

EXPERIMENTS made with petroleum vapor for propelling engines show that air mixed with 5 per cent. of the vapor does not explode; when, however, the proportion rises to 6.25 per cent., a slight explosion takes place, whilst with 8.3 per cent. the explosion becomes violent. The most violent explosion takes place, however, with from 11 to 12 per cent. of vapor; beyond this limit the violence of explosion decreases, and when the air contains 20 per cent. of vapor no explosion occurs.

A CHEMIST has invented a sensitive paint, which is a bright yellow at the ordinary temperature, but upon being warmed changes color gradually, until at 220 degrees it becomes a bright red. It returns to its original color upon cooling, and may be heated, with the same effect, over and over again. It is suggested that this paint may be used with advantage to detect a rise in the temperature of the frictional parts of high-speed machinery.

GEORGE HUNT, engineer of the Royal Electric Co., has for some time past advocated the organization of a mechanical engineers' association for Canada, on the lines, we presume, of that of Great Britain. We do not suppose any standard of qualification will be required for membership at present; but such an association organized merely with the object of mutual improvement and social intercourse, would accomplish a good purpose, and justify its promotion. We shall be glad to hear from anyone whose views accord with Mr. Hunt's.

A. J. MOCKHAM has been making a series of experiments with a view to doing away with track joints. His conclusion is that there is no objection to abutting rails, and this is but a prelude to an absolutely continuous track, the rails being welded by electricity. However, it should be remembered, says Mr. Mockham, that a track so laid will be like a huge spring under tension, safe when restrained by the roadway, but ready to spring out with tremendous force, if, while in this condition, the roadbed be removed. An improvement would, perhaps, be to limit the length of each continuous rail to, say, 1000 feet.

THE London papers contain detailed accounts of a new method of producing puddled iron, which has been discovered by an English manufacturer. In manufacturing malleable and gun iron by the hand-puddling process this method is to melt the pig iron in a cupola, with a small quantity of scrap, and when the iron becomes liquid, it is brought to the puddling furnace and remains there until it has reached the proper temperature. If scrap is scarce, manganese may be added to the iron whilst the latter is in a liquid state after leaving the cupola. It is claimed that the output is very considerably increased by the use of this process.

THE late Sir William Siemens, after several experiments as to the influence of the electric light upon vegetation, came to the following conclusions: (1) That the electric light is efficacious both in producing chlorophyll in the leaves of plants and in promoting growth. (2) That plants do not require a period of rest during the twenty-four hours, but that they make vigorous and increased progress if subjected during the night to the electric light. (3) That the flowers produced by its aid are remarkable for intense coloring and the fruit for its bloom and aroma. (4) That the expense depends on the cost of energy and

that it is moderate when the natural energy of water is available.

DYNAMOS require an extremely steady-running engine, as the variations of voltage liable to be caused by difference in velocity materially affect the light's brilliancy, especially in incandescent lamps. The brilliancy of such a lamp increases from three to five times as fast as its working pressure. Engines used for driving dynamos should also be little affected by sudden changes in the load, which occur when additional machines are started up or others shut down, or when machines are changed over from charging accumulators to connection in parallel. In such cases the governors at present in use nearly always fail, and it has yet to be decided, says Dr. Kohlrausch, whether proper electrical regulation will ever become easily attainable.

AMONG comparatively recent inventions is a crank in which the dead point is overcome. The crank-pin works in a slot cut in a steel disc fixed to the end of the shaft, and is pressed upon a spring so adjusted as to be held firmly in place at ordinary steam pressure. If, however, the crank be at a dead point when the full pressure of steam is admitted into the cylinder, the spring is compressed, the crank-pin slides in the groove at an angle with the shaft, and the engine begins to move. The pressure of steam in the cylinder while the engine is in motion is less than that in the boiler itself, and consequently as soon as the shaft begins turning the pressure against the spring is relieved and the crank-pin flies back to its original position.

THERE is a machine in use at one of the English docks for discharging cargoes of grain by means of the creation of a strong current of air. It is erected on a barge and has attached to it the ends of six large flexible pipes. The opposite ends of these pipes are carried into the hold of the vessel to be unloaded, and immersed for a depth of four or five inches in the grain. Upon starting the engine, the grain immediately begins flowing at the rate of 100 tons per hour through the pipe into receivers. From thence it falls by its own gravity into weighing machines, and then again into the receptacles of buyers. The pipes can either be worked all together, or some of them can be shut off. When only one pipe is in use, its capacity is 38 tons of grain per hour.

A new composition for the prevention of rust on any kind of metal has been invented by the German firm of Edmund Muller & Mann, of Charlottenburg. This composition is called "Mannocitin," and is intended for use on iron, steel, brass, copper or nickel plated goods and machinery. It is said to withstand all atmospheric influences, as well as the action of sea water, and that one coating will absolutely protect the goods from rust and oxidation, or from the vapors of acids. Mannocitin is put up in packages of 7, 14, 28, 56, 112, 224 and 400 pounds. The new compound, we learn, is now being placed on the Canadian market through Jas. W. Pyke, 35 St. Francois Xavier street, Montreal, and the trials made of it have proved highly satisfactory.

THE *American Shipbuilder* mentions as a fact not generally known that the shafting of modern steamships is hollow. After the shafts have been forged solid, a core, sometimes six or eight inches in diameter, is bored out from the centre, leaving a safe amount of metal in annular form for the work required. The reason for this is that a hollow shaft is really stronger, as well as lighter, than a solid one, and also that the core of a solid shaft