes the number of houses 50,528, and the sum insured thereon 11,290,521*l.* He adds:—

“I endeavoured to obtain accounts from the other fire offices, but not succeeding, I shall, by the help of the above, attempt to show the constructive value of all the houses within the bills of mortality. . . .

“But first it will be necessary to acquaint the reader that the several fire offices, to prevent their being imposed upon, insure (at most) only three-fourths of the value of each house; which fourth part uninsured being added to the aforesaid sum, it will increase the same to 15,054,028*l.*, which is the constructive value of all the said houses. But as the number total of all the houses within the bills of mortality amount to 95,968, the value of the said houses, according to the aforesaid method of calculation, must amount to the sum of 28,592,463*l.* 6*s.* 10½*d.*”

He had taken very considerable pains to ascertain the total number of houses in the city, and we think with success—therefore his estimate is entitled to reliance.

1802.—Sir Frederick Morton Eden, founder of the Globe Insurance Company, made an elaborate estimate of the amount of insurable property in Great Britain and Ireland at this date. His calculation then was that 612,975,000*l.* (his figures were 12 millions less through error in casting) represented the approximate value, while 223 millions only were then insured. The following is an abstract of the items constituting the data on which his estimate was founded:—

Estimate of the Value of Property Insurable from Fire in Great Britain and Ireland, A.D. 1802.

	£
1. Value of houses, including machinery, in England } and Wales	240,000,000
Value of houses, including machinery, in Scotland, } one-eighth of the above	30,000,000
	<hr/>
	270,000,000
2. Furniture in England and Wales	£120,000,000
„ Scotland, one-eighth	15,000,000
	<hr/>
	135,000,000
Stock of goods in hand, exclusive of furniture—	
Clothes	£15,550,000
Plate	10,000,000
Jewels and trinkets	5,000,000
Clocks and watches	2,000,000
Books	5,000,000
Wine and other liquors....	2,000,000
House and table linen	3,000,000
Horses and carriages.....	2,000,000
Miscellaneous articles	5,450,000
	<hr/>
	50,000,000
Scotland, say one-tenth	5,000,000
	<hr/>
	55,000,000
	<hr/>
	190,000,000

Property Insurable from Fire in Great Britain and Ireland—Contd.

3. Agricultural stock, including wheat, } barley, rye, oats, beans, rape, hops, } hay, &c., value at least	£ 52,000,000	£
Of which total there would be insurable } at an average (deducting what might } be consumed from time to time) to } the amount of	—	32,500,000
4. British manufactures for home consumption—		
Woollen	11,000,000	
Cotton	6,000,000	
Leather	12,000,000	
Flax	2,000,000	
Hemp	2,000,000	
Glass	2,000,000	
Paper	1,500,000	
Porcelain and pottery	2,000,000	
Silk	3,000,000	
Hardware	6,000,000	
Beer	10,000,000	
Spirits	4,000,000	
Soap	1,500,000	
Salt	1,000,000	
Candles (wax and tallow)	2,000,000	
Various articles, as carriages, &c.	10,000,000	
	76,000,000	
British manufactures for exportation	40,000,000	
Foreign merchandise in Great Britain	40,000,000	
	156,000,000	
Of which total about one-fourth is } insurable	—	39,000,000
Works of art, pictures, &c.	—	10,000,000
5. Shipping—1,725,940 tons	20,000,000	
Plantation-ships—240,786 tons	2,000,000	
Ships on the stocks	1,000,000	
	23,000,000	
Of which suppose one-fourth insurable		5,750,000
Minerals, river craft, public buildings, arsenals, &c.		10,000,000
Total insurable property in Great Britain		557,250,000
Insurable property in Ireland, supposed to be } one-tenth of that of Great Britain		55,725,000
Total insurable property in United Kingdom		612,975,000

1804.—Sir John Sinclair, in his “History of the Revenue,” published this year, adopts the preceding estimate, with the exception of the last two items of 10 millions each (and some corresponding deductions), making his total 590,975,000*l.* He says, “There

“is every reason to believe that the above [modified] estimate is “not over-rated.”

1857.—Mr. Brown, in a paper read before this Society, “On the “progress of fire insurance in Great Britain as compared with other “countries,” considered that the value of houses and buildings in England and Wales might be taken at the figures to be stated below, and that the contents of the houses, instead of being put at one-third of the value of the buildings, as assumed by Sir F. M. Eden, might be taken at half as much again as the value of the buildings, which would give the value of these two items as follows:—

	£
Value of buildings.....	654,000,000
Contents of „	981,000,000
Estimated value for 1855	1,635,000,000
Insured in 1855	802,574,000

So that something less than one-half of the real value was insured.

1863.—Mr. Coode, in his able report upon fire insurance duty, said:—

The *insurable* property (against fire) in England and Wales had been estimated as follows:—

	£
Houses and buildings	750,000,000
Household furniture, &c.	253,000,000
Stock-in-trade, &c.	130,000,000
Total	1,141,000,000

To which might be added, if it could be estimated, (1) value of machinery not included; (2) value of ships and craft not covered by marine insurance. The above figures gave to every man, woman, and child of the then population an average of insurable property amounting to 57*l.* 10*s.* per head.

The *uninsurable* property in England and Wales had been estimated as follows:—

	£
Land and its modifications in England	1,815,000,000
In colonies and abroad belonging to English residents, say	100,000,000
Funds and other investments	1,500,000,000
Live stock, capital sunk in tillage and manurance, } minerals unfashioned, &c., say	150,000,000
Shipping covered by marine insurance (and therefore } not requiring other insurance protection)	60,000,000
Total.....	3,625,000,000

Mr. Coode added some other items by which he brought up the

amount to 3,825 millions, or 19*l.* 10*s.* per head for every man, woman, and child of the then population.

1871.—As a key to the continuous increase of insurable property in one branch alone, we present the following figures from the “Builder:”—“We have built in England and Wales, in the way “of dwelling houses alone, upwards of 1,000 millions’ worth of “property, roughly speaking, since the year 1801, and within the “ten years only between 1861 and 1871 we have built dwelling “houses to the value of more than 220 millions sterling.”

Again, I find it impossible to furnish any reliable estimate of the insurable property in other countries.

V.—*Amount of Property actually Insured.*

As but very few direct statistics upon this point can be obtained in this or any other country, I am obliged to fall back upon such indirect estimates as are available. While the percentage duty was in force, we had indeed a fair approximate means of measurement. This was the only good feature which attached to the otherwise objectionable impost. I shall avail myself of the estimates based upon the duty return to the utmost extent.

1682.—If we consider that the business of fire insurance began in earnest in 1682, we shall hereafter see that by 1782 the sum insured was 130 millions. Assuming this sum to have been steadily progressing during the preceding century, it gives a ratio of progress of 1,300,000*l.* per annum. This is to be regarded as approximate only, as no doubt the annual increase in the later periods was much greater than in the earlier ones.

1776.—Dr. Adam Smith, in his “Wealth of Nations,” published this year, supposed that, “taking the whole kingdom at an average, “nineteen houses in twenty, or rather, perhaps, ninety-nine in a “hundred, were not insured from fire.” (Book i, c. 10.)

1783.—The duty on fire insurance collected in England and Wales this year under the Act of 1782 amounted to 142,822*l.*, but this really included receipts for 401 days. The estimate for the year was 130,000*l.*, but this probably included some septennial insurances, as the duty for several following years showed a decrease. Or it may be that the duty operated as a discouragement to insurance. The value of property insured (taken upon the 130,000*l.* duty) is estimated at 170,533,330*l.* The duty on foreign insurances effected in England was about 2,100*l.* No return from Scotland was obtained until 1787, which would be for the year 1786. The amount was 1,315*l.*

1790.—I propose to record the progress of fire insurance decennially, unless special circumstances shall call for more frequent

notice. The duty collected in 1791, which would be upon insurances effected in this year, was in England and Wales, 113,165*l.*; in Scotland, 1,851*l.*—total, 115,016*l.* The rate still being 1*s.* 6*d.* per 100*l.* insured. The estimate of the total property insured in England and Wales upon this basis is 150,886,000*l.*

1800.—The annual amount of percentage duty in England and Wales for the year ending 5th January, 1801 (duty upon insurance of 1800), was 204,947*l.*, and in Scotland 3,614*l.*—total, 208,561*l.* The rate had been increased to 2*s.* per 100*l.* in 1797. The value of property insured in England and Wales was estimated at 204,946,000*l.*

1810.—The amount of percentage duty on fire insurance (which had undergone some changes in the rate) in England and Wales for the year ending 5th January, 1811 (upon the insurance of 1810), was 434,158*l.*; in Scotland 16,435*l.*, and in Ireland 22,408*l.*—total, 473,001*l.* The duty had been at the rate of 2*s.* 6*d.* per 100*l.* insured since 1805. The total amount of property insurance in England and Wales was estimated at 347,325,600*l.* Of the above duty no less than 381,165*l.* 0*s.* 9*d.* was collected by fifteen London offices, which had therefore a monopoly of the whole fire insurance business of the country.

