

THE FRANKFORT ELECTRICAL EXHIBITION.

According to *Industries*, Messrs. Siemens & Halske have by far the most important exhibit in the exhibition. They exhibit practically everything within the scope of the exhibition. They begin with a double central station; one part is direct current with batteries, the other alternating with transformers. As if this were not enough, they add extensive exhibits of railway signals, scientific instruments, transmission of energy plant, telephones, telegraphic instruments, electric railway and tramway work, and electro-metallurgy. They also exhibit a model of an electrically lighted theater, also an extensive display of marine electrical gear. The exhibit is so extended and complete that they publish a special catalogue of 150 pages.

We cannot afford space to describe the whole of Messrs. Siemens & Halske's exhibit, so we will devote our attention to their electric light and power machines. They have made up a sort of complex exhibit, containing combinations of direct and alternate current generator motors and transformers all coupled up together, and transforming from one system to the other and back again, and to all sorts of different pressures and currents. The station works incandescent lamps, direct current arc lamps, alternating arc lamps, tramways, search lights, and motors, and these are scattered about over the whole exhibition.

the armature simultaneously by moving the controlling lever. All the positive and all the negative brushes are connected in parallel, and the current is carried off by two thick but flexible cables visible above the bearing. This dynamo runs at 150 volts.

Astronomical Notes.

At the recent Cardiff meeting of the British Association, Professor H. A. Newton, of New Haven, U. S. A., read a paper on "The Action of a Planet upon Small Bodies Passing Near to it, with Special Reference to the Action of Jupiter upon such Bodies." He showed that when comets came under certain conditions into the neighborhood of Jupiter, it was quite possible that they should under its attraction be constrained to revolve in the system of that planet. This was not possible in the case of the earth, since its much smaller mass would necessitate a very close approach on the part of the comet.

Professor George Forbes, commenting upon the paper, said that he had been studying the motion of comets in the solar system, and had become convinced that the movements of certain of them could only be explained by supposing the existence of a yet undiscovered planet in our system.

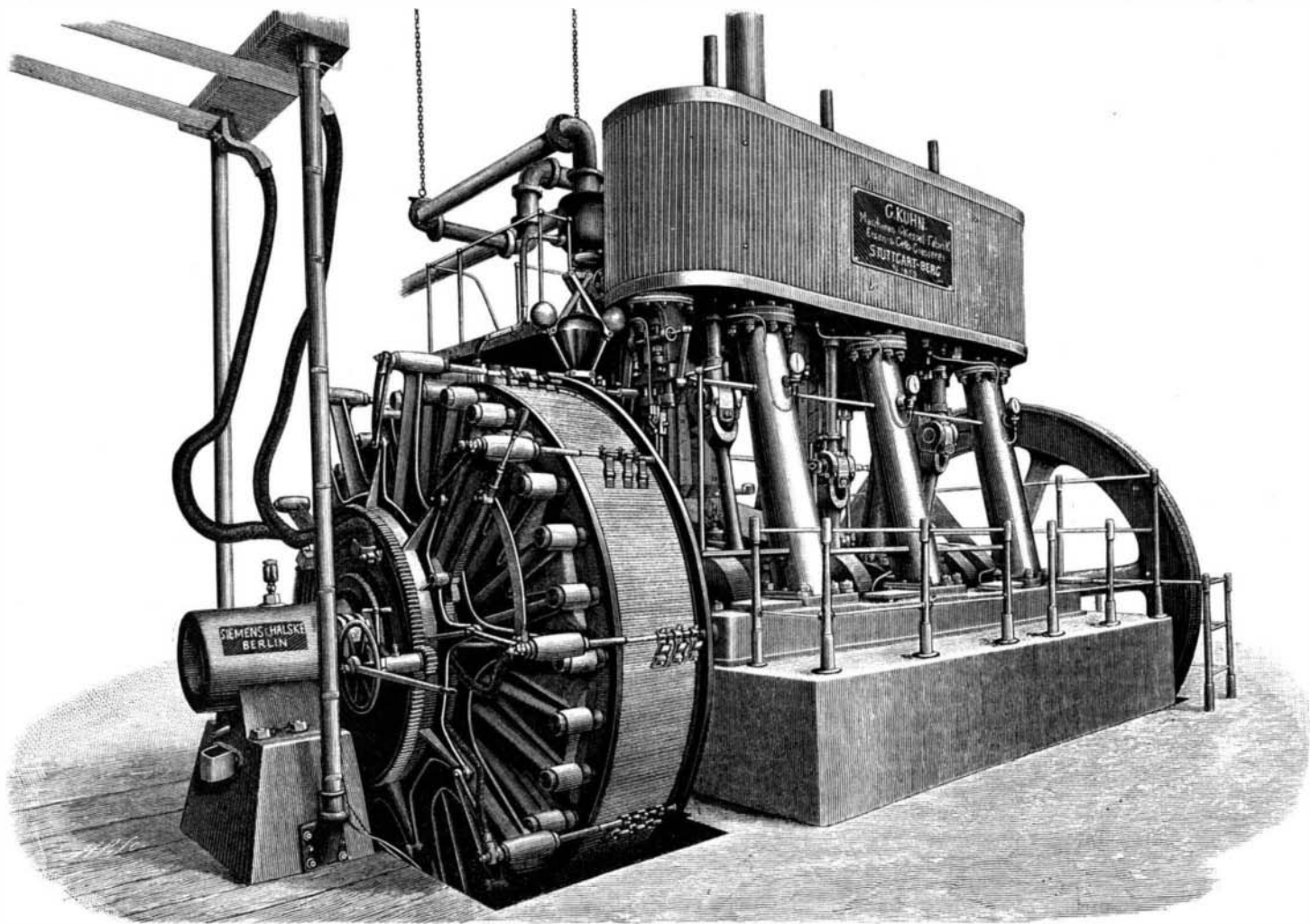
Mr. Isaac Roberts, referring to the conjecture of the last speaker, said that during the last winter he had been engaged in carefully photographing that part of

Testing a New Smokeless Powder.

