

It will be agreed by everyone that those who are anxious to learn to become skilled workmen should certainly be provided with the means to do so. Employers to-day find, in nine cases out of ten, trouble with apprentices. The masters do not look after the interests or welfare of the boy, although he makes a contract to turn him out a first-class tradesman. A boy should not be expected to get his technical training in the evening; it is too much for him to work during the day and then attend classes in the evening. He should be a ward of the State until he is 21. This was the scheme laid down by Mr. Board. You cannot afford to let the future of the country depend upon men who have a wholly material outlook. The material outlook of Germany has been largely responsible for the present debacle.

The classification of trades is essential, and employers should also be classified. The boy's training for citizenship and his physical welfare should be considered, and special attention should be given to these most essential points at the trades school. The trades school will supply a report of the boy's progress, and if the employers would supply a similar report of the boy's progress in the shop, it would be of great assistance. But the trouble is to get the employers to give this report.

Mr. SWAIN said one of the points to be considered in connection with the question under discussion is the class of apprenticeship we are concerned with. At present we are concerned with the apprentice craftsman, and Mr. Sinclair's remarks were more with regard to the apprentice operator. We will always want apprentice craftsmen, and, as our manufacturing develops we must also have operators. It will be difficult to find anything for these men to do until the Unions and Industrial conditions are changed to admit of the entering of the skilled trade by the operators. The Unions are find-

ing the necessity for splitting up their trades; it used to be a fitter and turner, now it is a fitter and a turner; but although they are split up into separate trades, they still, in each case, go through the five years' apprenticeship. To become a skilled turner operating plain lathes I think four years would be sufficient. A man standing at a bench bringing parts along to sample them can keep going as fast as the things are brought to him, but if he is kept on that class of work day after day it is very monotonous, and takes the soul out of him.

The High School should not be outlined to encourage the terms as set down by industrial conditions, except in the case of men who are fitted for professional avenues; others do not really work up until they have been through the shop and have seen the conditions existing there, and are able by diligence to get into the profession. It appears we would be much better off if we developed the Junior Technical School, which is suggested to cover the period from 14 to 16. These schools are not looked upon in the same light as the High Schools because there are facilities for getting into Universities, etc. If we could get more of the elementary outline into the system from trade training it would be better for the country. I find that at Newcastle in the apprenticeship school where boys from 14 to 16 are trained for engineering jobs, drawing, mathematics, etc., we have difficulty in keeping the boys for the two years, employers are anxious to get them as they consider them cheap labour.

Australia missed the greatest opportunity of developing this branch of engineering by making such a poor attempt at making munitions. I had great hopes that this method would be adopted, because our trades unions would have been able to see what was meant by repetition work, and I do not think you can make them understand without having

the thing in operation in their midst. One of the best methods would be to send a batch of them over to the other side, and let them see what is being done there; it would have a great effect upon the future development of the country.

Mr. THOMPSON asked if Mr. Sinclair knew anything about revival of Trade Guild in England; he considered that if they could be started here among experienced workmen it would have a good effect upon the younger workers, and would help them to realise the value of their work, not merely according to the money to be obtained by it, but because of the worth of the work itself.

Following upon the remarks by Mr. Sinclair and other members, etc., it was proposed at a meeting held June 7th, 1917, that the deputation to the Premier on the subject of Apprenticeship generally should bring forward Mr. Sinclair's views, but point out that the Association was handicapped in not knowing the Government's proposals on the same questions, and that if its assistance would be of any value it would freely help in any way that its services could be availed of.

Some desultory correspondence resulted from these interviews, but nothing really tangible eventuated, and it was decided that any further consideration of this most important phase of the Junior Engineers' training was to be left over till the amalgamation of the Engineering Institutions was an accomplished fact.

BOILER INSPECTION ACT.