1820.—The amount of percentage duty on fire insurance in England and Wales for the financial year ending 5th January, 1821, was 586,898*l.*; in Scotland, 22,244*l.*; in Ireland, 21,737*l.*—total, 630,879*l.* The rate had been at 3*s.* per 100*l.* since 1816; but the duty on colonial insurance had been repealed since 1810. The value of property insured in England and Wales was estimated from the duty at 391,265,300*l.*

1830.—The annual percentage duty on fire insurance collected upon insurance in England and Wales for the financial year ending 5th January, 1831, was 717,275*l.*; for Scotland, 51,579*l.*; for Ireland, 29,222*l.*—total, 798,076*l.* The rate had been 3*s.* per 100*l.* insured through the decennium. The value of insured property in England and Wales at this date was estimated from the duty at 478,183,300*l.*

1838.—The first volume of the *Journal* of this Society, published this year, contained an article, "Fires in London, with an account "of the London fire engine establishment." It was written by Mr. R. W. Rawson, and embodies the first systematic inquiry into the statistics of fires of which we have any knowledge. Its value has now, however, been superseded by the more complete details we have presented under another division of this paper. He made inquiries regarding the insurance in the case of 1,065 fires happening in 1836-37, with the following results:—

Building and contents insured.....	342 = 32 per cent.
„ only.....	120 = 11 „
Contents „	180 = 17 „
Neither insured	423 = 40 „

“ If this calculation (he says) holds good for the whole of London, “ two-fifths of the houses in the metropolis are entirely uninsured, “ and one-third only are insured for both the buildings and contents.”

1840.—The annual percentage duty on fire insurance collected upon insurance in England and Wales for the financial year ending 5th January, 1841, was 885,691*l.*; in Scotland, 59,746*l.*; in Ireland, 45,348*l.*—total, 990,785*l.* The rate remained at 3*s.*, but all agricultural insurance had been exempted from duty since 24th June, 1833. The value of insured property in England and Wales was estimated at 641,448,716*l.*, including 50,988,016*l.*, the value of agricultural insurance exempted from duty.

1845.—Mr. G. R. Porter, in his “ Progress of the Nation ” (edit. 1847), gives the following returns of the sums insured against fire in the three divisions of the kingdom at the following dates, and the percentage of aggregate increase (it will be observed that his estimates differ slightly from those previously presented):—

Years.	England.	Scotland.	Ireland.	United Kingdom.	Percentage of Increase on 1801.
	£	£	£	£	
1801	219,623,954	3,786,146	8,832,125	232,242,225	—
'11	340,296,000	13,106,400	13,302,400	366,704,880	57·89
'21	381,406,000	13,824,666	12,806,666	408,037,332	75·69
'31	473,073,333	34,109,333	19,472,666	526,655,332	126·77
'41	605,878,933	44,655,300	31,005,606	681,539,839	193·45
'45	640,680,500	47,122,900	34,277,900	722,081,300	210·91

1848.—The amount of property insured against loss by fire in the United Kingdom was 811 millions, and the nominal capital subscribed to guarantee the due fulfilment of these engagements at the end of 1849 was computed at more than 50,000,000*l.*, by fifty-nine companies; some of them, however, guaranteeing under the same capital also life and marine risks.

1849.—The total duty received in 1850 (for 1849) in the United Kingdom was 1,171,629*l.* 16*s.*, representing a sum insured of 781,086,533*l.*, besides 61,805,427*l.* farming stock insurance, which is exempt from duty, making a total of 842,891,960*l.* This large amount of insurance was steadily on the increase. Since 1844 it had increased 12 per cent., or 2 per cent. per annum, and in the last two years at the rate of 2·785 per cent. per annum.

1850.—The annual percentage duty on fire insurance in England and Wales for the financial year ending 5th January, 1851, was 1,042,396*l.*; in Scotland, 65,875*l.*; in Ireland, 51,259*l.*—total, 1,159,530*l.* The rate had remained at 3*s.* The value of insured property in England and Wales was estimated at 752,092,946*l.*, including 57,162,246*l.*, amount of agricultural insurance, exempted from duty.

In vol. i of the “Assurance Magazine” (p. 317), is an article from the pen of Mr. Brown on the increase of fire insurance in Great Britain from 1844 to 1850; wherein it was shown that the rate of increase in the sums insured by all the offices had been 10·39 per cent., or 1·73 per annum; for the last two years of the period the increase had been 1·96 per cent. per annum. The increase in the town offices during the whole period had been 12 per cent., or 2 per cent. per annum; in the last two years 2·78 per cent. per annum. In the country offices the increase over the whole period had been 2·29 per cent., but in the last two years only 1·08 per cent. per annum. On the farming stock insurance the increase from 1844 to 1848 had been 7·14 per cent., or 1·785 per cent. per annum; but between 1848 and 1850 there had been a falling off; so that over the whole period the increase had only been 4·1 per cent. or ·683 per cent. per annum. But these insurances fluctuate with the seasons. In Ireland the progress of fire insurance had been slow. In the six years the increase was only 2·90 per cent., or 8·48 per cent. per annum. In Scotland there had been an actual falling off; but there were signs of recovery.

His next point is the increasing percentage of insurance to fires, in the investigation of which he had been aided by Mr. Baddeley's reports from 1836 to 1849. The following table gives the results over several periods—

Proportion per Cent. of Insurances ascertained to have been Effected in Cases of Fire.

	1836-37.	1838-42.	1843-47.	1848-49.	Whole Period, 1836-49.
Buildings and contents .	32·11	37·33	37·73	41·27	37·58
„ only	11·27	14·37	16·23	17·22	15·24
Contents „	16·90	15·49	14·30	12·54	14·69
Neither	39·72	32·81	31·74	28·97	32·49
	100·00	100·00	100·00	100·00	100·00

These particulars relate exclusively to property in which the fire originated, not comprising the cases in which damage was done to the contiguous premises. Mr. Brown says hereon:—

"Thus it appears that on the average of the whole period, $67\frac{1}{2}$ per cent. have been insured in some way or other, and $32\frac{1}{2}$ per cent. not insured at all, and that the proportion not insured at all has diminished from nearly 40 per cent. in the first period to 29 per cent. in the last; whilst of those who have had the prudence to insure both buildings and contents, the proportion has increased from 32 per cent. in the first, to upwards of 41 per cent. in the last period. Even the gradual increase of the 'buildings only' insured, compared with the diminution of 'contents only' insured, is probably a favourable feature, since buildings may, in most cases, be presumed to require larger insurance than the contents, except in the case of some particular trades. This is a question, however, which, though interesting to the political economist in estimating the increasing wealth or prudent habits of the people, can only be answered by the insurance companies, from the combination of facts, which I fear it will be some time before we can expect to have brought together, or the results made public. The proportions given above are deduced from the reports of the fires, as stated above, only as regards the buildings in which they commenced."

1851.—The gross sum insured against fire in the United Kingdom this year was found from the duty returns, &c., to be 852,000,000*l.* This included farming stock.

1855.—At the International Statistical Congress held in Paris this year, it was recommended to collect the statistics of all branches of insurance, in such a form that the progress of nations therein might be compared. A similar recommendation has been made at some of the later congresses, but the task is a difficult one, and a plan suited to the views and requirements of all the nations has to be agreed upon. (See 1872.)

