examination, which are incumbent upon all who propose to enter for a tripos, for French and German have been introduced as alternative subjects. This will be a great boon to the classical men, who have hitherto been obliged to pass a mathematical examination before they could get classical honors. In fact, the 'additional subjects' of the 'Little Go' are merely a relic of the time when candidates for honors in any subject had first of all to graduate in mathematics; and the result of this was that many of the best classical men contented themselves with ordinary degrees. Now, however, all this is changed, and their path to distinction is much easier than it used to be.

A movement of the same kind is on foot in the University of London also. At a recent meeting of convocation (to which all graduates of a certain standing have the right to belong) a committee was appointed to consider the desirability of the establishment of degrees in engineering. The first meeting of this committee is to be held to-day. It is within the knowledge of the present writer, that many well-established engineers are feeling the want of a knowledge of electricity, and hence it seems desirable, that, for any degree in engineering, a theoretical as well as practical acquaintance with electricity should be exacted from all candidates.

Probably the most complete private electric installation in the world is now to be found at the house of Sir David Salomons, Bart, at Tunbridge Wells, about thirty miles south-east of London. On several occasions lately, he has kindly invited parties of leading electricians and engineers to inspect it, and most hospitably entertained them there. The boilers, steam-engines, generating-dynamos, etc., are all in duplicate; and opening out of the room containing those, is a large and very complete series of the E. P. S. storage-batteries. Under ordinary circumstances, the engine does not run more than six or eight hours daily. In a sort of annex to the house is a magnificent private workshop, with lathes, saws, planing-machines, and all sorts of 'tools.' The whole of these are worked from two or three motors, which put in motion the overhead shafting. Many thousand pounds must have been spent upon this unique installation.

The discussion upon Prof. D. E. Hughes's paper, upon "The self-induction of an electric current in relation to the nature and form of its conductor," was concluded last night at the Society of telegraph engineers and electricians. During the three evenings devoted to it, Lord Rayleigh, Prof. George Forbes, Professor Ayrton, Dr. Hopkinson, Prof. S. P. Thompson, Dr. Fleming, Mr. Frank Pope of New York, Mr. Preece, and many others expressed their sense of the very great value, ingenuity, and originality, of Professor Hughes's researches, — an opinion which was universally re-echoed in conversation among the members generally. Great applause greeted the proposal with which Dr. Fleming (of the Edison light company) closed a very effective speech, to call the co-efficient of the unit of self-induction a 'Hughes.' Both Mr. Frank Pope and Mr. Preece, as practical telegraphists, pointed out how the experimental results now obtained by Professor Hughes provided a clear explanation of certain remarkable facts observed in telegraphy; and Mr. Preece paid a warm tribute to Professor Hughes's ingenuity by pointing out, that, whereas the speaker had had to erect a pair of lines two hundred and seventy-eight miles in length to compare the telegraphic speed of iron and copper wires, Professor Hughes's wonderfully ingenious and delicate induction-bridge had enabled him to predict the same result from experiments upon only ten inches of wire. Perhaps the most important practical feature in the paper was that self-induction in iron wire could be cured by stranding the wire; but all of the results are a remarkable illustration of science enriched by practice.

W.

London, Feb. 26.

BOSTON LETTER.

THE topographical survey of Massachusetts, undertaken by the state in conjunction with the U. S. geological survey, has now been in progress for a year and a half, and about 3,250 square miles have been surveyed, or somewhat less than half the state. The parts already covered include the extreme western border of the state, embracing our highest elevations; two central sections, — one at the Connecticut, and the other around Worcester; the region about Boston; and almost the whole of the area to the south of it, lying to the east of Rhode Island, the character of which is very different from other parts of the state, hardly any parts of it being commanded by elevated positions. Hence, in surveying this, the plane-table has been laid aside, and the whole district has been mapped by traverse work; the courses of the streams, and the shore-lines of the open water spaces, being worked in by a winter party taking advantage of the ice. There is also a little completed patch in the extreme north-eastern corner of the state.

