

-B

Section A-B.  
0' 1' 2' 3' 4'



0" 6" 12"  
1 1 1  
Details of  
Top of  
Chimney.

Vertical  
Section  
E-F.



Half Section G-H.  
2' 3'

The Keuffel & Esser Co., of New York city, has a handsome and extensive exhibit of field, office and drawing instruments and supplies, in charge of Mr. E. Cardoso, the South America representative of the firm. In field instruments, one of the most noticeable exhibits is the telemeter target for telemetric surveying in rough country, which was described and illustrated in our issue of July 13, and was introduced into this country by Mr. Cardoso. A convertible builders' level has a new arrangement by which the telescope can be used for vertical sighting. Two independent trunnions (carried in the level box when the instrument is being used in the ordinary way) are screwed into a

collar around the middle of the telescope, the ends of the trunnions resting in the wyes, thus allowing a certain range of vertical movement, which may be as much as 40° above and below the horizontal. If the telescope is inverted so as to have the spirit level on top. Another novelty is a steel tape with temperature compensating scale. The tape has a thermometric scale engraved upon it, so that at any known temperature a full corrected measurement of 100 ft. can be made without calculation, the application of the formula for correction being necessary only when a shorter length than 100 ft. is to be measured. In the ordinary line of transits and levels, some improved features have been introduced; the standards have the legs bent into different planes, thus giving greater lateral stability; a new arrangement of adjustable stadia wires is used, by which the adjustment when made is maintained; and the vertical limb is not divided up to its edge, but an overlapping vernier is used, and is hinged so that it can be thrown back out of contact with the limb. For office work there is shown the eidograph, a modified and cheap form of pantograph for enlarging and reducing drawings. In regard to the use of aluminum for field instruments, the firm state that they have used it to some extent and are prepared to use it when specially called for, but it is not recommended, as it is not considered a suitable metal for instruments of precision. The exhibit includes an aluminum transit, but the divisions on the aluminum are practically invisible. Too great lightness in the instrument results in serious vibration. The Keuffel & Esser Co. is also agent for C. Bube, of Hanover, Germany, who has an exhibit of steel tapes, etc.

W. & L. E. Gurley, of Troy, N. Y., exhibit a number of transits, ranging from the more elaborate solar transits (some fitted with the Jones patent latitude arc) to the simpler and lighter reconnaissance and mountain transits. The transit with 5-in. needle is considered as the standard for railway purposes. In leveling instruments there are wye, architect's and drainage levels, the latter being simple and compact, with level and telescope inclosed in a bronze case. Plane tables are shown, and three styles of alidades for use with the plane table, suitable for various grades of work; one has sights only, and the others have telescopes. The traverse plane table is very simple and is used extensively by the U. S. Geological Survey for traverse work. Several styles of compasses are shown, including the dip compass, with needle moving in a vertical plane; a pocket compass of aluminum, which is useful for topographical work; and a clinometer compass. Level rods, targets and the Abney and binocular hand levels are among the exhibits, together with an adjustable plumb-bob, in which the cord, when not in use, is wound around an inner reel by turning the cap. Among the special instruments exhibited are the Price current meter, illustrated and described in our issue of March 2, and the Boyden hook gage for determining the precise depth of water flowing over weirs, the scale being read by verniers to thousandths of a foot. As to the use of aluminum, this firm has made a number of such instruments, and is prepared to make to order any instrument of regular pattern, but the demand is found to be quite limited, as nearly everybody prefers the regular brass and bronze.