1855.—The total sum insured in the Sun Fire this year, as calculated from the duty returns, was 140,442,000*l.* This probably was below the actual amount, unless the short term insurances were spread pretty equally over the year. It was also exclusive of foreign insurance, which paid no duty in the United Kingdom.

Mr. Hyde Clarke published in the "Land and Building News" this year an article Statistics of Fire Insurance in 1853 and 1854. In the "Post Magazine" of 14th July this year, there is a valuable letter by "Investigator," showing how, by reason of short term fire policies, the sum insured was much greater than is indicated by the duty returns merely.

1857.—This year Mr. Samuel Brown read before this Society a paper on the progress of fire insurance in Great Britain as compared with other countries, which paper is printed in the *Journal*, vol. xx, p. 135. It is necessary for our present purposes to reproduce one or two of its paragraphs here. Thus:—

"Notwithstanding the importance of the subject, and the enormous amount of property which is known to be brought within the benefits of the system, no record exists of the actual amount insured, nor are there any public or private documents from which the real facts can be drawn. The nearest approximation to the truth

is obtained from the returns of the Government duty, since it was first charged as a percentage on the sums insured, commencing with 24th June, 1782. . . . And as insurances against fire effected by British offices on property in foreign countries were exempted from the percentage duty from the 5th July, 1786, the most careful estimate we can make may still differ several millions from the actual amount of business transacted by the British offices. Even when we have recourse to the best means in our power, and endeavour to analyse the returns of duty paid into the stamp offices, which have been called for by various members in different years, and printed by order of the House of Commons, we find the labour so great and the liability to error so increased, from the manner in which the statements have been presented, that scarcely any of the printed totals for any one year precisely agree. For England the accounts of the sums paid into the stamp office for the fire insurance duties are printed separately for each office, London and country, with the allowance at 4 per cent. for collection in London, and 5 per cent. for collection in the country in each of the four quarters, all the items being given to shillings and pence. No attempt is made to bring together the total duty paid by each office in the year, nor by the London or country offices collectively; and, without the great labour of copying the whole of the returns into a new form, it is very difficult to obtain accuracy in the totals. If any error has occurred in the printing, it is equally impossible to ascertain in which column the error lies. The same remark applies to the returns for Ireland, both for the insurance duties and the farming stock exempt, and, with the exception of the small portion of the returns from Scotland, the whole document is by no means creditable to the department from which it is issued."

Again :—

"It is to be regretted that no accurate computation can be given of the amount of insurance effected on foreign property. Only a few of the offices carry on this class of business. Mr. F. G. Smith is disposed to estimate the total home and foreign business for last year at not less than 1,500 millions; but I have been favoured with the opinion of a gentleman, whose position and experience gives the greatest weight to his judgment, that the whole of the foreign fire insurance of Great Britain, including that of the colonies, does not exceed 25,000,000*l*. Between statements differing so widely it is impossible to give any accurate computation, but the greater part of those whom I consulted considered that from 100 to 200 millions were more probably the limits, and I have, therefore, assumed 125 millions, being only one-fourth of the highest estimate."

None but those who have entered upon such an inquiry as the present, can fully realise the difficulties arising from the carelessness and incompleteness of official returns, where they exist at all.

But the most important part of Mr. Brown's then labour was that, wherein he recalculated the returns of sums insured in Great Britain and in various continental countries as at the end of 1856, together with the amount of premiums received and losses paid during that year, of which the following is a short abstract:—

In Great Britain, France, Germany, Belgium, Sweden, Denmark, Russia, Poland, and United States—

	£
Total sums insured	4,482,500,000
„ annual premiums	8,217,000
Estimated losses	4,772,800

The figures for Great Britain alone were: sums insured as shown by duty returns, 927,000,000*l.*, farming stock exempt, 70,000,000*l.*, foreign and colonial business about 125,000,000*l.*, total insured 1,122,000,000*l.*; annual premiums thereon 1,953,000*l.*, losses 976,500*l.* He says by way of explanation—"From this "rough approximation it appears that the total of the amount of "fire insurance in the countries, or in the offices referred to in the "preceding pages, and estimated to the present date, amounts to "the large sum of 4,482½ millions sterling, though it is evident "that it by no means gives an adequate view of the total amount "of property insured against fire in Europe and America. A vast "amount, protected by Governments or private associations, must "still have escaped notice."

This was the first general estimate of the amount of fire insurance existing in the western nations which had been made.

1860.—The annual percentage duty on fire insurance in England and Wales for the financial year ending 5th January, 1861, was 1,375,798*l.*; in Scotland, 106,250*l.*; in Ireland, 76,744*l.*; total, 1,558,792*l.* The rate remained at 3*s.*; reinsurances were exempted from duty from 1856; but in practice they had never paid any. Workmen's tools up to 20*l.* were exempted from duty by enactment this year, and could not have affected the returns. The value of insured property in England and Wales was estimated at 983,161,773*l.*, including 65,963,073*l.* value of agricultural insurance exempted from duty.

1861.—The number of fire policies in force this year in the various fire offices in Great Britain was 1,389,304; and Mr. Coode (in his report upon the fire insurance duties, 1863) estimated that if fire policies were freely obtainable under 25*l.*, the number would be doubled; and if freely obtainable under 100*l.*, trebled; and that the amount of property insured in the first case would be increased by one-eighteenth, and in the second case by one-third. Undoubtedly (he adds), the greatest number of persons, indeed nearly all, whose destructible property is not worth 300*l.* are uninsured. "The "value of the aggregate of their destructible property very probably "approaches that of all the more wealthy classes." Mr. Coode also gives the following:—

A Statement showing the Total Number of New Policies Issued in England, and Amount of Duty Paid thereon, during the Quarter ended Lady-day, 1862, by the several Offices undermentioned.

Office.	New Policies.	Duty.
		£
Sun	6,225	8,082
Royal Farmers	457	344
Atlas	1,472	2,022
County	2,664	2,633
Law Union	475	364
Alliance	1,076	2,582
Imperial	2,565	4,685
Law	1,154	1,630
Liverpool and London	3,809	5,360
Manchester	1,751	2,295
Norwich Union	2,907	2,846
Royal	5,395	6,572
Union	1,143	1,322
West of England	2,248	2,669
Phoenix	4,749	6,163
Total	38,090	49,569

Fire Insurance Duty. A Statement of the Number of New Policies under 100l. Issued in England, Lady-day Quarter, 1862, for the Respective Amounts in the several Offices as undermentioned.

Office.	Above 10l. to 20l. Inclusive.	Above 20l. to 50l. Inclusive.	Above 50l. to 100l. Inclusive.	Total.
				£
Sun	—	107	782	889
Royal Farmers	—	16	66	83
Atlas	2	12	101	115
County	1	61	280	342
Law Union	—	7	54	61
Alliance	3	39	122	164
Imperial	1	51	195	247
Law	—	2	51	53
Liverpool and London	12	52	308	372
Manchester	—	20	140	160
Norwich Union	—	108	394	502
Royal	—	61	445	506
Union	—	10	126	136
West of England	—	8	228	236
Phoenix	—	60	372	432
Total	19	614	3,664	4,297

1862.—A select parliamentary committee was appointed “to inquire into the state of legislation, and of any existing arrangements for the protection of life and property against fires in the “metropolis.” There was some statistical evidence taken, which falls to be noticed here :

Mr. W. M. Browne, secretary of Westminster Fire, and hon. secretary of London fire engine establishment, estimated the amount of property in London insured by the various offices as being 266,000,000*l.*; and the amount of premiums paid for such insurance at from 340,000*l.* to 350,000*l.* The contribution towards the maintenance of the then brigade amounted to about 2*d.* on each 100*l.* insured in London. (Q. 285-6.) There was probably some 15,000,000*l.* in addition insured by offices which did not contribute to the brigade expenses. (461.)

Mr. John Drummond, one of the managers of the Sun Fire, considered the sum insured against fire in the metropolitan district to be from 280,000,000*l.* to 290,000,000*l.* (1660.)

