pally to call attention to clauses Nos. 1 and 4. In the former clause they say, "Conductors.—They must have a sectional area and conductivity so proportioned to the work they have to do that if double the current proposed is sent through them the temperature of such conductors shall not exceed 150° F." And in the latter, "Whatever insulating material is employed it should not soften until a temperature of 170° F. has been reached, and in all cases the material must be damp proof." Now I quite fail to see why, with such a large margin for safety as the enforced use of a conductor capable of carrying double the required current, they should fix the softening point of the insulator at 170° F., which entirely excludes the use of gutta percha. I write with no biassed pen, as, personally, it is immaterial to me what insulator is used; but, from my forty years' experience of gutta percha, I say a great injustice has been done to an old and well-tried servant, and I have no hesitation in saying that for *well*-planned installations for electric lighting, gutta percha as an insulator for the leads will be found to fulfil all the necessary requirements. In my inaugural address as president of the Society, in January, 1883, I said: "The conductivity of conductors diminishes in well-known ratios with an increase of temperature; consequently it is essential that conductors, especially those used for electric lighting, should be of sufficient capacity so as not to be affected by the current. If the current passing along a conductor increases the temperature of the same it is plain that the resistance of such a conductor is too great, and therefore its temperature and resistance will continue to increase until very prejudicial effects are reached. Perhaps the results of actual experiment will make this more clear. The experiments were made with a dynamo, the resistance of the armature of which was 0·6 of an ohm, and an arc lamp, the resistance of which was 0·38 of an ohm. In each case the circuit was metallic, and the total length of the conductor fifty yards, insulated to a thickness of ·065 of an inch. At one part of the circuit the conductor leading to the lamp, and that leading from it, were placed so as to touch each other, the consequence of which was as follows: When the resistance of the conductor was ·28 of an ohm, and the strength of the current 27 amperes, the dielectric became soft, and allowed the conductor to form contact in twenty-five minutes; with a conductor of ·21 ohm resistance and a current of 30 amperes the same results follow after forty minutes; but with a conductor of ·07 ohm resistance and a current of 33 amperes no heating effects were perceptible during the two hours the lamp was kept burning." Nothing since then has occurred to cause me to alter my opinion; in fact, I am more than ever convinced that the conductor must be so proportioned to the maximum current it has to carry as not to increase its temperature.—Yours, &c.,

WILLOUGHBY SMITH.

COPPER: AUDI ALTERAM PARTEM.

A very careful criticism of the position of the copper syndicate has been issued by Messrs. Everitt, a firm engaged in the copper trade, and as the conclusions arrived at are somewhat different from those generally held, our readers will probably like to see the following extract:—

The advantages of the rigging of the market have not been confined to the syndicate alone, as the shareholders in many large engineering concerns can testify. It is a singular feature in the present departure that the complaining has chiefly emanated from those who probably have never purchased a ton of copper. We do not suppose that the higher rates of the present moment will hamper the copper trade any more than did the extraordinary prices in iron and steel at the commencement of the last decade cripple that industry. An increased usefulness for copper is what we anticipate. Not the least of its triumphs was that which only eighteen months ago attended upon a comparison by the Government between copper and iron wire for telegraphic purposes. The verdict for copper was conclusive, and proved its indispensability—a lighter wire, with proportionately greater strength, and a marvellous increase in the average velocity of transmission. With a favourable Budget to rest upon, it is impossible to forecast the value and the magnitude of the revolution which a capable administrator like the present Postmaster-General would initiate. The modern tendency to quick and cheap telegraphic communication is here justified. A further question suggests itself as to what the syndicate can do, having due regard to the full maintenance of the use of copper in sustaining prices in the future. What prospect is there that, for some time at least, opponents will be able to discover a corrective to the present upward tendency? It was thought such remedy was at hand when the coalition between the English smelters and the syndicate came to naught. It has since appeared that the smelters have but placed themselves between the syndicate and the deep sea. They are responsive to the inarticulate but real influence of the syndicate; and prices now move in sheer obedience to the dictates of the operators. The reason is at hand. The former available supplies of material for smelting have been securely locked by the ubiquitous key of M. Secrétan and his coadjutors; for the production of the largest mines in the old and the new world is under their control. To calculate upon a fiasco by virtue of the increased volume of Chili bars is to court disappointment; so to hope for a breakdown of present rates from any increase in refined or select copper is equally futile. So long as the wealth of the syndicate can carry the one, and its power can govern the other, they will remain passive in the progress of the struggle. The world is now waking up to the fact that the present combination is only in its infancy, and that to the relief of the strain upon the syndicate may be brought, when necessary, the federation of the mining interests which the syndicate has done so much to improve. Should, however, new forces work the defeat of the now victorious corner-men at last, the influence of the present movement will live after many days. Whenever the hour of liberation arrives, and the market again breathes its quondam freedom, it will doubtless leave hostages behind. Not the least important will be that touching the prices of the future. It is certain that the result will be the establishment of a condition which shall give to the producer and the manufacturer a fair return for their capital, to the operative a livelihood for his skill and labour, and to the consumer merchandise of a value proportionate to his money. But for ourselves at this moment, and without regard to the future, against all the drawbacks to the situation we place the living fact that the trade has, by the syndicate's daring in the application of its resources, been lifted out of a depression which, had it continued, would have proved calamitous.