One very important matter that deserves space in these memoirs is the persistent action of this Association towards having an Act governing the inspection of boilers and other vessels under pressure placed upon the Statutes of this State. In 1879 a Committee was appointed to consider the advisability of having Certificates issued for engine drivers, boiler attendants, etc., in order to safeguard life and property from boiler explosions and other accidents of a similar nature; in August, 1879, it was decided to send out broadcast, inquiries to various steam users throughout the State as to their views re the necessity for authorised Government inspections to be made of steam-driven plant.

The anticipated assistance from those approached was not forthcoming, however, more particularly with regard to boiler explosions, etc. The Committee were, therefore, compelled to advise the Association that in the absence of sufficient data they could not recommend the Government be approached on the matter.

The question cropped up again and again until at last we were called upon in 1909 to formulate and prepare "A Bill to regulate the construction and use of steam and other boilers; to provide for inquiry into boiler explosions, and for purposes consequent thereon or incidental thereto."

A committee representative of the many branches of steam users was formed from within the membership of the Association, and was composed as follows:—

Mr. Hector Kidd, consulting engineer, as Chairman.

Messrs. A. J. Arnot (Babcock & Wilcox Boiler Company), G. Boulton (Morts Dock & Engineering Co., Ltd.), W. H. German (Colonial Sugar Company), R. R. King (Morts Dock & Engineering Co., Ltd).

Mr. Arnot resigned through having to leave the State; Mr. T. Irons appointed in his stead.

C. G. Petrie (Colonial Sugar Company) and lately of the Manchester Steam Users' Association.

Russell Sinclair consulting engineer.

James Shirra (Department of Navigation),
Hon. Sec.

The Bill was presented to the Honourable the Minister for Labour and Industry in February, 1909.

Twelve meetings were held at which the sections of the draft Bill were carefully gone through and compared with similar provisions in other States of the Commonwealth. The Committee, while sensible of the advantage of a uniform system of regulation of boilers in the various States, did not recommend that New South Wales should simply adopt what has been enacted elsewhere, but has endeavoured to make the Bill recognise modern practice and interfere as little as possible with legitimate developments in boiler construction and use, while ensuring a system of registration and inspection that will keep all boilers under supervision by competent inspectors.

It was recommended that the Bill apply to all boilers, except such as may be already under satisfactory inspection, the statutory exceptions being of boilers the property of the Railway Commissioners and those of steamships certificated by the Department of Navigation. As the Bill was much of the nature of an extension of the powers of the Mines

Regulation Acts as regard boilers, mining boilers are recommended to be brought under this Act also in order to prevent duplication of departments doing the same work; also to ensure the experience of the inspectors under that Act being available under this Act also. Great care was taken in compiling the Bill to leave it sufficiently elastic to enable it to cover not only the present but the requirements of the future. The Technical regulations submitted were typical of what was considered necessary, while helpful suggestions as to the organisation necessary to carry out the drawing up of the Regulations were also indicated in the report presented.

The Act is divided into four parts:—

1. Preliminary.
2. Certification and Use of Boilers.
3. Boiler Explosions.
4. General and Supplemental.

The work of the Sub-Committee was of a particularly onerous nature, and their findings as set down in the recommendations furnished to the then Minister for Labour and Industry reflect the greatest credit upon the work carried out by them, both as a Committee and as individual members of the same. The brief reference made here of the contents of the Bill is only done so on account of the futility of choosing any special section from the Bill for insertion in these "memoirs," and space will not permit of its inclusion in its entirety.

The successful passage of the Act was felt to be a just reward for the labours of those who presided over its formulation.

TOWN HALL GIRDERS CASE.

In 1888 an important civil action was heard before Mr. Justice Owen; *Stewart v. S.M. Council of Sydney*, in which the quality of the material used in the girders carrying the roof over the Main Hall was in contest.

