Mount Olive, and Collinsville. Computations were made showing how the capacity of a chimney could be increased much beyond the normal by raising the temperature of the gases, the result always being accompanied by a corresponding loss in efficiency. It was shown that the same capacity could be obtained without loss of efficiency by increasing the height of the chimney. A table was given showing the changes in the capacity of a given chimney by varying the temperatures of the gases; also the change of height necessary while maintaining a constant temperature. Another table showed the effect of different coals on the velocity of the gases, and on the areas of chimneys, the velocity being kept constant. The chimney formulæ of Smith, Kent, and Gale, and the experiments of De Kinder, were discussed. A table was given showing appropriate heights and areas of chimneys for powers from 75 H.P. to 3,100 H.P., assuming 7 lbs. of water evaporation per pound of coal, and 5 lbs. of coal per H.P. per hour. The effect of long flues leading to chimneys was also discussed. It was shown that where a number of boilers were to be connected to the same stack, its dimensions could be reduced proportionately after the first few boilers, as they would never all be fired at the same time.

American Railway Master Mechanics' Association.—The Secretary has sent out a number of circulars issued by the committees that have been appointed to report at the June convention. They are, in substance, as follows:

THE CAUSES OF BULGING OF FIRE-BOX SHEETS.

Is the difficulty caused—

1. By accumulation of mud or scale, preventing the sheet from receiving the necessary protection of the water?

2. Insufficient water space, preventing free circulation, and tending to drive water from sheet?

3. Bad water—that is, water containing such impurities and other hurtful substances, producing excessive foaming and tendency of water to leave the sheet?

4. Do you consider that the fact that the inside of the sheet is hotter than that next to the water has any influence on the bulging of sheets? If so, can you suggest a practical remedy?

5. Does the spacing of stay-bolts have anything to do with the bulging of sheets? Do you consider that closer spacing would provide a partial remedy?

6. Have you noticed that the use of oil in boilers to neutralize the evil effects of bad water has had a tendency to increase the bulging of sheets? In stationary boilers there has been an insoluble soap, formed by oil and water impurities, deposited on furnace sheets, which caused over-heating. Has anything of this character been noticeable by you in locomotive boilers?

7. Have you any reason to believe that the variation of temperature between the outside and inside of sheets has had anything to do with the breaking of stay-bolts?

In sections where bad water is prevalent, experience has led to a constant fight to keep boilers clean, and when very little neglect shows itself in the bulging of sheets and other serious results, it seems wise and helpful to get all the practical experience possible, with a view to broadening the scope of the committee's inquiry; and any information relative to the subject, or concerning (*a*) methods of preventing fire-box sheets from bulging, or (*b*) how to take care of boilers in bad-water districts, will be pertinent and very acceptable.

Answers to be sent to P. Leeds, Superintendent of Machinery, Louisville & Nashville Railroad, Louisville, Ky.

RIVETED JOINTS.

The committee especially request that the information furnished should apply only to the latest practice, and should not include data relative to old styles and types, unless such joints represent present practice. To facilitate the work of the committee, it is especially requested that all information called for in the first ten items on a drawing or tracing $8\frac{1}{4} \times 10\frac{3}{4}$ in. in size, showing only one joint on each drawing or tracing; all joints used should be furnished and every drawing should be fully dimensioned. A sufficient amount of each joint should be shown to enable a calculation to be made of its efficiency, hence please show not less than three rivets of the row with greatest pitch. 1. Thickness of stock plates or sheets. 2. Thickness of inside butt or welt strips. 3. Width of inside butt or welt strips. 4. Thickness of outside butt or welt strips. 5. Width of outside butt or welt strips. 6. Diameter of rivet or rivets. 7. Diameter of rivet hole or holes. 8. Distance from edge of stock and welt sheets to centre of first row of rivets. 9. Distance between each row of rivets. 10. Distance (pitch) between each rivet on each row. 11. Are rivet-holes punched or drilled? 12. If sheet is punched or drilled, do you remove the burr from the edge of the hole before assembling the sheets? 13. Do you ream the rivet-holes after assembling the various sheets? 14. In punching your sheets, do you punch them so that the smaller diameter of the holes will be together when assembled, or *vice versa?* 15. Do you use iron or steel rivets? 16. Do you single or double-rivet the mud-ring? 17. Do you consider it advisable to double-rivet the circumferential seams of a locomotive boiler? If so, why? 18. Have you ever seen the joints in a fire-box double-riveted? 19. Have you ever made any physical tests of riveted joints? If so, please give us the results obtained, and how closely the results compared with the calculated strength.

The committee would also be pleased to receive information relative to your practice in riveting domes, mud-rings, boiler heads, fire-door and other sheets in a boiler, and your reasons for adopting such practice. In order that the committee may have ample time to compile and work up its report, kindly have all replies forwarded not later than February 15, to A. E. Mitchell, Superintendent of Motive Power of the New York, Lake Erie & Western Railroad, 21 Cortlandt Street, New York City.

BEST MATERIAL FOR BOILER TUBES.

The committee desires a full expression of opinion, and propounds the following questions:

1. What is the best material for locomotive tubes? 2. Please give your reasons for this preference. 3. In ordering tubes, do you furnish specifications? If so, please send a copy of same. 4. In your opinion, would a tube made of a *fair quality* of material, combined with a safe end made of a *good quality* of material, answer for all practical purposes? 5. What is the maximum length of locomotive tubes of different diameters? 6. What should be the thickness of metal for tubes of different diameters? 7. How often may tubes be pieced out with advantage and safety? 8. When and for what causes should tubes be condemned? 9. How do you test tubes and safe ends? 10. In making specifications for tubes, is the effect on them of the water used taken into consideration? 11. Describe your methods of fastening tubes at front and back end, say whether copper ferrules, and what kind of tools are used for caulking and turning over the ends of tubes.

Please answer these questions, and mail same to T. A. Lawes, Mechanical Engineer of the Chicago, Cleveland, Cincinnati & St. Louis Railway, Indianapolis, Ind.

Prizes for Railroad Inventions.—The Verein of German Railroads has appropriated 30,000 marks ($7,500) to be distributed in prizes every four years for remarkable inventions and important improvements that are brought out in the domain of the railroad service. These prizes are to be divided as follows:

A. For inventions and improvements in the domain of construction and mechanical equipment of railways: A first prize of 7,500 marks; a second of 3,000 marks, and a third of 1,500 marks.

B. For inventions and improvements in the domain of the methods of operation, and that of the maintenance and development of the methods of operation. A first prize of 7,500 marks, a second of 3,000 marks, and a third of 1,500 marks.

C. For inventions and improvements in the domain of the administration and the operation of railroads, as well as that of railroad statistics, and for valuable literary work in the province of railroad work of all kinds. A first prize of 3,000 marks, and two second prizes of 1,500 marks each.

Without desiring to exclude from the competition other inventions and improvements appertaining to the railroad service, and without desiring to limit the commission in the examination of things that may have an influence on their decision, the following subjects have been selected as being especially worthy of consideration:

(*a*) Improvements relating to the construction of locomotive boilers, especially such as have for their object, without any great increase of the dead weight, a greater safety against the dangers of explosion, a better utilization of the fuel, lessening the amount of sparks that are thrown, and a saving in the expense of maintenance.

(*b*) Manufacture of strong and durable hose for conveying steam and compressed air for the rolling stock.

(*c*) An arrangement for permitting the trainmen to safely couple cars equipped with the American automatic coupler and the standard coupler of the Verein.

(*d*) Construction of a practical and cheap brake for freight cars.

(*e*) An automatic arrangement that will prevent the displacement of switch points during the passage of a train.