Buff & Berger, of Boston, Mass., show a number of transits, ranging from 8-in. and 7-in. transits for triangulation to a small engineer's transit weighing only 10½ lbs.; they also include mining and surveyors' transits with solar attachments, and reconnaissance transits, some fitted with stadia wires. The patent universal mining transit, with duplex telescope bearings, has its standard frame, vertical circle and striding level made of aluminum. A tachymeter, or transit fitted with stadia wires, is also shown. The exhibit includes dumpy and wye levels and an engineers' precise level with mirror and one fixed and one striding level, and fitted with a micrometer screw for the close setting of the spirit level bubble. Two tripods are shown, one extension and one regular, as supplied with the more portable instruments. The plane table alidade shown has fixed stadia wires and a detached compass, and the striding level and ruler are of aluminum. The exhibit also includes Locke's hand level, interchangeable lamp targets for mining

transits, plumb-bobs, targets, tapes, etc. Two electric current meters are shown: the Ellis meter for use in rivers, harbors, etc., and the Pteley & Stearns meter for measuring the velocities of currents in conduits, flumes and shallow rivers. The firm states that aluminum and its alloys may be, and to some extent are, used for telescope standards, tripod heads, vertical circles and other parts, but as yet there is little demand for the material, and it is considered that its use in fine instruments will always be limited owing to the fact that the metal is very soft, although rigid, and becomes brittle when alloyed with copper to make it harder. An alloy of 95% aluminum to 5% silver gives good results, but is expensive, and little is gained in reduction of weight by the use of aluminum bronze, which has 10% aluminum to 90% copper. Where light weight is of importance the firm recommends its smaller transits in preference to larger instruments made in whole or in part of aluminum and of equal weight, as the former retain their adjustments better than the latter, while being equally as durable and capable of doing just as close work.

Young & Sons, of Philadelphia, Pa., exhibit several of their standard makes of instruments, selected from stock and having no especially novel features. Three interesting instruments may be noted, as follows: 1, the first American transit, invented in 1831 by W. J. Young, and made in 1832, which instrument has been in use for 50 years; 2, a serviceable transit used on the Intercontinental Railway survey, on the section between Quito, in Ecuador, and Cuzco, in Peru (Eng. News, Jan. 26 and June 29, 1893), with which transit and stadia lines have been run aggregating 1,700 miles in length; and, 3, a level exhibited at the Centennial exhibition at Philadelphia, in 1876, which has been in constant use since that time and is still a good instrument. Among the minor appliances for field work are the cup-headed stake tacks illustrated in our issue of Jan. 26, 1889. In regard to the use of aluminum, this firm states that it has not had many calls for instruments to be made of it, and that experience has shown that it is not satisfactory for surveying instruments to be made entirely of this metal. The weight of a transit or level can be reduced 20 or 25% by making certain parts of aluminum, but further than this the firm does not care to use the material.

F. Weber & Co., of Philadelphia, Pa., have exhibits of instruments by foreign makers for which they have the agency, and many of which are carried in stock. The instruments of Albert Ott, Kempton, Bavaria, include tachymeters for surveying and stadia work; planimeters; an elaborately constructed pantograph for accurate reduction and enlargement of drawings up to a proportion of 1 to 20; current meters with electrical connections to the counter (two of these have been constructed under the direction of Professor Harlacher, of Prague); and plane tables and stadia poles. The instruments of Sigmund Riefler, of Munich, include various lines of drawing instruments, and some very delicate clockwork attachments for astronomical work. His astronomical clock is said to have the greatest precision yet attained for any mechanical movement, and the attachments have also been applied to tower clocks. His special exhibits in this line are a mercurial compensation pendulum, and a pendulum escapement with free pendulum, the impulse being communicated in the axis of oscillation and at the moment in which the pendulum swings through the dead point. The exhibits of A. Schoenner, of Nuremberg, are drawing instruments. As to the use of aluminum for field instruments, Weber & Co. state that they learn that the metal has hardly been used yet for such instruments, the objection being that it is too light and wears quicker than the other metals now in use.

The Eugene Dietgen Co., of Chicago, Ill., has an exhibit of Swiss drawing instruments by Kern & Co., of Aarau, and it is claimed that while there is nothing specially novel in this exhibit, the styles have been improved, and the instruments are light and of good workmanship and finish. Besides this exhibit in the Manufactures Building, the Dietgen company has in the Mining Building an exhibit of L. & C. Hardtmuth's drawing pencils, made with graphite of smooth and even quality which by a new process of manufacture is highly compressed,

thus giving it good lasting quality and causing the pencil point to remain sharp for a considerable time.

