Diesel motor at the Electrical Exposition at New York, by the throw of a switch, was not noticed by observers of the engines or the lights, though promptly registered by the ammeter. For variable load, then, the Diesel motor will show in practice a much greater superiority over all rivals than that apparent from the tabular figures just given.

A NEW FORM OF EXHAUST HEAD.

One of the important features of a modern steam plant is an exhaust steam pipe head. To be effective it must thoroughlyseparate the water from the steam, and thereby prevent the constant spraying of roofs and walls with consequent deterioration and expensive repairs. In the form of exhaust head built by the B. F. Sturtevant Co., Boston, Mass., and illustrated herewith, the principle of centrifugal force is utilized to secure perfect separation. Dry exhaust steam weighs only .038 lbs, per cubic foot, while water of the same temperature weighs 59.36



pounds per cubic foot. It is therefore evident that inasmuch as centrifugal force is proportional to the weights of the bodies in 59.36

notion, the water will be thrown outward with ----, equals .038

1,562 times the force exerted upon the steam. In the Sturtevant exhaust head the steam passes up the interior pipes, is discharged tangentially close to the shell, and is thereby given a vigorous whirling motion. The entrained water—likewise the oil—flies outward, strikes the cool side and trickles down to the outlet at the bottom. The steam now perfectly dry, finds ready escape through the central opening above. The action is claimed to be so positive and absolute that perfect separation must be the result. These heads are built in sizes to fit pipes from 1 inch to 20 inches. All sizes above 10 inches are flanged instead of tapped.

THE LATE PROFESSOR BUNSEN.

Prof. Robert W. Bunsen died recently at Heidelberg, Germany. The age of the great scientist was 88, and he formed a most interesting link between the German scientific men of the past and those of to-day. As the obituary notice in the London Times says, Prof. Bunsen passed away full of years and of honors. He was born in 1810 at Gottingen, and graduated in the university of that town. The greater portion of his scientific researches were carried out at Heidelberg, where he held the chair of experimental chemistry from 1852 until his retirement in 1889. To enumerate Prof. Bunsen's discoveries in almost every branch of chemistry would fill a treatise. Suffice it here to enumerate those which have made Bunsen's name a household word. First came Bunsen voltaic battery, which, supplanting the more expensive form bearing the name of our countryman Grove, was generally used as the cheapest and most effective mode of generating electricity until the dynamo displaced all forms of chemical batteries. Next came the Bunsen gas burner, which, it is not too much to say, is now not only a necessity in the laboratory, but in every household and every manufactory where a clean flame is wanted. About his discovery of this simple and effective apparatus an interesting tale could be told. No one before Bunsen had thought it possible that a mixture of coal-gas and air could be made to burn without explosion from

a simple tube burner. His clear conception of the laws which apply to the inflammation of such a mixture showed him that it was possible to arrange the dimensions in such a way that a steady, smokeless, and highly combustible mixture could be obtained, but a long series of delicate experiments was needed before the perfect burner which now bears his name resulted. Prof. Bunsen's work in spectrum analysis was most valuable, and his papers on this and on the many other subjects in experimental chemistry have been valued most highly by the world of science They also resulted in honors from foreign scientific societies being conferred on their author, which were most richly deserved and were highly valued by their recipient.

REPORT OF THE CITY ENGINEER OF TORONTO.

The annual report of the city engineer of Toronto, Ont., C. H Rust, for 1898, has been issued. It contains a great mass of information concerning matters dealt with by the engineer's department during the year. Statistics of the city show: Area, 17.17 square miles; 257.93 miles of streets, of which 179 are paved and 78 are unpaved; 8214 miles of lanes; 230 miles of sewers, 430 miles of sidewalks, 255 miles of water mains, 230 miles of gas mains, 130 miles of underground electric conduit. 4.300 miles of overhead electric wire, 80 miles of steam railway track, 841/2 miles of single street railway tracks, 7,000,000,000 gallons of water supplied annually. During the year there were 24.64 miles of new pavements and roadways constructed, as follows: Asphalt. 3.408 miles; brick, on concrete, 6.079; brick. on gravel, .352; brick. on concrete (track allowance). .413: cedar block and brick, on concrete, (track allowance), .280; cedar block, on concrete, .084; cedar block, on gravel, 4.831; macadam, 2.089; gravel, 4.756; concrete, 0.57. Reconstruction of track allowances—' :k, 3.341; scoria, 2.986. The engineer, ret. ing to the increasing demand for im-

proved roadways, says that the ratepayers are, owing to better times, beginning to realize the advantage of having a good pavement in front of their property. He mentions his disapproval of gravel roadways, as unsuitable for city streets, and he advocates discouragement of their construction. It is noted that a great many of the ratepayers have, Mr. Rust thinks, unjustly condemned cedar block pavements. The difficulty has been in the past that too long a time was given for the payment of the cost of cedar block pavements. Instead of ten years the time for payment is now five years. A cedar block pavement is cheap, casily laid and repaired, noiseless, and, dependent upon the extent of traffic, will remain in good repair for from six to eight years, and at the end of that period it can be renewed at a cost of from 45 to 50 cents per square yard, making it the cheapest pavement that can be laid, and much to be preferred to a gravel roadway, which costs about 10 per cent. more.

A large folder map is inserted in the report, which shows all, the streets in the city, and they are colored to show the various pavements. Those which are in immediate need of repavement are also indicated.

Respecting pole, wires and conduits on streets, it is said that the time has arrived when strong efforts should be made to get rid of a number of poles and overhead wires, especially in the central portion of the city; and we should try and arrive at an agreement with the different electrical companies in the matter of the construction of underground conduits, which should be constructed by the city, and a yearly rental charged the different companies for the use of them. During the preceding year this department made several attempts to bring the companies together, so as to avoid the duplication of pole lines, but those efforts did not result in any satisfactory arrangement.

Mr. Rust urges improvements to the water works system. to place that branch of the city service absolutely beyond failure and guarantee an adequate supply of water for domestic and fire requirements for some years to come. Mr. Rust states most emphatically that a new conduit is necessary between the Island shore crib and the pumping station; at present the supply is endangered with low water. A large expenditure for mains. conduits and pumps, in order to place the water works in a satisfactory condition is recommended. He also recommends the installation of another 10,000,000 gallon high duty engine at the main pumping station, as an economical expenditure. A new 36-inch main is said to be required from the corner of Bathurst