Mr. William Newmarch, then secretary of Globe Insurance Company, considered that there was insured in the metropolitan area, *i.e.*, six miles round Charing Cross, "about 300 millions sterling, out of about 900 millions at risk." Under the system then in force he considered that those who insured the lesser sum actually paid for the protection of the larger sum—a very great injustice. (4043-48.)

Investigation showed that for the one hundred and sixty-eight years from 1694, when stamp duty was first imposed upon policies of insurance, down to this date (1862), the rate of increase in the sums insured by the British offices had been six millions sterling per annum; while during the forty-seven years from 1815, when the duty was increased to 3*s.* per 100*l.* insured, the annual increase had averaged 13½ millions. The business had increased in spite of the restrictions imposed upon it. The increase was due to the growth of commerce. The figures showed that no less than 46 millions more was insured this year than in 1861.

At the close of this year an estimate was made from the fire insurance duty returns of the increase of insured property during the twelve years from 1851 (both inclusive). The increase was found to be no less than 312 millions sterling; but this did not include farming stock, upon which no duty was payable. This too had increased 15 millions during the like period. The total increase was therefore 327 millions. The gross sum insured in 1862 was found to be 1,200 millions sterling.

1863.—Mr. Coode's report on the fire insurance duties (already noticed) was published this year, and I must here render some of the facts it contained.

The property actually insured in 1862 he found amounted to 1,007,035,014*l.* leaving 133,965,986*l.* uninsured—plus the value of the items not included in the values of insurable property. Estimating these for the purpose of completing this survey, he considered that some 460 millions remained uninsured, which might be insured.

But a good deal of this uninsured property consisted of furniture and stock-in-trade in such small quantities individually as to be practically excluded from insurance by the then regulations of the fire insurance offices—many of which would not issue a policy carrying a less premium than 3s.

In England and Wales then, property was permanently insured to the extent of 1,007 millions. Of this, about 600 millions of house property and furniture was insured for about two-thirds of its value, and represented therefore 900 millions worth of property. About 400 millions of insurance on stock-in-trade and commerce represent transitory stocks changing generally from four to twelve times in a year, amounting probably to more than 2,000 millions in the year. The 1,007 millions of *actual* insurance probably therefore represented more than 3,000 millions of *effectual* insurance. This was put forward to meet the argument that the fire insurance duty was a tax of 200 per cent. upon insurance.

Regarding the various estimates as to the proportions of insured and uninsured property made by other persons, Mr. Coode remarks :—

“Two eminent persons estimate the proportions in money, and one of them says there still exists in London 80 per cent. in value of property uninsured, and remaining to be brought within the benefits of insurance. The other of these, of yet greater authority, estimates the value of property in the metropolis actually insured at 300,000,000*l.*, and of the uninsured at 600,000,000*l.*, or the uninsured as two to one of the insured. This estimate is adopted in the petitions presented to parliament for the repeal of the duty. A more common estimate adopted by experienced officers of insurance companies is that one-half of the property in the whole country is *uninsured*. But equally eminent and experienced persons, advocates also of the reduction of the duty, wholly discredit even this last estimate, and have assured me that their experience does not justify an estimate of one-third of all the property in the country as being uninsured.”

On this point Mr. Coode further remarks with some force, that
 “when instead of values, which the fire returns do not and cannot
 “estimate, we give our attention only to the number of properties
 “damaged or destroyed, which is all that the fire returns show, it
 “will be found that by far the greater number of the uninsured
 “and uninsurable property consists of the smallest tenements, to a
 “great extent mostly wooden out-houses of the slightest construc-
 “tion, in the worst neighbourhoods, and of the very lowest value of
 “any class of buildings.”

He next proceeds to consider the effect of the fiscal changes in the percentage duty on the progress of fire insurance; and as the result, furnishes the facts given in the following table :—

Periods.	Percentage Duty.	Average Annual Value of Property Insured.	Progress in Periods.	Rate of Annual Increase.
	<i>s. d.</i>	Mins.	Mins. increase.	Mins.
88 years, 1694-1782	None	—	200 (?)	2 $\frac{2}{3}$ (?)
14 „ 1782-83 to 1797	at 1 6	156	12 $\frac{1}{2}$	1 $\frac{1}{10}$
8 „ '97-1804	„ 2 —	207	51	6 $\frac{1}{10}$
11 „ 1806-15	„ 2 6	316	109	10
6 „ '16-21	„ 3 —	388	72	12
5 „ '22-26	„	415	27	5 $\frac{3}{5}$
5 „ '27-31	„	467	52	10 $\frac{2}{5}$
5 „ '32-36	„	514	47	9 $\frac{2}{5}$
5 „ '37-41	„	596	82	16 $\frac{2}{5}$
5 „ '42-46	„	673	77	15 $\frac{2}{5}$
5 „ '47-51	„	724	51	10 $\frac{1}{5}$
5 „ '52-56	„	816	92	18 $\frac{2}{5}$
5 „ '57-61	„	941	125	25
1 year, '62.....	„	1,007	46	46

The following is a quinquennial abstract of Mr. Coode's table of sums insured in England and Wales, as calculated from the duty returns; but including in 1835 and downwards the amount insured on farming stock, although exempted from duty:—

Aggregate Property Insured in England and Wales.

£	£	£
1785 133,777,330	1815 389,232,000	1845 681,888,872
'90 144,748,000	'20 396,841,300	'50 738,106,239
'95 177,563,300	'25 427,700,000	'55 844,252,857
1800 211,392,300	'30 482,215,300	'60 956,876,279
'05 248,200,000	'35 521,183,303	'68 1,504,164,000
'10 324,829,000	'40 625,106,328	

The wonderful development of the business of fire insurance in England is shown in these figures. They do not include Scotland or Ireland.

Mr. Coode next entered upon a somewhat new aspect of the subject, and pointed out, that as to all trades whatever, wholesale or retail, the insurance or a year *spreads over and protects all the stock in hand during that year*. Thus, 100*l.* insured would cover above 15,000*l.* of a butcher's or a poulterer's stock in a year; 30,000*l.* of a fishmonger's stock, 1,200*l.* of any trader changing his stock twelve times a-year. He illustrates the point more in detail. The greatest retail trades of the country, the provision trades, are carried on with stocks at all times extremely small in comparison with the amount of the annual aggregate of transactions. Bakers rarely have a stock in hand for the week's consumption; butchers from two to three days' consumption; fishmongers more than one day's; poulterers two days'; greengrocers three days'; grocers

three weeks'; coal merchants one week's consumption. It is greatly to under estimate the frequency of the change of stock of these great trades to put it at only fifty times a-year.

In the wholesale trades, the average stock in hand corresponds with the rate at which the producers or importers can bring the commodities to the market. Of imported provisions there is ordinarily not more than a few days' consumption on hand—except of groceries, which may occasionally reach an average of three months. Of cotton, it is very rarely that stock equal to three months' consumption is on hand. Our home agricultural production is that of which the largest stock is commonly on hand. The farmer's or grazier's live stock may at any time equal a year's sale, the grazier's even two or three; but these are to a very small extent subject to loss by fire or the subject of fire insurance at all. A farmer's dead stock of corn, hay, and other crops, immediately after a harvest, constitutes the stock of that produce of a whole year, and he must, to be safe, insure on the largest stock that may be destructible by fire.

1868.—This is the last year for which we have complete returns of the annual percentage duty on fire insurance. The amount returned in England and Wales was 921,486*l.*; in Scotland, 99,222*l.*; in Ireland, 51,923*l.*; total, 1,072,631*l.* But to account for these diminished figures, it must be stated that while insurance on stock-in-trade had been reduced to 1*s.* 6*d.* per 100*l.* in 1864, in 1866 the rate on all insurance had been decreased to that amount, or one-half the former rate. The value of insured property in England and Wales was estimated to have increased to 1,504,164,000*l.*; this was including 75,419,303*l.* value of agricultural insurance exempted.

1872.—Professor Anderson Kirkwood estimated that the extent of inland fire insurance in the United Kingdom in 1872 was 1,900,000,000*l.* The aggregate premiums received by the offices, he says, had been estimated at 7,000,000*l.* per annum.