Theodore Altenecker & Sons, of Philadelphia, Pa., have a showcase full of drawing instruments, scales and office appliances. Among the instruments are specimens of a new patent spring hinge drawing pen. The advantages claimed for it are the facility of separating the blades for cleaning them. A spring in the hinge of the pivoted blade tends to bring it in contact with the fixed blade. The usual thumbscrew, therefore, is used to keep the blades apart instead of bringing them together, and is consequently tapped through the pivoted blade only, so that in cleaning the pen it is only necessary to open them by hand, the spring closing the blade when released in the same way as the blade of a pocket knife. We illustrate this in another column.

Queen & Co., of Philadelphia, Pa., have an exhibit of engineering instruments, and chemical and optical apparatus. The most distinctive feature of their engineering instruments exhibited is the combination of aluminum with the metals usually employed. The company states that it does not consider aluminum to be a satisfactory metal for the entire instrument, as it is bad for bearings, and is brittle in the form of screws. It is, therefore, employed for the heavier parts, such as the telescope tube, the plates, and standards of the transit, while the usual gun metal and phosphor bronze are used. The combination results in an instrument about a third lighter than the usual transit, without in any way sacrificing the efficiency. The tripod head is also of aluminum, with hard brass screws. It is stated that careful tests have failed to show any disadvantage in thus employing aluminum, while the gain, where lightness is a desideratum, is obvious

#### PERSONALS.

Mr. E. Brown has been appointed City Engineer of Indianapolis, Ind.

Mr. John Fritz has resigned his position as Consulting Engineer of the Bethlehem Iron Co.

Professor Grashof, Civil Engineer, and Director of the German Association of Engineers, died at Carlsruhe, Germany, Oct. 26.

Mr. A. A. Allen has been appointed General Manager of the Missouri, Kansas & Texas Ry. lines in Texas, with headquarters in Denison, Tex.

Maj. E. S. Hosford died suddenly at Jackson, Tenn., Oct. 19, aged 53 years. He was at one time Superintendent of the Northern Division of the Mobile & Ohio R. R.

Mr. Louis Giraud, Chief Engineer of the Velasco Terminal R. R., died at Velasco, Tex., Oct. 11, from injuries received in falling from and being run over by a hand car.

Judge John M. Hall, of Willimantic, Conn., has been elected Director and Vice-President of the New York, New Haven & Hartford R. R., vice Mr. Lucius Tuttle, resigned.

Mr. G. H. Sharman has been appointed Consulting Engineer of the Louisville, Evansville & St. Louis R. R. Several extensions are contemplated, as noted in another column.

Mr. Robert B. Campbell, General Superintendent of the Baltimore & Ohio R. R. lines west of the Ohio River, has been appointed General Manager, vice Mr. J. T. Odell, resigned.

Mr. Vassily Strelkoff, Inspector and Engineer of the seventh division of the transcaucasus Ry., of Russia, and Mr. Joseph Kozlowsky, Superintendent of Motive Power of the same road, are in this country to investigate American railways and railway practice.

#### NEW PUBLICATIONS.

REPORT OF THE ILLINOIS STATE RAILROAD COMMISSION for the year ending June 30, 1892. Pub. Doc.; 80vo; cloth; pp. 331.

This report contains the usual complete tables covering the various branches of the railway business during the year, and the details of the operations of the several railways in the state. The feature of chief technical interest is the report of Mr. Charles Hansel, the former Consulting Engineer of the board, on the use of "Railway Safety Appliances in the Kingdom of Great Britain."

ADDRESSES DELIVERED BEFORE THE WORLD'S RAILWAY COMMERCE CONGRESS, Held in Chicago, Ill., June 19, 23, 1893. Under the Auspices of the World's Columbian Exposition. Official Report. Chicago: "The Railway Age and Northwestern Railroader." 8vo; cloth; pp. 265; \$3.

The proceedings of the Railway Commerce Congress

were reported in our issue of July 6, and abstracts of some of the papers presented there have been published in our columns. The volume now under notice contains an introductory account, the addresses made, and all the papers presented, dealing with railway law and legislation, management and operation, employees, history and development, and foreign railways.

