

Henrici, Prof. Huxley, Prof. Ray Lankester, Prof. Henry Nettleship, Prof. Pearson, Sir H. Roscoe, Prof. Rücker, Dr. Russell, Prof. T. E. Thorpe, Prof. Unwin, Dr. Waller, Dr. Windle, Prof. Weldon.

During the month of November the Committee were informed that a Committee of the Senate of London University had drawn up a series of resolutions, to be submitted to the Royal Commission. Your Committee therefore requested the Vice-Chancellor to allow its members to address the Committee of the University Senate in support of the proposals of the Association. The Vice-Chancellor replied by inviting the Executive Committee of the Association to attend a meeting of the University Committee on Wednesday, December 7. At this meeting the objects of the Association were explained by the President, Sir Henry Roscoe, and Prof. Weldon, and the Vice-Chancellor in reply made an important statement, to the effect that the resolutions which were put forward by the Committee of the Senate were intended to be understood in such a manner as to render them perfectly consistent with the programme of the Association. The resolutions proposed by the University Committee, and since adopted by the whole Senate, are as follows:—

The Senate having reason to believe that a distinct expression of opinion may be useful to the Commissioners at the present stage of the inquiry, desire to recall to their attention the fact that during last year the Senate approved a Scheme for a Reconstitution of the University which provided for the constitution of Faculties consisting of teachers and of Boards of Studies in each Faculty, and for the election of members of the Senate by the Faculties; and that the Scheme further proposed to confer on the University power to hold real property and to accept grants, gifts, devises, and legacies for the purposes of the University, including the establishment of Professorships and Scholarships, whether attached or not to any particular College, and the furtherance of regular liberal education and of original research.

The Senate now desire to state that, if in accordance with the decision of the Commissioners, the Senate is prepared, in order to promote the efficiency of the University, and with a view to its reorganization as a Teaching University in and for London, without curtailment of the functions which it now discharges—

(a) To establish and incorporate with the University Faculties in Arts, Science, Laws, and Medicine, and Boards of Studies acting thereunder.

(b) To provide for the incorporation with the University of Teaching Institutions of the higher rank.

(c) To utilize, with their consent, existing organizations for higher culture, and subject to such utilization to institute and maintain Professorships and Lectureships, whether for academical or other purposes, and generally to assume such functions as may be required for the furtherance and superintendence of a regular liberal education, and for the promotion of original research.

(d) To accept and administer fees and such other funds, public or private, as may be necessary, and may be granted or given for the purposes of the reorganized University.

(e) To provide for the adequate representation of the Professoriate on the Senate.

The Committee regret that Prof. Pearson, whose energy and enthusiasm have been of such essential service to the Association, has felt obliged to retire from the office of Secretary. His place has been taken by Prof. Weldon.