ANGLO-AMERICAN BRUSH ELECTRIC LIGHT CORPORATION (LIMITED).

The following circular has been issued to the shareholders of this Corporation:—

"In compliance with the request of several shareholders, and in view of many important events during the last few months, the Directors, while not anticipating the approaching annual report, consider that a brief statement as to the present position of the Corporation as regards prominent questions may be of interest.

"By the Electric Lighting Amendment Act, which received the Royal Assent on 28th June, 1888, the chief obstacles to the investment of capital in central lighting stations have been removed. Although the alteration of the law does not meet all wishes, nevertheless the extension from 21 to 42 years of the period after which the local authorities can require the undertakers to sell, and the improvement in the terms of purchase which the Act effects will be of material benefit to the industry.

"There are, indeed, good grounds for hoping that the recent amendment of the Act of 1882 will prove a turning point in the history of the industry, and there are already many indications that the long-anticipated revival in the electric lighting business is now at hand.

"Among the electric lighting companies which have already been formed for the supply of electricity may be mentioned the Chelsea Electricity Company, in which the Corporation are interested as contractors for the generating plant.

"This company, which has been established for the purpose of supplying electricity to one of the most important residential districts of London, possesses a Provisional Order which secures to the company the benefit of the new Act. It proposes to put down plant in the first instance sufficient to supply 6,000 lights. The system of distribution which is being adopted is one in the economy and efficiency of which the Directors have the fullest confidence. The electricity generated at the central station will be conveyed by underground mains to sub-centres where accumulators, which the Electrical Power Storage Company are supplying, will be charged. From these storage stations the current will be distributed to the surrounding buildings.

"The Corporation have also made arrangements for establishing central stations at Bournemouth and other places.

"The negotiations with the Commissioners of Sewers with a view to the electric lighting of a part of the City of London have been resumed, and the Corporation having submitted to the Commissioners' proposals, which will meet the objections made by some of the members of the Commission to the former scheme, there is every reason to hope for a satisfactory issue.

"The volume of the Corporation's business during the year shows a very considerable increase as compared with the corresponding period of previous years, and the factories are at present fully employed.

"Among the more important and remunerative work that has been done may be mentioned the contracts in connection with the Glasgow, Barcelona and Melbourne Exhibitions.

"At the Melbourne Exhibition the Australasian Electric Light and Power Company has installed, besides a large Victoria incandescence plant, about 40 Brush arc dynamos and 1,000 arc lamps. The whole of this plant was supplied by the Corporation, and shipped within a period of two months, and is now in very satisfactory operation in the Antipodes as the largest temporary installation on record.

"The Continental business of the Corporation is also developing very satisfactorily. The factory at Vienna is now a source of revenue, and at

Temesvar, where the lighting has hitherto been confined to the streets, the Corporation are putting down extensive plant, with a view to supplying the light to private consumers. The theatre and other buildings are already supplied, and the demand for the electric light has very largely increased.

"In July last the Directors had reason to congratulate the shareholders on the decision of Mr. Justice Kay in the action brought by the Edison and Swan United Electric Light Company, by which judgment was given in favour of the Corporation upon the main issue, viz., the Edison patent, and in favour of the Edison-Swan Company upon the minor issue of the Cheesbrough patent.