At the International Statistical Congress held at St. Petersburg this year, Professor G. Mayr, of Munich, was appointed to collate insurance statistics. But up to the close of 1873 he had made no actual progress in the work.

1874.—The abolition of the percentage duty on fire insurance deprived us of an element of statistical knowledge, which was the only good feature associated with the tax. Under the Metropolitan Fire Brigade Act, 1865, the fire offices transacting business in the metropolitan district are required to contribute *pro rata* to the Metropolitan Board of Works in part support of the brigade. By means of the returns made by the offices for this purpose it was found that the fire insurance in force in the metropolitan district in the quarter ending 1st April this year reached 488,500,000*l.*—being

an increase of 21 millions in the year. The following return shows the relative positions of the offices regarding London business:—

Name of Insurance Company.	Business Done in 1874, as per Certified Returns in Form prescribed by the Board.	Amount of Yearly Contribution at 35 ^l . per Million.	Name of Insurance Company.	Business Done in 1874, as per Certified Returns in Form prescribed by the Board.	Amount of Yearly Contribution at 35 ^l . per Million.
	£	£ s. d.		£	£ s. d.
Sun	73,136,500	2,259 15 8	Britannia	1,000,000	35 - -
Phoenix	55,840,950	1,936 18 8	Great Britain	1,000,000	35 - -
North British and Mercantile	34,642,520	1,212 9 6	National of Ireland	1,000,000	35 - -
Liverpool and London and Globe	32,434,822	1,135 4 4	Scottish Provincial	1,000,000	35 - -
Law	32,257,927	1,132 10 8	" Imperial	929,957	32 11 -
Imperial	30,185,000	1,056 10 -	Azienda Assicu- ratrice	827,519	28 19 4
Royal Exchange	29,360,818	1,027 12 8	Staffordshire	592,397	20 14 8
County	24,375,617	853 3 -	Scottish National	578,745	20 5 -
Royal	23,441,360	820 9 -	Caledonian	412,919	14 9 -
Westminster	22,046,331	771 12 4	Magdeburg	352,464	12 6 8
London	19,748,515	691 4 -	Universal	280,018	9 16 -
Union	17,407,817	602 5 4	Emperor	242,783	8 10 -
Atlas	17,323,658	606 6 8	Border Counties	240,000	8 8 -
Commercial Union	15,382,554	538 7 8	British National	211,000	7 7 8
Guardian	14,876,320	520 13 4	Midland Counties	163,545	5 14 8
Alliance	13,238,003	463 6 8	Norwich Equi- table	150,826	5 5 8
General	8,635,797	302 5 -	Belfast	143,320	5 - 4
Northern	8,621,363	301 15 -	Home of New York	141,095	4 18 8
Norwich Union	8,541,050	298 18 -	Anchor	132,325	4 12 8
Hand-in-Hand	7,460,000	261 2 -	Yorkshire	81,000	2 16 8
Law Union	5,419,759	189 13 8	Preserver	56,958	2 - -
Yorkshire	5,237,787	183 6 8	Provident	46,925	1 13 -
Manchester	4,748,798	166 4 -	Mutual	40,300	1 8 4
Lancashire	4,500,000	158 10 -	Salop	35,800	1 5 -
Queen	4,422,241	154 15 8	Primitive Metho- dists	25,450	- 18 -
London and Lan- cashire	3,887,989	136 1 8	Equitable	19,100	- 13 4
Scottish Union	2,988,081	104 11 8	La Confiance	17,650	- 12 4
London and Southwark	2,769,156	96 18 3	Shropshire and North Wales	9,680	- 6 8
Kent	2,724,180	65 7 -	Essex and Suffolk	6,860	- 4 8
Church of Eng- land	1,513,359	52 19 4	Household	6,150	- 4 4
Scottish	1,473,000	51 11 -	Middlesex	3,130	- 2 -
Royal Farmers	1,138,025	39 16 8	Patriotic	1,350	- 1 -
Scottish Commer- cial	1,017,413	35 11 -	Total	540,146,582	18,905 2 8

The amount of insurance in the metropolis appears to be progressing at the rate of about 20 millions sterling per annum.

Finally, I have to endeavour to estimate the bulk of the fire insurance business of the world. It can only be an estimate based upon the best known probabilities. The prospectus of the Fire Reinsurance Corporation (issued in 1874) gave the following

statistics as applicable to this year: There was in Great Britain and her colonies more than 100 fire insurance offices possessing a premium income ranging from 10,000*l.* to over a million sterling per annum. On the continent of Europe there were about 150 similar companies; and in the United States more than 300. Their aggregate incomes were estimated at 60,000,000*l.* per annum. I suspect this to be too low an estimate. At all events, the aggregate of the smaller companies has to be added, which would probably put on another 10 millions—making the aggregate income of the fire offices 70,000,000*l.* per annum.

VI.—*General Review and Conclusions.*

I trust the purport of the preceding arrangement of facts and data may be apparent to the mind of the reader. A few words of recapitulation however seem desirable. In the first place the measures of protection taken in view of preventing fire have never, at any period of our history, been really efficacious, in the sense of preventing fires entirely. Probably they never could be under any circumstances—accidents will happen. In a rude state of society individual losses are usually small, but as communities advance property accumulates; and then protection to individuals becomes requisite. It was this necessity for protection of individual properties which first gave rise to the idea of fire insurance, as it had previously given rise to marine insurance. The State very rarely furnishes a full measure of indemnity, and it is not always either convenient or wise to indicate the precise extent of individual accumulation. It is indeed more than likely that but for the great fire of London, 1666, fire insurance would have taken a State or Municipal basis here in Great Britain, as it had I suspect before that date (if it existed at all) in other parts of Europe. All the proposals which I have enumerated as having been made previously were on that basis. The magnitude of that conflagration ought to have afforded a lesson against municipal insurance, and I suspect did in the minds of reflecting men. It may be that this was the real reason why the scheme of the corporation of London already noticed did not flourish. It is certain that when the scheme of municipal insurance was brought into competition with that of trading companies specially organised for the business, the former went to the wall; it has been, and is so now, in almost every case where real competition between the two systems is permitted. Then, again, municipal fire insurance, however possible it may be in regard to *buildings*, is almost impracticable for insurance of stock in trade, or even household effects.

Looking at the facts as they stand, we have in the latter half of the seventeenth century fire insurance associations organised as

trading companies, and the only scheme of municipal fire insurance ever organised in Great Britain, speedily dying out as a failure. I do not think the scheme of the corporation of London ever had a very fair chance of success, quite apart from its merits; but that I am not going into now. My immediate purpose here is rather to consider how the scheme of fire insurance as established with us, and the measures of fire protection, which at least up to that period had been always regarded as a clear municipal obligation, have since acted and reacted upon each other. It was very natural that when the trading insurance associations were seen, or supposed, to be reaping profits from their business, that the municipal authorities should think and perhaps say, among themselves—"May we not leave it to these associations who have now taken up the affair of insurance to provide the appliances for fire extinction?" And was it not equally natural that the managers of the fire offices should soon see it to be to their interest to take all means in their power to extinguish fires, in view of lessening the loss on property insured with them? And to this end their firemen (water-men they originally called them) must appear at all fires and render service, quite irrespective of whether the particular property in flames was insured with them or even the properties next to it; for if the fire once got headway, some of the insured properties would soon be reached. Thus the insurance offices soon found themselves performing what is really the duty of the municipality. In process of time too the managers of the offices would learn more fully to appreciate the necessities of the situation. They would find for instance that an abundant supply of water was necessary to the prompt extinguishment of fires, and they would endeavour to stimulate the municipal authorities in this direction. Hence good would result not simply in regard to fires, but as respects the general health of the people. So again, experience would teach the managers of the offices that fires were not only more likely to arise in badly constructed buildings, but that when they did arise greater damage resulted by reason of the rapidity with which the flames spread; hence building laws would be suggested, streets made wider, and many other obvious improvements become inaugurated.