According to an estimate made by the commissioners of the survey, the cost of the work the past season has varied from about eight to nineteen dollars per square mile, and an average of a

little over ten dollars. By request of the commission, the U. S. coast survey has also aided the work by extending its triangulation over about nine hundred square miles during the past season, at a cost of a little less than two dollars a square mile, about a fourth of which has been borne by the state.

A year ago the state appropriated nine thousand dollars to enable the commissioners to take advantage of the progress of the present survey to determine by triangulation the boundary-lines of all the towns of the commonwealth. A commencement of the work was made the past season, only to discover that the estimate of the expense, based on the irregularities shown in the boundary outlines as given in the old state map, — the only possible basis for a calculation, — was far too little; probably at least double the original estimate will be required. As less than twenty-five hundred dollars have been expended, the abandonment of the scheme would be no severe financial loss; but the commissioners rightly urge its continuance under a doubled appropriation, as, when completed, it will form the best basis for a cadastral or property survey yet provided by any state in the country. This is only one of a number of ways in which our legislators are beginning to learn what it costs *not* to have a good state map, and there can be little doubt that they will be witty enough to carry the intended boundaries survey to completion.

Among the numerous partly executed plans for the improvement of Boston, its schemes of public parks hold a prominent place. The recent death of Hon. Elizur Wright has called attention anew to his proposal to establish a forest-preserve within easy reach of Boston, in the wild and little-inhabited region known as the Middlesex Fells, — a region belonging to some half-dozen municipalities, and situated on the Charlestown or northern side of Boston, not half a dozen miles from the city. On the opposite side, progress is making in the Arnold arboretum, which now forms part of the Boston park system, where definite plans, long maturing, are being put into execution. It is proposed to form two distinct collections of growing trees, — one for display; and one, less permanent, for investigation and experiment. The plan of the former contemplates, among other things, that each hardy-tree species of eastern America shall be represented by an individual planted so as to secure the maximum growth attainable here, and also by a group of from six to twenty-five individuals selected to show variations of character and habit, and planted so as to secure expression in mass rather than perfect individual development. The representation of no species will therefore depend on the life of one tree, and the natural behavior of our principal trees will also be illustrated.

The Appalachian Mountain club celebrated its decennial anniversary last Friday by a dinner at the Parker House; Prof. E. C. Pickering, whom every one recognizes as the founder of the club, presiding. As a first experiment of the kind, it proved a great success. About one hundred and twenty-five members were present, about equally divided between ladies and gentlemen, and sat to a late hour. After dinner, speeches were made by Profs. W. H. Brewer of New Haven and C. A. Young of Princeton, and by many of the home members, with letters from those who could not be present. The club may well be proud of what it has accomplished, having succeeded in obtaining a paying membership of considerably over six hundred in these ten years, and in publishing more than three volumes of *Appalachia*, — a journal which, with its two sides of mountain exploration and geographical science, holds a somewhat unique and enviable place in literature. A new number is announced to appear immediately.

It is announced that the liberality and co-operation of the Woman's education association will enable the Boston society of natural history to open its seaside laboratory at Annisquam to students, during the coming summer, from June 15 to Aug. 15, 1886. Mr. B. H. Van Vleck, an assistant in the laboratory of the society, will have charge of the instruction. Y.

Boston, March 8.

NOTES AND NEWS.

THE danger of poisoning from arsenic in wall-papers is a subject attracting considerable attention in Boston. At a public meeting the past week, called for its consideration, a draught of a bill was submitted, prohibiting the manufacture and sale of such papers when they contain more than one-fourteenth of a grain of arsenic to the square yard. A number of cases of illness from this cause were reported, as also the death of one child from the wearing of stockings colored by arsenic.

— A resolution has been introduced in the senate, empowering the superintendent of the Coast and geodetic survey to loan any instrument or instruments named in a list to any college or incorporated institution of learning in the United States, to be retained by such college or institution until the dissolution thereof, whereupon such instrument or instruments shall, if existing, be returned to said survey.