#### THE MANCHESTER MUNICIPAL TECHNICAL SCHOOL.

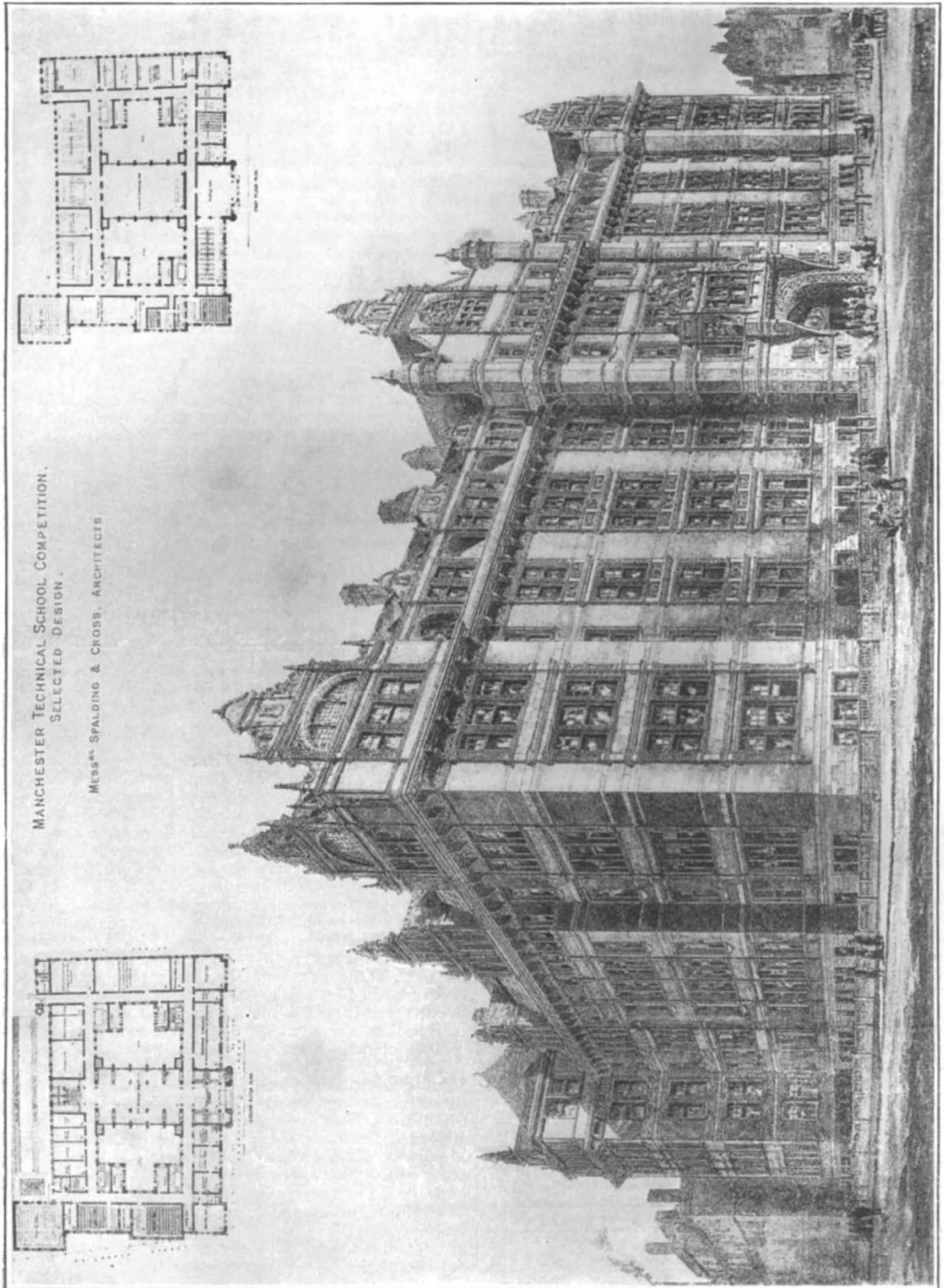
IN his interesting address on technical education, when distributing the prizes of the Manchester Municipal Technical School, on the 19th inst., Mr. Balfour pointed

out that the occasion was an important one, not only in the history of technical instruction in Manchester, in the history of the Corporation of that city, but also in the commercial and manufacturing history of Manchester itself, since this was the first public occasion of the distribution of prizes to the scholars of the Technical School and the School of Art since these schools were taken over by the municipality, and supported out of the public funds of the city. The fact that the Corporation of the northern metropolis has taken possession of the School of Art and of the flourishing Technical School, founded a few years ago on the site of the old Mechanics' Institution, is one which may well claim the attention of the leading statesmen of our time, and Mr. Balfour has done good service to this great educational movement by thus placing prominently before the country the part which our municipal authorities are now playing in the matter. Fully alive to the revolution which these changes are bringing about in our educational system, Mr. Balfour, speaking to the teachers and students, insisted that there is now thrown upon them something more than personal responsibility, something more than the desire for self-advancement. They are concerned, he said, in a national work, and ought to look at it from a national point of view, and it is this public aspect of the question which justifies and more than justifies the Corporation for having taken up this great work and for having created the greatest technical school at present existing in England, but which, great as it is, is still in its infancy, and will yet show developments which will astonish those who are now devoting their time to it in so public-spirited a fashion.

Then spoke Mr. Councillor Hoy, the chairman of the Technical Education Committee of the Corporation, and in thanking Mr. Balfour for his "thoughtful and charming address" added that it was only nine months since these schools were handed over to the Corporation, that they had to master the whole machinery of the education, to arrange all the details of the transfer, but that in addition they had plunged right away into the necessary steps for erecting a new and enlarged school.