There is indeed the reverse side to this picture. If no indemnity had been obtainable by means of fire insurance, people would have become more careful in regard to the storage of their property, buildings would have been made as nearly as possible fire proof, and every sort of precaution which individual sagacity could have devised would have been exercised—prompted by the strong stimulus of individual risk. Whereas indemnity at the hands of fire insurance offices being easily obtainable, people grew careless regarding all extra precautions, particularly where expense was

involved. Besides, as the number of fire offices increased, competition sprang into existence. This resulted first in a reduction of premiums, next in a laxity of requirements, and finally almost offered facilities to excessive valuations, and by an easy gradation to fraudulent claims. There can be no doubt whatever that too great facilities for insurance *not only prevent efforts towards the erection of fire proof buildings*—the extra cost of their construction being found greater than the difference in premiums for protection by insurance, as between buildings of the best and of the ordinary class—but far worse than all this, it leads, in the end, to arson, incendiarism, the wanton waste of property, and the commission of most atrocious crimes.

The result of this very natural, though by no means necessary conflict, if I may so call it, between the municipal authorities and the fire insurance offices, has been on the whole very unfortunate, for other reasons than those already stated. It is clearly the duty of the municipality to see to the following matters. 1. The efficient construction of all buildings in relation to the purposes for which they are intended. 2. The preventing of the storage of combustible materials in unsuitable localities, to the danger of life and property. 3. The supply of an efficient water supply for the purposes alike of health and fire extinguishment. 4. The protection of the lives and property of the inhabitants under its charge from all the mischances capable of human control, and of these fire is not only the most frequent, but the most to be dreaded. Have the municipalities of the kingdom generally performed these functions in a satisfactory—even in a reasonably complete manner—in the past: and are they doing so now? The answer is but too obvious—they have left these duties to the care of the insurance offices.

Regarding the fire offices, perhaps the greatest evil extant with them is that they have been working too much in the dark; too much on the “rule of thumb” system, of making the business pay in the whole—or endeavouring to do so—even at the expense of some inequality in the assessment of their rates of premium. As to the encouragement of crime, which we sometimes lay at their doors, by the permission of over-insurance, and the failure to prosecute in cases where fraud is but too apparent, have they not the reasonable answers—first, that over insurance is always at the risk and even the peril of those who are guilty of it where it is intentional; and next as to the punishment of offenders, may they not plead the almost blind prejudice of juries when the attempt is made to resist fraudulent claims? While further, is it not the business of the State rather than of trading corporations, to put the laws in force against wrongdoers? Can these positions be readily controverted?

Suppose for a moment fire insurance to be entirely abolished, how could the accumulated wealth of the world, that is the destructible portion of it, be protected? Fire insurance then with civilised and commercial nations is an admitted necessity. I often reflect upon the wisdom of those merchants in New York, who, after the fires of Chicago and Boston, urged the fire offices which had survived those great conflagrations to put up the rates to a paying point. They said, we can stand fluctuations in prices, and even failures among our customers, these are the ordinary vicissitudes of our trade, but if the protection of fire insurance fail us we are indeed ruined!

But now I reach the last, but almost the chief point which has been before me in the preparation of this paper, or the rather in bringing it before this Society for consideration, namely, *What is the duty of the State in this matter of Fires and Fire Insurances?* Let us here advance step by step, for upon these points I desire some expression of opinion to-night.

1. Is it not the duty of the State to require a return to be made to some central authority—say the Home Office or the Board of Trade—I despair of ever seeing the organisation of a *bureau of statistics*, such as is possessed by some countries hardly so boastful of their advancement as our own—Ought it not, I say, to be a function of the Government to require *an accurate return annually of ALL fires wherein life is endangered or property destroyed?* Such a return might be made either by the clerk of the peace or the chief constable of every county; by the town clerk of every city or borough. Is it generally known that *Russia* is the only country in Europe at present which boasts of such a record? Is it not to be seen at a glance what value such a return must possess even in the lowest regard of an item in our judicial statistics?

2. May it not be fairly held to be the duty of every truly enlightened Government to cause an *official inquiry to be made into the cause of every fire whereby life or property is endangered or destroyed?* Is it known that such inquiries are held in several countries of Europe; and that the fire insurance offices are desired not to pay any claim in respect of property destroyed until the result of the inquiry is known to all interested? A parliamentary committee composed of many most able members of the House of Commons reported fire inquests to be a necessity now just ten years ago. Chambers of commerce and other enlightened mercantile bodies are yearly urging its adoption. Can this be far off?

3. Dare I go a step further and inquire if a census of the estimated value and the nature of occupations of all buildings in the United Kingdom be not possible? Is it known that censuses of this nature have recently been taken, at the instance of the national

board of fire underwriters (New York), in at least two States of the American union; and that the results are now being made up, and will soon be available to the whole people of that enlightened country? If this can be done, and done cheerfully by the officials in charge of the census, in the populous States of New York and Massachusetts, why can it not be done in the United Kingdom?

If the Government were to co-operate to the extent indicated under these three heads, co-operate in a really efficient and intelligent manner, would not the business of fire insurance very soon be lifted into a very different category from that which it now occupies? We should no longer be deficient in such necessary statistics as we have had to lament the absence of in other parts of this paper; light would be thrown on points now involved in darkness; fraud would cease, because it would become too dangerous; equity would prevail, because the means to secure it would exist; the cost of insurance all round would become lessened by the gradual elimination of fraudulent claims; crime would be held in some restraint by reason of the watchful eye of justice; and as a return for all this, the fire offices might be fairly required to give annually some general statement of their affairs, such as the total amount of insurance at risk, if not in individual classes, the losses paid, and the amount of the reserves in hand.

But the *national aspect* of fires and fire insurance is by no means exhausted even yet. It has to be regarded that every fire such as we have been contemplating in this paper, involves a loss of property, leaving the loss of life for the moment entirely out of consideration. The incessant destruction occurring all around us means a serious loss of wealth in the aggregate. It assumes the shape of a national loss, for of two nations equally thrifty, that which has the larger proportion of its wealth annually burned up—taken clear away and destroyed—must in the end be behind in the race. And here it is seen that we have to leave the question of insurance entirely out of consideration. *Insurance is merely an adjustment of accounts between parties.* A sustains a loss, and all the letters of the alphabet come forward and take a share in it, and so A becomes indemnified, at the expense of its twenty-five compeers. But the loss in its aggregate is the same whoever pays it; so much of the accumulated wealth of the people is destroyed by every conflagration. It may indeed be, as some believe, that fire is the ultimate fate of all that is consumable; but the process is not usually regarded as being in operation in our very midst. Be this as it may, I ask, whatever is happening and whatever the moving cause, let us have the best information which can be had regarding it. I need not attempt to defend such a demand among the members of this Society. The fires of every country annually

consume a percentage of its wealth. It might happen that if we knew the exact measure of our loss we should take more vigorous measures than ever to avert it. Anyhow, I urge, let us have the knowledge! Does the percentage of loss in any or each particular country bear any exact relation to the percentage of accumulation in that same country? Do the countries inhabited by different races sustain different degrees of loss? Is it beyond the control of a people to alter their ratio in this regard? Does climate exercise any influence on the ratio of destruction from fire? Have the products of the soil in different parts of the globe different affinities for combustion? Has fire any necessary function as a purifier of our cities and towns? That it has so operated in many cases, and did so operate in 1666, in preparing our great city to be the capital of the mercantile world, is clear beyond a doubt.

These are but some of the many considerations which flash before the mental vision in the contemplation of fires and fire insurance. I commend them, such as they are, to the members of this Society, and more especially to those of them who take part or interest in the International Statistical Congresses from time to time held in Europe.

DISCUSSION *on* MR. CORNELIUS WALFORD'S PAPER.

MR. R. B. MARTIN said he really had not many comments to make on a paper so exhaustive and so interesting. With regard to some of the more interesting questions of the archæology of insurances, he would mention that in the year 1704 large badges were worn upon the arm, one of their uses being to exempt the men who wore them from the press-gang. There were some curious traditional facts in his office in the early stage of fire insurances. They were not effected for any particular sum; but a body of gentlemen met together and mutually insured each other, and if there was a fire they subscribed just as much as was wanted to cover the loss. But that did not last over many years. He thought that an inquiry into fires of the nature of a coroner's inquest was a point of the greatest importance. He was under the impression that there was legislation about it, but he did not know how much was done in that way. Whatever the action of the insurance companies might be, it did not affect the political or economical view that every fire destroyed a vast amount of property. He was extremely gratified by the excellent paper that had been read, and he hoped some person would supplement what the author of the paper had read and point out any deficiency in it; but he did not think there was any deficiency.