"The well-known 'Victoria' incandescent lamp, which is manufactured by the Corporation, is absolutely independent of patents other than those held by this Corporation, and is superior to any in the market either in this country or abroad, in cheapness, durability, and efficiency. In order to cope with the increasing demand, a new factory for the manufacture of these lamps upon a very large scale is being fitted up in the neighbourhood of London.

"The Directors feel they are able to congratulate the shareholders upon the improved prospects of the electrical industry generally, and having regard to the fact that during the past few years of comparative stagnation the efforts of the Corporation have been directed to developing its resources for undertaking large contracts, it is now in a very favourable position for profiting by the revival which is at hand.

"By order of the Board,

"E. GARCKE, Manager and Secretary

"112, Belvedere-road, Lambeth, 3rd October, 1888."

COMPANIES' MEETINGS.

Eastern Extension, Australasia and China Telegraph Company (Limited).

The thirtieth ordinary general meeting of this Company was held on the 10th inst., at Winchester House, 50, Old Broad-street, under the presidency of Sir John Pender, K.C.M.G.

The SECRETARY (Mr. F. E. Hesse) read the notice convening the meeting and the minutes of the last meeting, which were confirmed by the present meeting, and signed as correct by the Chairman. The report of the Directors was taken as read.

The CHAIRMAN: Before asking you to approve of the first resolution, I will, as usual, go over some of the details in the report, so as to give you a more accurate idea of the working of our system during the last six months. The gross receipts for the half year amounted to £239,926, against £219,201 for the corresponding period of 1887, or an increase of £20,725, which is due to general increase of business throughout the system. The working expenses for the half-year have been £69,297, against £76,241 for the corresponding period of 1887, showing a decrease of £6,944, of which nearly £4,000 is on account of the repairing ships—a fluctuating item as you know—and the remainder is spread over the general working. The net revenue for the half year amounted to £125,804, against £97,662 in the corresponding period of 1887, showing an increase of £28,142. One interim dividend of 1½ per cent. has been paid for the six months, and another of like amount will be distributed on the 16th inst., leaving a balance of £47,903 to be carried forward, after charging against revenue £15,401, the balance of the cost of the Singapore-Saigon cable renewal, to which full reference was made at the last meeting. Now, gentlemen, before going a little into the details of what we have done during the last six months I think it is only right and respectful to an old shareholder that I should refer to the subject of the bonus. I do not know whether Mr. King is present, but he addressed me on the subject of paying the bonus half yearly, instead of at the end of the year only. Mr. King, however, has overlooked the fact that 12 months ago we laid down the principle, after full discussion, that it was not wise to pay a bonus before we had made up our accounts to the end of the year. This is, as you are aware, only the interim half year, consequently we are adhering to the policy which was then accepted by the shareholders, and upon which we have decided to act in the future. I think we are fully justified in taking this course. In the first place, by keeping in hand such a sum as we carry forward at the present time—because we simply carry it forward—we maintain in the market a more uniform rate for our shares. Those who hold our shares as a permanent investment have the satisfaction of seeing the value of their property from day to day rather increasing than decreasing; and, on the other hand, those who are disposed to sell their shares at any particular period during the three months, or the six months, receive a higher market price than they would obtain if there was a smaller reserve. I think that that is a very clear and good reason for paying our bonus at the end of the year. There is another reason, and a very important one, too. Those who are watching our system closely observe that we have interruptions, and during the past six months we had the two Australian cables suddenly and simultaneously interrupted for nineteen days, cutting off Australasia from telegraphic communication with the rest of the world. That might have had a tendency to cause almost a panic in regard to our property, had we not our large reserve: but the event passed off without any material change taking place in the value of our property. We found that the breaks arose from volcanic action, and, curiously enough, when we picked up the cables we found all sorts of things attached to them, even roots of trees. The whole thing seemed to be a great upheaval of Nature. In order, however, to avert a recurrence as far as possible of the inconvenience caused to the telegraphing community by the interruptions, your Directors resolved without any hesitation to have a third cable laid between Java and Australia, the policy of the Company being to do its work in such a way as to command the confidence of the public; and when we see that we can do anything to strengthen our system we do not fail to do it. We purpose connecting that cable with the land lines of Western Australia, which will give an alternative land system to the existing South Australian overland line. The manufacture of the new cable is all but complete, and we believe that within a comparatively short period the cable will be laid, with the approval of the Western