So it is evident that the men of Manchester do not allow the grass to grow under their feet. They know that the business they have undertaken is a big one, and they, like good business men, are prepared boldly to meet the necessities of their position. How boldly and how completely they propose to do so will be seen when we learn what are the proposals which they have made for carrying on their work, for making the necessary preparations, for giving the highest and most complete technical training which can be given in all those matters upon the satisfactory accomplishment of which, the industry and commerce of the vast district of which Manchester is the centre depends. At present the work of the Technical School is carried on in three different buildings, one the old Mechanics Institution where the great bulk of the teaching is done, another in an old warehouse fitted to suit the wants, as far as may be, of the electrical engineering department, and a third in the buildings of a school where a very completely-equipped department for the scientific study of the cotton manufacture is arranged. Needless to say that none of these three buildings provide sufficient or adequate accommodation for the proper practical teaching and illustration of their subjects, and no sooner had the Corporation Committee become acquainted with what they had to do, and the means placed at their disposal for doing it, than they made up their minds that a new building must be erected fully representative of the present needs, and with room, if possible, for future developments.

But before committing themselves to plans or estimates, this committee wisely determined to see with their own



MANCHESTER TECHNICAL SCHOOL, COMPETITION.  
SELECTED DESIGN.

Messrs SPALDING & CROSS, ARCHITECTS.

eyes what was doing and had been done elsewhere. They visited the English schools, such as they are, and, more important, they went abroad and inspected the well-known technical schools on the continent, and on their return they issued an interesting report containing not only an account of what they saw and learnt, but the conclusions they drew as to how far their Manchester school should be modelled on foreign lines. This journey of inspection gave the members of the committee a new and enlarged view of their duties, and they returned home with the determination that if they could not approach the size of such buildings as the Zurich Polytechnicum or the Technical High School of Charlottenburg, at any rate they would put up a school which should be as complete in its parts as any similar institution abroad and capable of doing for their centre work equally useful and of exerting an equally beneficial influence on their population as any of the foreign schools. Some captious critics were loud in their condemnation of such a way of spending public money as that of sending a number of Manchester men on an educational tour abroad. In fact, no money could be or has been more judiciously or more economically spent. Without a knowledge from personal observation of what is doing elsewhere, these gentlemen could not possibly have carried out their business to a successful issue; with such a knowledge they can and will do it.

Fortunately for Manchester, the necessity for technical training of the people was long ago preached by one of her most distinguished sons, the late Sir Joseph Whitworth, and his legatees, knowing his views, presented a site for the school of 5000 square yards, situated in the centre of the city, and well placed as regards light and air. On this site the Corporation have decided to build a spacious, not to say magnificent, school, a perspective view of which is found on the opposite page. The whole of the site, including 770 yards in addition given by the Corporation, is to be covered by buildings, and in it ample accommodation will be found for the work carried on in the present temporary premises. This will include engineering, mechanical, electrical, civil and sanitary, the chemical industries, the cotton manufacture, spinning and weaving, the building trades, dyeing and calico printing, metallurgy, letterpress and lithographic printing, and other minor industries; industrial art and design, and the subjects classed under the heads of commercial and economical instruction. And in addition to these proper accommodation for the teaching of the pure sciences, mathematics, foreign languages, to say nothing of manual instruction and gymnastics. All these matters require means of giving practical instruction, not only lecture rooms, but laboratories, workshops, and museums, so the problem of satisfying all their needs is a complicated one, but one which the committee are determined to do their best to carry out. The size of the proposed building called forth a large number of competing designs from some of the first architects of the day, and the first premium was awarded by the Committee, assisted by Mr. Waterhouse, R.A., to Messrs. Spalding and Cross, of London. Their design is in Renaissance style of the early French period, and the internal arrangements are made with the view of giving as much light as possible. The material is red brick with terra cotta facings; it is roofed with green Whitland Abbey slates. The building will be fireproof throughout, and the flooring covered with wood blocks, except in the case of the dyehouse and laboratories, where impervious paving is needed. One great desideratum in such a building is proper ventilation; this will be arranged on the plenum or plus pressure system, the air being pumped throughout the building by fans worked by electricity, and the lighting will also be electrical. The building is six stories high, none of the rooms will be lower than 15 feet clear, and averaging from 25 to 30 feet in depth. The class rooms, lecture theatres, drawing and designing offices, laboratories, library, work-