Professor Charles E. Munroe, a graduate of Harvard, and recently on duty in the navy at the Newport torpedo station, has produced a new smokeless powder which has been tested at the Naval Ordnance proving grounds, and is said to be eminently satisfactory to the government officials. Eleven rounds were fired from six-pound guns, a charge of 400 grammes giving a velocity of 1,900 feet and a pressure of 16 tons; with a charge of 392 grammes the velocity was 1,920 feet and the pressure 14 tons. With the ordinary service charge of 820 grammes of black powder, the velocity is 1,800 feet and the pressure 15½ tons. The results obtained with three-pound guns are said to have been still better, the trials comparing well with anything which has been done in Europe. This new powder is almost entirely smokeless, but it is necessary to use with it a small priming charge of black powder, which causes a slight puff of gray smoke that quickly disappears.

The Regenerative Gas Lamp.

It may be stated as a general rule that any ordinary regenerative lamps may be relied on to increase by at least 150 per cent the light from any given consumption per hour. In practice, one may safely guarantee that equal light will be got from little more than one third the consumption of flat-flame burners in the



THE FRANKFORT EXHIBITION—SIEMENS & HALSKE'S CONTINUOUS CURRENT DYNAMO.

The electrical power is generated by two dynamos, which are the largest in the exhibition. One is an alternator, the other a continuous current machine, and either of them can alone supply the whole distributing system. The engines are both of the vertical marine type, as shown in the illustration. The continuous current machine is driven by a triple-expansion condensing engine, by Messrs. G. Kuhn, of Stuttgart-Berg. It has three cylinders, of 20 in., 28 in., and 47 in. diameter respectively, and 2 ft. stroke. It develops 400 h. p., 500 h. p., and 600 h. p. when run at 80, 100, or 120 revolutions per minute. The dynamo, made according to Messrs. Siemens' latest design, is coupled direct to the engine shaft. It is a ten-pole machine, with radial electromagnets placed inside a Gramme armature of 10 ft. diameter, giving a normal output of 330,000 watts at 65 revolutions per minute, or of above 600,000 watts at 100 revolutions. An interesting feature of these machines is the total want of a special commutator. The outside winding is made of solid copper strips, 1½ in. high by 0.24 in. broad, insulated from one another by fiber. The whole of the winding is turned up true on the outside, and ten sets of brushes, corresponding to the ten poles of the machine, collect in parallel. These are mounted on a star-shaped casting mounted on the outside bearing of the engine proper. This arrangement is exceedingly simple and very accessible. The brush holders are so constructed that every brush can be independently adjusted during work without disturbing the others, and at the same time the position of all the brushes may be altered at once by an ingenious and simple device, and all the brushes can be lifted off or put on

the heavens to which Professor Forbes had alluded, and, though he had as yet had no opportunity of examining his plates, he had reason to believe that they would be found to have recorded the position of every star greater than those of the eighteenth magnitude. If, therefore, the planet in question really did exist, he thought it probable that he should be able to demonstrate the fact of its existence.

Mr. W. E. Wilson followed with a paper descriptive of experiments he had made upon the absorption of heat by the solar atmosphere. In these he had made use of Professor Boys' new radio-micrometer, and the curves which he exhibited showed in a very striking manner the variation in radiation from different parts of the sun's disk.

Professor G. E. Hale, Chicago, then contributed a paper, in which he described the results he had obtained from recent photographic investigations of solar prominences and their spectra.

An Irrigating Flume.

The farmers and others east of Fresno, Cal., have united in a project to irrigate a large area of foothill land, on which they will raise oranges. The water will be conveyed from Stevenson Creek, in the Sierras, along Pine Ridge, which itself is twenty miles long, thence to Dry Creek and into the foothills. The water will come down into the foothills by a V-shaped flume, and will convey lumber to the farmers who need it, as well as furnish water for the soil. The flume will be about forty-five miles long, will cost from \$125,000 to \$150,000, and will prove of great advantage to that region. Work is already progressing on the flume.

usual type of fitting; while, for a given consumption, it is equally safe to count upon almost treble duty from regenerative lamps as against ordinary burners.—*D. Macfie.*

Peach Yellows.

The Hale Brothers, of Connecticut, who are among the largest and most successful growers in the country, have never yet been satisfied that "yellows" is anything more than a symptom of hunger or starvation. They apply potash freely to the soil under all their trees, and thus far have had very little trouble from the disease. If any of their trees begin to look yellow and throw out fine, sickly shoots from the trunk and branches, they apply potash and nitrate of soda; for large trees, ten pounds of the former to five of the latter.

The late P. M. Angur, of Connecticut, was more inclined to look upon yellows as a specific disease due to microscopic germs, and most easily cured by digging out and burning. The study of the disease has been undertaken by the Department of Agriculture, at Washington, and a volume of 250 pages published on the subject, but at that time (1888) no definite conclusions had been reached, although the author, Prof. E. F. Smith, said that experiments pointed strongly to some *contagium vivum* as the cause of the disease. The peach is a comparatively short-lived tree at best, and uncertain in our climate, and the only way to get fruit is to plant frequently, fertilize liberally with suitable material, shorten in surplus growth annually, thin the fruit boldly in bearing years, and avoid forcing a late growth in autumn.—*N. E. Farmer.*