Australian Government and of our Home Government; and altogether this active and prompt operation is one that should, I think, reflect credit on the Company, and give satisfaction to the telegraphing public, besides which it has put aside a competition which threatened to lay a line from a certain point in Western Australia to India, and left us, as we ought to be, masters of the position. I have given you these details, gentlemen, so as to show you that your interests are daily—I may say, hourly—cared for, and that what we are called upon to do requires a great deal of ready money at hand. Look at the changes that take place suddenly in the value of money. If we had had to go to our bankers before we contracted for this cable, we should probably have been in rather an uncomfortable position to-day; but, as things are, we have been able to undertake this work in such a manner as will, at all events, give a greater amount of permanency to your dividends, even if it does not add to them. The last time I addressed you I referred to certain renewal operations which were going on, since which we have sent out some two hundred miles of new cable of the most improved type to be inserted in the Java-Australian sections, off the Lombok Straits, near Banjoewangie, where we have experienced serious troubles from time to time, owing to the cables at this spot being on bad bottom and in too close proximity to each other. The Company's steamship "Sherard Osborn" is now engaged on the work, and although every care was taken to avoid interrupting the duplicate cable till the work on the original line was finished, we have this morning heard that the communication with Australia is interrupted about eighty miles from Banjoewangie. I believe, however, that before the day is over we shall hear of its repair. The ship is on the spot, and we believe that the vessel engaged in working on the one cable has caused the interruption to the other. A great deal has been said in the Colonies in regard to the interruptions which occur. I see that the Government of Queensland even considered it so important as to have the subject alluded to in the speech which was delivered in August last, on the opening of Parliament, by the late Governor, Sir Anthony Musgrave, whose sudden death, I regret to state, took place yesterday morning. He was Governor of Queensland for a considerable time, and his death is a great loss to that colony and to the country also, for he was a very valuable servant of the Crown. In his speech last August—the speech, no doubt, being inspired by the Premier of the day—it was stated that it was very desirable to encourage a competing cable in the Pacific as against this Company, simply for the purpose of reducing what they consider the very exorbitant rates we charge. I may say in regard to Queensland that from the very beginning that colony has given no credit whatever to the Company as the pioneer of cable communication, though deriving immense benefit from our connecting them with the mother country and the other colonies. The whole cry in Queensland has been, get a competing system and reduce the rates. I may tell you that we have done everything we possibly could to meet the requirements of Queensland, but it seems to me that nothing will satisfy them. I therefore beg publicly to say—and probably I shall take the opportunity of making my remark better known in the colony—that when Queensland comes forward and shows that she is in earnest in doing something to reduce the rates we shall be only too pleased to negotiate with her. The Company submitted a proposal some time ago to all the Australian Colonies by which a 4s. or even a lower tariff could be brought about, provided the Governments would guarantee the Company three-fourths of the receipts from the Australian traffic, the Company accepting the remaining one-fourth of the guarantee risk. So far, however, they have declined to give us this guarantee, or to take any part with the other colonies in reducing rates. What they are prepared to do, as I understand, is this, though I doubt if they are ready to find any money to do it—but, so far as I understand, they are prepared to join the other colonies to form a Pacific line, so as to force down our rates by competition, losing sight of the fact that if two cables are liable to interruption, as above explained, a single line *vid* the Pacific, consisting of long stretches of cable across enormous and practically unsurveyed depths, terminating in coral reefs, would inevitably be exposed to greater danger of interruption. Moreover, if the rates were forced down, as advocated in the Governor's speech, the traffic would probably be found to be so unremunerative that when interruptions took place the companies would be unable to bear the expense of repairing them. I am glad to say that our connection with the other colonies has been of a very satisfactory and pleasant character. They acknowledge that we have been the pioneers in this great enterprise, and they appreciate the work that we have done for them. Since direct telegraphic communication with Australia was established in October, 1872, until 1880, when the duplicate cable was laid, only two total interruptions occurred, namely, in 1877 for 38 days, and in 1879 for 18 days, making a total of 56 days, or an average of seven days per annum. From the date of duplication until the present date the communication has been thrice interrupted, aggregating 32 days, including the recent breakdown from volcanic disturbance already referred to, or an average of less than four days a year. I now pass from that matter to the next point, and I am again brought back to the subject of interruptions, and