shops and administrative department, as well as the students' and lecturers' rooms, are all lighted from the face of the building with wide continuous corridors all round each floor, lit from internal areas, and each department will be as far as possible separate and self-contained. The total available floor-space exceeds 150,000 square feet exclusive of the corridors. The main entrance hall is 85 by 50 feet, and it is to be utilized as an industrial museum; on the first floor is a public lecture hall 30 feet high, and of the above dimensions. On the third floor is the chemical laboratory arranged for 80 working benches. Two independent staircases, as well as a spacious passenger lift give access to the different floors, and extra exits are provided in case of fire. The basement, which is only seven feet below the ground line, is to be fitted with heavy machinery and other apparatus used in industrial operations on a considerable scale. Here we find the electrical and mechanical workshops and testing machinery; rooms for purposes in which stability is necessary; experimental steam engine, dynamo, and secondary battery rooms; spinning and weaving machinery for cotton and silk; rooms for bleaching, dyeing, and finishing; plumbers', bricksetters', and masons' workshops; shops for repairs, and construction of new apparatus, &c. The upper stories contain the laboratories, general and special, lecture rooms, drawing offices, gymnasium, library, and students' reading and common rooms.

The following is the space allotted on the various floors for the several departments:—

	Sq. feet.
1. Administration, Museum, Lecture Hall, Library, Reading Room, Gymnasium, and other offices ... ..	26,837
2. Mechanical Engineering ... ..	18,266
3. Applied Physics and Electrical Engineering ... ..	13,666
4. Textile Trades ... ..	19,211
5. Applied Chemistry, Dyeing, &c., Metallurgy ... ..	29,232
6. Building Trades ... ..	10,922
7. Letterpress and Lithographic Printing ... ..	2,798
8. Industrial Design ... ..	13,453
9. Commercial Subjects ... ..	11,844
10. Domestic Economy Subjects ... ..	6,461
Total ... ..	152,690

As if to indicate the determination to make the utmost of their building, the Committee have asked Sir Howard Grubb to design a small astronomical and meteorological observatory on the roof! This in the centre of smoky Manchester; but experts say that even here much useful work can be done.

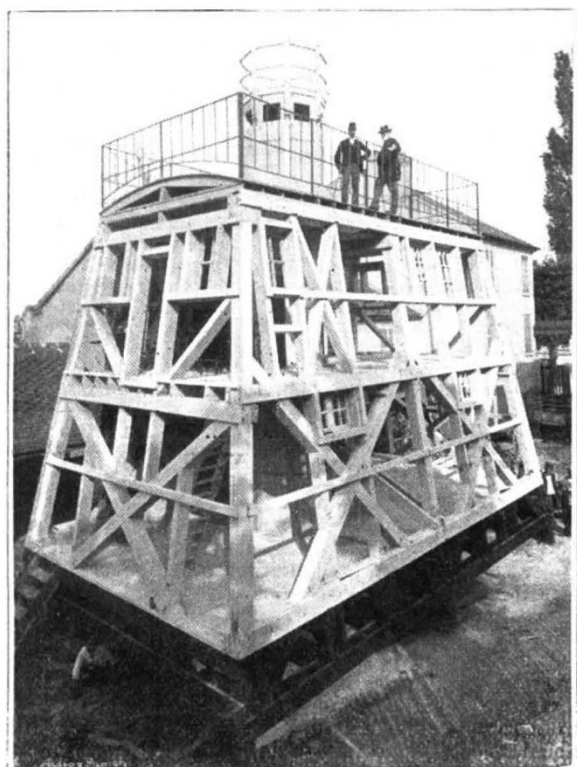
The estimated cost of the building, including fittings, apparatus, and machinery is about £125,000; towards this sum the Committee have available £14,000 balance of profit from the Jubilee Exhibition; £5000 promised by the Whitworth trustees; and the property belonging to the old schools estimated at £31,000. The remainder of the sum, about £75,000, the Corporation will borrow for a period of thirty years on the security of the 1d. rate. This great school will be governed by a Committee of thirty-six persons, twenty-four of whom are members of the City Council, twelve being chosen from the public interested in the progress of Industrial and Commercial Education.

Enough has been said to give the reader an idea of the scale and completeness of the proposed Municipal School. To work this properly will cost nearly £10,000 per annum. The fees will be low, but nevertheless will bring in a goodly sum, and the funds available from the Local Taxation (Customs and Excise) Act of 1890—commonly termed the beer money—will provide the remainder. Such a school, holding as it will do an intermediate position, between the Board Schools on the one hand, and highest University Education as given in the Owens

College on the other, cannot fail to exert a most important influence on the future development of trade and manufactures in Lancashire. What Manchester is doing in this magnificent way, other towns, notably Birmingham, Salford, Stockport, Oldham, Bolton, and others, are also doing, it is true on a smaller scale, but still in a manner sufficient for their needs. How long will it be before London moves? H. E. ROSCOE.