Mr. Justice Owens' interpretation of Engineers' Specification re brands and qualities of iron were too far-reaching, and the body of Engineers in the main dissented. Lively discussion over this ruling took place at two subsequent meetings of the Association, and the following resolution was passed and forwarded to the Minister for Justice:—

“That the Engineering Association of N.S.W. dissents from the ruling of the Judge in Equity in the case of *Stewart v. the Municipal Council of Sydney* in his interpretation of the words used to denote the qualities of iron, and which are known as Technical or Trade terms; and further, this Association is of the opinion that Assessors should be appointed in all cases where Technical or Trade terms are used to denote qualities of material, etc., so as to assist the Judge in arriving at his decision.

STATUS OF THE ENGINEER.

Even at this date (1894) this very important question to us as Engineers seems to have been before the members of the profession, for Mr. Harry Fitzmaurice forwarded an urgent appeal to the Council to prepare the necessary details to cause an Act to be prepared recognising the “Professional Status of the Engineer,” but our records do not furnish us with any concise report as to the result of this appeal, the reference is interesting at this stage on account of the magnitude of the movement at the present day.

COLUMBIAN EXPOSITION AT CHICAGO, U.S.A.

It was very gratifying to the members of Council in 1892 to receive the following letter:—

The American Society of Civil Engineers,
 127 East Twenty-third Street, New York, N.J.
 Cable Address: "Tragob," New York.
 Secretary, The Engineering Association of N.S.W.,
 Sydney, N.S.W.

Sir,—

During the World's Columbian Exposition, to occur at Chicago in the year 1893, there will be held an International Congress of Engineers.

The American Society of Civil Engineers has accepted the charge of the Division of that Congress devoted to Civil Engineering.

A list of the subjects which it is proposed to present and discuss on that occasion is sent you herewith.

It is particularly desired that the Membership of your Society be represented by papers upon some of these subjects, and the Board of Direction of the American Society of Civil Engineers asks your aid in this direction.

Will you kindly send to this Board the names of such of your members as would probably prepare a paper on any of these subjects, designating with each name the particular subject such person would most probably be fitted and willing to discuss. On receiving this information formal invitations to prepare papers will be issued.

We take the liberty of asking your valuable assistance in this important matter, and with the hope that your Society will be fully represented in the International Congress in 1893, and afford us the opportunity of welcoming your members to this country, we are, with great respect.

Truly yours,

The Board of Direction of the American
 Society of Civil Engineers,
 F. COLLINGWOOD,

Secretary.

Messrs. H. B. Howe, Hector Kidd and A. M. Howarth were chosen to represent the Association on this occasion.

Mr. H. B. Howe later furnished a report relative to his visit to the Exposition.

ENGINEERING EXHIBITION.

Letters were received by the Honorary Secretary from Mr. Septimus Pryce, on April 14th and 17th, 1894, relative to a proposal to hold an Engineering Exhibition in the near future. The matter was placed before Council on April 20th, 1894, and a lengthy discussion ensued.

On the motion of Mr. A. D. Nelson, seconded by Mr. Sands, it was resolved that a Committee be formed to consider the matter, and to draw up a report for presentation to next Council meeting.

The Committee consisted of the President (Mr. R. Pollock), Messrs. A. D. Nelson, John Sands, H. V. Ahrbecker and the Secretary, James S. Fitzmaurice.

Some delay seems to have prevented active work in connection with this proposal until June, 1896, when Mr. H. V. Ahrbecker announced at a meeting of Council that the Electric Club of N.S.W. was considering the desirability of holding an Engineering and Electrical Exhibition, and further that they would like to co-operate with the Engineering Association of N.S.W. in the arrangement of such an exhibition at an early date. A Committee was again appointed, consisting of the President (Mr. H. D. Nelson), Mr. H. V. Ahrbecker, the Secretary (Mr. J. S. Fitzmaurice), and Mr. Cruickshank, such Committee to collaborate with the Electric Club in order to further the object. Eventually, in 1897, a three months' tenure of the Exhibition Building, Sydney, was secured, and the Exhibition carried out. From the first it was apparent that the anticipated public support would not be forthcoming, and indeed at the conclusion of the Exhibition the Association was faced with a heavy deficit. The members were called upon to help defray the outstanding debts,

and finally the matter was cleared up permanently by a levy of £5 per head from each effective member of both the Engineering and the Electrical Association. This was carried by special resolutions at a meeting held on November 1st, 1897.