The Hon. H. S. WASHBURN expressed the very great pleasure he had had in listening to so elaborate and excellent a paper, and thought that such statistics must be of immense value to those who were interested in insurance matters, as well as to the community at large. He came from a city—the city of Boston—that had had some sad experience in the matter of fires, in regard to which they were now endeavouring to improve. Efforts were now being made in the various States to get at the causes of fire and the means of their prevention; and all that related to the subject of fire insurance would be interesting to the people of the United States. This interest had grown, for the reason that there had been such awful fires within the last decade. He was not particularly connected with any fire insurance company, but he had taken a great deal of interest incidentally in looking to the matter of fires in his own city since the great fire a few years ago, and he had to state that the fire department was at present certainly very efficient. He had the honour to be one of a committee two years ago to visit the engine stations to ascertain the time between an alarm of fire being given and the time the engines were on their way to the fire. He thought that all money that could be expended in increasing facilities in reaching fires at the earliest possible moment was economy. They had a system of electrical fire alarms running through the city of the most efficient kind. There was a system of these at the city hall in the centre of the city that connected with

all parts of Boston. Boston in its extent was not of course so large as London, but it covered a great many miles. By means of these alarms, in less than a minute, the knowledge of a fire spread all over the city. They communicated with every police station, and an alarm was rung from all the bells, and the engines in the vicinity rushed to the place where the fire was. If the alarm was not sufficient, a second alarm was given in ten minutes, and an additional number of fire engines went to the rescue. The horses were so perfectly trained in the engine houses that they knew their places, and in twenty seconds from the alarm of fire the engine would be rushing out of the door. An arrangement was also made by which the electric spark disengaged the collar of the horses, and they rushed to the engine and took their places, and the whole thing was done in the time mentioned. The people of the city of Boston were determined to grapple with the foe, before he could conquer them. Then there was also an inexhaustible supply of water from the reservoirs, and he did not see how it was possible that there could be ever again any fire such as that which occurred a few years ago. Another thing the Americans were learning from the Old World, was to build houses of a more substantial and incombustible material than hitherto. Boston was entirely unlike Chicago, which was surrounded by a large number of wooden buildings in every direction. This was a great mistake, and these buildings must be got out of the way, or there would be another fire. If, when he returned to America, he was asked what he had learned about fires in London, he would be forced to say that he had been there three months and he had not heard an alarm of fire, nor seen an engine. He had read in the "Times" that there were some fires, but they seemed to be very small ones. He thought that the statistics given by Mr. Walford were of the utmost importance, and he hoped that other statistics would be worked up which would be of equal value on the great subject of fires.

Mr. BUNYON said he had not many remarks to make, as he had no statistics. His belief was that there was no city so well furnished with fire brigades as the city of London. If there was not a large fire brigade, it was so efficient that it was always able to cope with any fires that occurred.

The PRESIDENT said he understood that in the United States there was a duty on slates which prevented their being generally used. One of the reasons why there were not so many fires on the tops of the houses in this country was because slates were used, and it was rather difficult for the fire to run on.

Dr. GUY said the paper was to him extremely interesting, and he was much gratified with the remarks made by Mr. Washburn. He (Dr. Guy) held it to be of extreme importance to bring prevention to bear on fires as much as possible. He thought that fire-proof construction was a matter that should be carefully considered. His friend, the late Mr. Bellamy, had published a small work which was worthy of more attention than it seemed to have received, in

which he pointed out that in the case of large fires, especially in large warehouses, the great difficulty was that the ironwork itself melted to a certain extent and gave way, and the fabric tumbled down in consequence. He adopted the simple plan of erecting all his pillars hollow, with slits at intervals. He then poured concrete into them, which issued through the slits, and he then completed the pillars with cement. No fire could create such heat as to penetrate into these and soften the iron so much as to cause it to tumble down upon the heads of those who were unfortunate enough to be under it. He was much struck at the time with this plan, and was sorry to think it had attracted so little attention. He hoped that by mentioning it some practical man present would think it worth while to inquire a little further into the means whereby buildings could be made fire-proof.

Mr. LUMLEY, Q.C., called attention to the arrangements that had been made by the legislature in recent years, by requiring the local authorities to make bye-laws which provided for the erection of buildings in such a way as to provide for special protection against fires. One of the provisions of the Local Government Act of 1868, was for the express intention that the local board should take care that the buildings were erected in such a manner that fire should, to as great an extent as possible, be prevented. He hoped that regulations were now being made which would have a very good effect in future, by having the buildings erected in a safer and more substantial manner. He thought it would be desirable to know that this had been really a subject of attention with the government for the last twenty-five years.

Dr. FARR said he should like to ask Mr. Walford whether he had considered another system under which the water itself did the duty which horses and men performed in Boston. In some cities the water in the supply pipes was at high pressure, and the instant hydrants were applied, was hurled in masses on the flames. He wanted to know if Mr. Walford could mention the effect of that system on life as well as property. According to Mr. Chadwick, there had been a great saving of property where that system had been in operation. One reason why hydrants were not used in London was, it was true, because the water was not at high pressure, but what he wanted to know was, why it was not at high pressure in London? He could not sit down without bearing his testimony to the admirable industry of Mr. Walford. The paper was most elaborate, and they, as a statistical society, must express the deep interest they all felt in the success of the great cyclopædic work on "Insurance" on which Mr. Walford had for some years been engaged, and where every other subject connected with insurance was treated with equal ability and comprehensiveness.

Captain CRAIGIE, speaking of the proposed fire inquests said, that one strong objection to them was that they would throw the cost of inquiry upon a particular tax which was not properly qualified to bear it. The reader of the paper had said truly that every fire

destroyed a great portion of the movable wealth of the community; but it was just the movable wealth of the community that did not contribute in any way to that local taxation which was to defray this new charge. In America some attempt was made to reach locally that wealth which was, after all, the main sufferer; but until there was some mode of re-adjusting our local taxation, he thought there was a great difficulty in adding to the functions of the local authorities. He agreed that the proper duties of the local authority would seem to lie in the direction of preventative measures, in providing for a full supply of water and proper building regulations. This was met by a charge falling chiefly on the houses, a more equitable rate. But with regard to the new functions with which the local authorities were proposed to be invested, the right of objecting to a charge even for a good object must be maintained, so long as the incidence of that charge was unfair.

Mr. E. HEPPLÉ HALL said he had been in the service (United States) and had run to many a fire. Mr. Walford had thrown out one or two suggestive and useful hints in regard to what might be learned from foreign countries, and had cited Russia and China, apart from the United States, as being especially prominent in that direction. There could be no doubt if we were to take any lessons at all from our foreign neighbours, they must come from the United States. With regard to the hydrants, he happened to be in Cincinnati when one of the large fires was under way, and it was rapidly subdued, almost wholly by these hydrants. In most of the large and many of the small American cities, these hydrants were to be met with in every street and almost in every block. The way in which the hose is attached and the rapid play which is directed to the building, and the prompt movements of the fire brigade in the metropolitan service, was largely predominant in the States, and the chances were that the fire was extinguished with very trifling loss or one scarcely worth mentioning. In regard to China, Mr. Walford had paid a very handsome tribute to that country in regard to her fires. Much could not be learned from China, but certainly the Chinese had a method of supervising fires which never occurred to us in this country with all its civilisation, and that was with regard to their methods of signalling. In almost every Chinese city there was a signal tower, and in these were stationed men who used signals of a primitive kind. They telegraphed by means of their hands and flags or banners, thus raising the alarm and summoning the firemen to the scene in a most marvellous way.