STATE ENGINEER OF NEW YORK: Report for the year ending Sept. 30, 1892. Martin Schenck, State Engineer and Surveyor. 8vo; pp. 328; large folding map and plates.

Chief among the public works of the state under the supervision of the state engineer is its canal system, and to that subject this report is largely confined, a detailed account of the work of the year in connection with the canals being given. Some sections of the canals and their feeders have been enlarged or otherwise improved. The electric propulsion of canal-boats and a proposed ship canal from the Hudson River to the great lakes are discussed and investigation along these lines is recommended. Maps and profiles are given showing the canals of the state.

PROVINCIAL BOARD OF HEALTH OF TORONTO. —Report for the Year 1892. Dr. P. H. Bryce, Toronto, Secretary. Pamph.; pp. 137; diagrams and tables.

This report, including those from the local boards of health, shows that Ontario ranks high in sanitary matters, giving much careful attention to water supply and the proper disposal of domestic and manufacturing wastes. The economic value of sanitation and the pollution of streams are discussed at some length by Secretary Bryce. Among the reports relating to water supply and sewerage is one regarding the disposal of the wastes of a tannery in Acton, Ont., which were alleged to have caused anthrax among animals pastured along the stream. The wastes are now subjected to intermittent filtration through beds of gravel. The local reports contain some fragmentary information regarding the disposal of garbage, the use of dry earth closets and other sanitary matters in various municipalities.

HYDRAULIC CEMENT.—Notes on its testing and use. By Fred P. Spalding, Assistant Professor of Civil Engineering, Cornell University. Ithaca, N. Y.: Andrus & Church. 12mo; cloth; pp. 108. \$1.

The small size of this book, of course, precludes anything but a mere outline treatment of the subject of hydraulic cements. The author has a good knowledge of the most recent literature and experiments on the testing and use of cements, and has handled the subject in a clear and simple manner. For those who like to obtain their knowledge in homeopathic doses and are not much disposed to inquire into the reason for things, the book seems likely to prove extremely satisfactory. Others who may prefer a more thorough knowledge will find the book helpful in pointing out lines of study and in providing a fairly complete bibliography of the subject of hydraulic cements.

MICHIGAN SANITARY CONVENTION: Proceedings of a meeting at Stanton, Mich., April 27 and 28, 1893. H. B. Baker, Lansing, Secretary State Board of Health. Pamph.; pp. 118; charts and diagrams.

For some years the Michigan State Board of Health has held sanitary conventions in various cities and towns of the state in conjunction with the citizens of the municipalities concerned. At these conventions, both local and general sanitary problems are discussed, the former often with the specific purpose of improving the condition of the town in which the meeting is held. At the Stanton convention the water supply of the village, the need of a sewerage system and school sanitation were made the subject of papers and discussions. The report contains numerous diagrams showing the reduction of deaths from zymotic diseases by improved sanitary methods and papers on a number of different subjects.

CONTINUOUS CURRENT DYNAMOS AND MOTORS: Their Theory, Design and Testing. With sections on Indicator Diagrams, Properties of Saturated Steam, Belting Calculations, Etc. An elementary treatise for students. By Frank P. Cox, B. S. New York: The W. J. Johnston Co., Ltd.; 12mo; cloth; pp. 271; 83 illustrations. \$2.00.

The author in placing this work before students assumes that the reader has a general knowledge of electricity and is conversant with electrical terms and machinery. No particular machine is used as a basis, however, but the work is a general consideration of the laws governing the design of direct-current dynamos and motors. He commences, in the first four chapters, with a brief review of the electrical units and the general principles of machines, avoiding the higher mathematics and using only algebra and the elements of geometry. Succeeding chapters treat of the magnetic circuit; the theory of winding, losses, etc., and special points to be observed in motor designing. Then follows the application of the principles developed to the design of armatures, field magnets and motors, explained by selected problems. The methods of testing and investigating the characteristics and effects of a completed machine, under various changes in design and operation, are fully discussed and illustrated by curve diagrams. The last