We have no further record of any attempt having been made to promote another Exhibition, as the members of our Council evidently were not favourably disposed towards a repetition of further financial worry.

GOOD ROADS CONVENTION.

Having been invited to send representatives to this important public convention Messrs. Jas Vicars and Arthur J. Hart were appointed by Council to act on our behalf. Representative members of almost every public body were present at these meetings which were termed "The National Roads Convention," the object being to create a Main Roads Board, similar to that existing in Victoria.

The following valuable and important resolutions were formulated and carried at the meeting:

That the condition of the main roads causes incalculable loss to the business community, and excessive inconvenience to the general public, and, therefore, that it calls for the inauguration of new methods of construction, maintenance, and organisation.

That this convention urges the adoption of a main road policy, which will ensure (a) the connection of large producing districts with their shipping points, whether on river, coast, or rail; (b) the establishment of through routes of communication between the capital and coun-

try districts; (c) the establishment of a properly thought-out system of metropolitan main roads, giving access, not only between city and suburbs, but also between suburb and suburb.

That this convention affirms the principle that there should be a continuous thread of Government guidance and control running through the main roads policy; and that that policy, subject to the aforesaid guidance, should be based upon co-operation between the Government and the local councils.

That when the main road is once properly constructed, there shall be a definite policy laid down as to the future apportionment of the cost of its upkeep.

That upon main roads there should be a constant endeavour to secure the best location, grading, and drainage.

That every main road should be dealt with as one continuous means of transit right through the whole of its length.

That there should be a main roads board established, which shall have power to declare what are main roads, and to distribute among main roads the money votes of Parliament therefor, to co-operate with and subsidise the local councils, in order to secure the construction and maintenance, of main roads, and to construct and maintain main roads in case the local councils make default in that respect.

The Main Roads Board shall have power (a) to resume land for road deviations, for quarries, and for depots, with the right of what is known as "excess condemnation;" (b) to construct and maintain main roads, to hire or sell road-making plants to shires and municipalities, and to maintain ferries; (c) to carry out experimental work, testing road material,

and maintenance; (d) where necessary and deemed advisable by the Board, to engage in the manufacture of road-making material.

That the Main Roads Board consist of five members, to be appointed by the Government as follows:—(a) A president, who shall be a business man; (b) two Government representatives, one of whom shall be a highly qualified road engineer, and the other a representative of the vehicle or motor taxpayers; (c) a representative of the shires; (d) a representative of the municipal councils.

That the cost of construction and maintenance of main roads be shared between the various councils and the Government through the Main Roads Board.

That this conference affirms the necessity to set aside in addition to the present main roads vote all the money raised by motor licenses and taxation.

That this conference urges the adoption of a general graded tax on all vehicles.

That the Main Roads Board in respect of the metropolitan area shall have power to levy by requisition upon the local councils, and that in no case shall such levy exceed 4d. in £1.

That the Main Roads Board be authorised to borrow up to a sum not exceeding £2,000,000, in such sums as the Minister from time to time may approve.

That this convention affirms the desirability of legislation governing width of tyres in accordance with the scheme outlined in the Local Government Bill, 1915.

That a percentage of the proceeds of all sales of crown land should be set aside and added to the main road vote.

That there should be a repeal of the "No-preference Clause," of the Railways Act, so as to allow roadmaking materials and machinery to be carried at special rates.

That when any person shall damage a road by any extraordinary or unreasonable use of it, the cost of repairing the road may be recovered from such person.

That for the purpose of educating the community an inquiry should be held by the Government to place on record the actual figures of the saving effected and the increase in land values following on road construction.

That before bodies with statutory powers open the roads the councils concerned be consulted.