#### THE MONT BLANC OBSERVATORY.<sup>1</sup>

THE project of establishing a meteorological and astronomical observatory on the summit of Mont Blanc has, under the care of M. J. Janssen, of the Meudon Observatory, made considerable progress during this year's summer months. It has been decided to use the snow itself as a foundation on which to rest the building. That this can be done with security was shown by some experiments carried out at Meudon last winter. A miniature mountain was made of snow pressed to the same density as that which is found on Mont Blanc at a depth of one or two metres below the surface. This being



made level at the top, discs of lead 35 cm. in diameter, and weighing each about 30 kgr., were placed on the snow, one upon the other. After twelve of these had been piled up, with an aggregate weight of 360 kgr., they were removed and the depth of the impression measured. It was not more than 7 or 8 mm. Thus a structure measuring 10 m. by 5 m. might safely weigh 187,000 kgr. without sinking into the snow more than a few centimetres.

The summit of Mont Blanc is formed by a very narrow edge of rock 100 m. long, running from west to east, and covered by snow which is thicker on the French than on the Italian side. The level of this snow has not shown

Janssen, *Comptes rendus*, November 28.

any important oscillations throughout a number of years. To obviate the disturbing effects of the storms which frequently rage round the summit, the building is constructed in the shape of a truncated pyramid, the lower floor being sunk into the snow. The rectangular base measures 10 m. by 5 m. The upper floor, which will be devoted to the observations, is covered with a flat roof, towards which ascent is made by a spiral staircase leading from the basement upwards through the whole building, and above the flat roof to a small platform destined for meteorological observations.

The whole observatory has double walls to protect the observers against the cold. The windows and doors are also double, and provided on the outside with shutters closing hermetically. The floor is made of double planks, and furnished with trap-doors giving access to the snow supporting the observatory, and to the screw-jacks placed in position for adjusting the level of the building in case the snow should yield. The building will be provided with heating apparatus and all the furniture necessary to make habitation at such an altitude possible.

Up to the present the observatory has been transported in parts to Chamounix. On the Grands-Mulets a cottage has been erected for the use of the workmen and for storing the things destined for the observatory.

On the Grand Rocher Rouge another cottage has been built, only 300 m. below the summit, in which the workers and observers can, if necessary, take refuge. Three-quarters of the materials for the observatory have been transported to the Grands-Mulets (3000 m.) and the rest to the Rocher Rouge (4500 m.).

Next year the erection on the summit will be carried out. An astronomical dome, which is to complete the observatory, will also be taken in hand. The work done up to now has been carried out under great difficulties, owing to the fact that everything had to be carried by hand. But no accident has, so far, marred the success.

Dr. Capus, who accompanied M. Bonvalot in his well-known expedition to the Pamir, has promised his assistance for certain observations. But the observatory will be international, and open to all observers who wish to work there. E. E. F. d'A.

#### M. PASTEUR'S SEVENTIETH BIRTHDAY.

FRENCHMEN may be cordially congratulated on the enthusiasm with which the seventieth birthday of M. Pasteur was celebrated on Tuesday. It afforded a most striking illustration of the way in which they appreciate the services rendered by men of science. But the celebration was not, of course, one in which only the countrymen of M. Pasteur were interested; representatives of science from many different parts of the world were present to do honour to the illustrious investigator.

The ceremony took place in the great amphitheatre of the Sorbonne, which was crowded by a brilliant assembly including many of the foremost men of the day, not merely in science but in politics and literature. M. Carnot was present, and among those who supported him was M. Dupuy, the Minister of Public Instruction. M. Pasteur entered the amphitheatre leaning upon the arm of his son and upon that of the President of the Republic. All who were present rose to their feet and greeted the hero of the day with loud cheers. M. Pasteur, who was much affected by this reception, took his place beside his colleagues of the Institute and a row of Ambassadors and Ministers.

The proceedings were opened by M. Bertrand, perpetual secretary of the Academy of Science, who acted as chairman. At his request an address was delivered by the Minister of Public Instruction, who spoke eloquently of the great qualities displayed by M. Pasteur during his splendid career, and of the benefits conferred on man-