Mr. HAMMICK called attention to a point that had not been touched upon. He alluded to fires which were the result of fraud, which was practised upon the insurance offices, and he should like to know the proportion per cent. of fires in London and England that resulted from clear fraud. Probably if there were no fire insurance offices at all there would be much fewer fires in this country.

Mr. BOURNE said that whilst expressing his sense of the high importance of the paper that had been read, he rose for the purpose of referring to the author's despair of a bureau of statistics being organised. He did not think there would be much difficulty in a country where such an amount of attention was paid to these subjects. The statistics wanted a great deal of the completeness that would be given to them by the consolidation of the whole under one central authority. It would be very important to have the statistics of crime and fire insurance brought under the eye of one board. He thought the detection of the fraud would be very much facilitated, if the characters of the individuals and their localities were placed in juxtaposition with relation to fire. If the character of the buildings in which the things were stored, the degree of supervision which was exercised over them, and a variety of other particulars in connection with fire insurance were known, it would often be of great assistance to the revenue officers. There was no reason why the adoption of such a system should be despaired of, and he would impress upon the Society to take up as a very important point to be urged upon the Government, that there should be more uniformity in the statistics under a more central authority. However remote many subjects might at first sight appear, it was strange how one threw light upon another.

The Rev. Mr. DOXSEY referred to the difficulty there was sometimes of obtaining water in cases of fire, and thought that if the fire brigade and the police had control over the supply of the water more fires would be extinguished.

Professor JEVONS said in reference to Dr. Farr's question as to why there were no hydrants in London, that he must have forgotten that Manchester was in the neighbourhood of very considerable elevations, and the reservoirs were such that the water ran down by gravitation. In London the supply of water was mainly drawn from the Thames or low lying sources. Of course he did not deny that there were hills in the neighbourhood of London which might be used for the reservoirs, but the water would have to be pumped up, which would be a very costly thing. What was possible in one town was not equally possible in another.

Mr. WHITE thought that if there was an inquiry by the coroner, who had a movable court, the number of fires would be lessened. It seemed to him rather singular that so large fires occurred as those at Messrs. Grant's, Clerkenwell, Brooks's Wharf, and the City Flour Mills, considering the buildings were fire-proof. He thought they were so high that the water could not be thrown up to them, and he thought that stages should be formed to attack such buildings from the outside. He could not help thinking that the threshing machine was a very prolific source of fires in farms; and he thought that if the machine had a spark-catcher, the number of fires would be lessened.

Mr. WALFORD, in reply, thanked the meeting for the kind reception his paper had met with. With regard to Mr. Martin's remarks

as to the functions of the early watermen, these men did secure exemption from the press gangs, had other privileges, and performed their duties very well; but with regard to the general impression that some small mutual insurance societies were formed after the fire of London, that was simply a popular delusion. He had looked at newspapers from the time of the fire of London to the reign of Queen Anne, and read the advertisements, and he was prepared to say that although there were several contribution offices founded, they in every case granted a policy for a particular sum. Their plan of operation was to require a premium for the sum insured upon, and a collection was made when the fire occurred. Those who were acquainted with the newspaper advertisements of the period, would see that the policy holders were requested when a fire occurred to come and pay their contributions before a particular day; and this was the only system that could be adopted at the time. There was an Act against monopolies, which hindered the formation of properly constituted insurance companies. No such company could be founded without the authority of a Royal Charter, and to apply for such a charter was unfortunately construed, by the Government of that day, into something like an invitation for the perpetration of a wholesale robbery. He could confirm some of Mr. Washburn's remarks with regard to Boston. In every community the measures for fire protection were more or less adapted to the circumstances of that community. While in America there was the largest provision for fire, still there was nothing approaching the completeness that was required. Unless the brigade arrived early at the larger buildings there was no chance of the fire being extinguished. With regard to London he was sorry to differ from Mr. Bunyon, who was so great an authority on the subject: but if Mr. Bunyon had seen the effective measure taken in America he would no doubt be inclined to change his opinion. Dr. Guy had thrown light on the subject on which he spoke. There was an important fact for which they were indebted to Dr. Guy. He had said that for every thousand criminal lunatics that were taken charge of by the Government so many of them were incendiaries. This showed how much the argument in favour of taking care of the criminal classes applied even to this subject. Mr. Lumley had drawn attention to the Local Government Act. He (Mr. Walford) had referred to several local Acts, empowering as they did the local authorities to pay attention to water supply and to buildings and to provide fire brigades. It was a long time before this was done; but within the last twenty years there was no doubt that protective measures had been taken by many local towns which much required protection. Dr. Farr had referred to the system of hydrants. The paper had referred to the system of hydrants in London, and that was the same that prevailed in the American cities generally. He agreed with what Professor Jevons had said in reference to the hydrant system, which was the perfection of all fire extinguishing when it could be introduced. He wanted to know why a constant supply of water had not yet been given. There was a Bill introduced into the House of Commons, and the water companies had undertaken to serve London with a continuous

supply of water; but this, for reasons which no one could understand, had not been adopted. He observed some honourable members of the House of Commons present, and when the Bill came before the committee he hoped Dr. Guy would obtain an answer to his question—why water companies had not performed the duties they had undertaken? He agreed with Captain Craigie that to throw the expense of fire inquests on certain sections of persons would be an unfair thing; and as it was the duty of the Government to protect the community against robbers and thieves, so it was their duty to give protection against fire, and the time was not far distant when it would have to undertake this duty. Mr. Hall, who had a large experience of the world, and had written a handbook of the globe, had made some very useful and interesting remarks as to the hydrant question. In American cities where there was not the advantage of a natural flow of water from a high elevation, a system was introduced by which the steam engines accelerated the passage of water through the pipes. The moment the fire began the engine went to work and kept the hydrants supplied with three or four or five times more pressure than they would otherwise obtain. That was a mechanical appliance that might well be used in London. Mr. Hall had spoken of the voluntary system in America, but in that country volunteer fire brigades were often partisan or political institutions which had been done away with, and the voluntary system was now a matter of history. In regard to the remarks made by Mr. Hammick in reference to frauds, he would say that unless there was a system of inquiry of some form or other into the cause of every fire, fires would never be put down. Mr. Bourne had made some valuable remarks in reference to statistics. When the statistics were collected in the different departments they were of no use, because they differed in their standard and relationship, but if they were made on a common base they would be of some service. Mr. Doxsey had spoken of fire plugs, which in London were very effective as far as they went, but there was the question of water supply, which was as necessary in regard to fires as it was on grounds of health. Mr. White, of the County Fire, had had a large experience in regard to fires of a certain class, and he would find in the paper some very curious statistics in regard to incendiary fires which were given in the evidence of Mr. Fletcher. With regard to the subject of fire telegraphs, a paper would be read before the Society of Telegraph Engineers on the 28th of this month, on the different systems of telegraph fire alarms in America, and that subject would be fully discussed there. It might be fairly put, as an abstract question, whether fire insurance had done more good than harm, and therefore whether the country would have been better without it; but knowing how much the fire offices had done in the absence of the municipal authorities taking up fire protection, he felt a delicacy in throwing even a doubt upon the use of fire offices. The cost of fire insurance came out of the pockets of the people, and was a charge on their property, and if they chose to spend so much money on fire protection every year, they did so with the hope and belief that their fire premiums on the insurance of property would

be much less, and that was the fact. It would be a good thing in London if there was a central authority who would see that fire protection was sufficiently carried out, and who would consult with the insurance companies on this question. No doubt, as Mr. Doxsey had said, the fire engines waiting for the watermen was a nuisance. The mains were the property of the water companies, who, however, supplied water for extinguishing the fires without any charge at all; but they demanded the right of not having the plugs turned on without their sanction. The sooner that system was abolished the better; and if the hydrants were provided, all the people would have to do would be to turn on the water and the first step would be accomplished. There were many other subjects arising out of this question which he should have been glad to discuss if time had permitted. At the present moment it was not known how it was that ice houses were so frequently struck by lightning. Those that were acquainted with the United States and Canada, would know that such risks were the very worst. It was also a fact that very few deaths from lightning took place on chalk formations. These were questions that might have been discussed, but he was obliged to defer them on the present occasion. He hoped, however, to have the pleasure of speaking on them on some future occasion.