Following upon this meeting a deputation awaited upon the Premier and was introduced by Mr. A. Cocks, M.L.A., Chairman of the National Roads Convention, who said that a Main Roads Board should be appointed, consisting of the five members mentioned in the set of Resolutions handed in, such Board to have the power to borrow £2,000,000, as good roads were a State asset as well as an important military necessity. Very definite promises were given by the Premier that the matter would be given every consideration by his Ministry.

The thanks of the Association were tendered to our representatives on the Convention.

GAS STANDARDS AND PROPOSED AMENDMENT TO THE N.S.W. GAS ACT OF 1912.

The Sub-Committee to report upon this matter consisted of Messrs. Wm. Poole (Convener), J. G. Lancaster, A. Campbell, Mr. Wm. Corm (Electrical Association N.S.W. section collaborated), J. McNamara (Hon. Sec.).

In December, 1917, the President of the Association offered the services of the members in assisting the Government to prepare the amended Gas Act, then under consideration, and a Sub-Committee as above was formed to look into and formulate a report upon this matter.

A reply to our offer was received from the Minister of Labour and Industry intimating that no further action would be taken until the report of the deliberations of our Sub-Committee was handed to the Department concerned. After much discussion it was decided that the items in the Gas Act of 1912 (N.S.W.), which it was considered should be reviewed in the interests of both the supply companies and the consumers, were as follows:—

- (a) The legal standard of light.
- (b) The value of the calorific power of gas.
- (c) The advisability or otherwise of replacing the illumination standard, by the calorific power standard.
- (d) The pressure of the supply.
- (a) The legal standard of light, the sperm candle—specified in the existing 1912 Act is the English Parliamentary sperm candle legalised 1860, and was the official standard of the time under the Metropolis Gas Act for the purpose of testing London Gas.

- (b) The calorific power of gas. This may represent the observed, total (or gross) or nett heating value.
- (c) The advisability or otherwise of replacing the illumination standard, by the calorific power standard. The standards set by law should be such that they define without ambiguity those qualities of the gas to the purchaser.
- (d) The pressure of the supply. This under supply specified in the 1912 Act is as follows:—From midnight to sunset—six-tenths inches of water. From sunset to midnight—ten-tenths inches of water. These being the minimum values, to be taken at the main close to the point of service to the consumer.

The recommendations submitted to the Minister were as follows:—

- (a) That the first test of quality should be the calorific power standard, the value per cubic foot to be as much over 500 B.T.U. nett as is consistent with low price of supply to the purchaser and a fair return on the capital invested to the supply Company.
- (b) That the second test of quality should be the illuminating power standard, that the C.P. under the standard test conditions of gas consumption, pressure, and temperature be not less than 14 C.P., such candle power to represent international candles.
- (c) That the existing obsolete sperm candle should be replaced by the 10 C.P. Pentane Harcourt Lamp in its standardised form.
- (d) That the minimum pressure of supply at the consumers' service should be not less than 20 tenths inches of water.

- (e) That the maximum pressure of supply at the consumers' service should be not more than 20 tenths inches of water greater than the minimum pressure.

Mr. Wm. Poole, the Convener of this Sub-Committee, was of the opinion that some provision should be made in the proposed amended act for the use of coke oven gas for town supply, and a copy of his very interesting and instructive letter was forwarded to the Minister for Labour and Industry, on 15th January, 1918. This read as follows:—

(7)

The Hon. the Minister for Labour and Industry,
SYDNEY.

Proposed Amendment to New South Wales Gas Act.

Dear Sir,—

Further upon ours of the 13th ult. I beg to submit some recommendations with regard to the use of coke oven gas for town and domestic purposes, as follows:—

- “The manufacture of coke is an industry which is increasing at a rapid rate in this State, and has already reached large dimensions in the South Coast District.
- “In the manufacture of coke the hydrocarbons are driven off as gas. A portion of this gas is utilised in heating the oven to coke the charge of coal, but at present the balance is everywhere wasted, except at Broken Hill Proprietary Company's Steel Works, Newcastle. The volume thus wasted annually is enormous.
- “The gas driven off during the earlier stages of coking is of higher illuminating and calorific quality than that during the latter stages. The former could be used for lighting, heating and power purposes, and the latter for heating the ovens.
- “From careful tests made of South Coast Coal, the average yield of gas would be from 10,000 to 11,000 cubic feet per ton of coal, and about 500 B.T.U. per cubic foot of gas.

- “Assuming that regenerative ovens were used, the spare gas available for power, lighting, etc., would average 5,000 to 6,000 cubic feet per ton of coal.
- “Under average working conditions the calorific value of coke oven gas would probably be considerably less, e.g., down to even 350 B.T.U.
- “The minimum standard of calorific power proposed for ordinary town gas is 500 B.T.U.
- “It would, therefore, be necessary to set a lower standard, e.g., even as low as 350-375 B.T.U. for coke oven gas but, on the other hand, this gas could be profitably sold very cheaply, probably at least at half the price charged for town gas made in the ordinary manner. The cost could be so very low that, despite its lower quality, it would be much cheaper for equivalent lighting and power purposes.”

We feel sure that the question of coke oven gas should have some consideration in any revision of the present N.S.W. Gas Act, and trust that the accompanying remarks will prove of some assistance.

Yours faithfully,

Hon Secretary.

Electric Lighting Act.

Active co-operation with the Electrical Association re the formation of a special Act to govern Electric Lighting Installations resulted in a deputation to the Premier with the object of having a statute prepared which would protect consumers from defective installation work, etc. The deputation was favourably received, and promise of assistance to carry their wishes before Parliament was given.

**RE CONDITIONS OF CONTRACT FOR USE
IN CONNECTION WITH ELECTRICAL
WIRING CONTRACTS, N.S.W.**

At the invitation of the members of the Electrical Employers' Association of N.S.W., the Council of the Engineering Association was asked to appoint representatives to collaborate with the leading consulting engineers of the City, to investigate and make any recommendations they might think suitable for determining a concise and equable set of conditions that would assist in the preparation of Electrical Wiring contracts.

Messrs. Snashall, Lancaster, and McNamara were appointed to this Sub-Committee. (Mr. Snashall Convener.)

The work covered all the conditions usually met with in installation work, such as preparations of drawings and specifications, the correct definition of various electrical terms and their meaning as applied to contract conditions, notes for guidance of both contractor and purchaser, etc.

Reference was also made to the obligation existing between the parties concerned and the authorities controlling the electricity supply undertakings as well as the care to be exercised by the contractor in conforming to the rules of the various bodies vested with the power of making the final tests.

Stress was also laid upon the use of proper material and the class of workmanship effecting the installation.

The vexed question of arbitrator was also exhaustively discussed, and a very clear and valuable definition set down in the regulations which has been found of great value to users.

Upon the adoption of the amended conditions, the Council of the Engineering Association was notified as follows, by the Electrical Employers' Association:—

“That following upon certain criticisms by the Engineering Association of N.S.W., in collaboration with some of the leading consulting engineers of Sydney, of the set of wiring conditions as originally drafted by this Association, some slight amendments have been made, and a copy of the amended conditions is now forwarded for your information.

“It is desired by the Association that these conditions should be used for all Wiring contracts of sufficient importance to warrant the use of General Conditions of contract, etc.”

The hearty thanks of the Electrical Employers' Association was tendered to this Association through their Secretary for our assistance in the foregoing conditions.

REINFORCED CONCRETE REGULATIONS FOR SYDNEY MUNICIPAL COUNCIL.

Owing to the passage of an Amending Building Act by Parliament early in the year 1917, the Sydney Municipal Council found it necessary to make drastic alterations to their ordinances governing Concrete Buildings.

Although an advisory board had been appointed by the then Lord Mayor, it was considered that in order to have the new regulations in an up-to-date and correct form, that other assistance should be sought for this purpose. The Town Clerk was instructed to communicate with the Engineering