TRANSLATIONS.

M. Stroh presented to the *Société des Ingénieurs Telegraphistes de Londres* a very interesting memoir upon the measurement of the adhesion which occurs when a voltaic current of a certain intensity is made to pass between two metals of the same nature. The author of this remarkable paper has also devised a special instrument for the purpose of measuring the force necessary to separate the adherent metals. It is perhaps not inopportune to remark here that this adhesion should be considered as a disturbing force in many experiments, and especially in telegraphy. The measurement of the amount of force required to overcome the adhesion gave the following results expressed in grammes:

Copper	0.15	Zinc	11.	Platinum	42.
Silver	0.15	Tin	14.	Iron	85.
Alluminium	2.50	Gold	17.	Steel	100.
Bronze	8.50	Lead	18.	Tempered Steel	225

When contact takes place between two different metals, the force of adhesion appears to correspond with that of the metal requiring the least force for its separation. Thus the adhesion of tin with iron would require 14 grammes for separation, the corresponding figure for tin, and not that of iron, which is 85. The importance of this matter is quite obvious, and seems to be well worthy of complete investigation. On microscopical examination of the two surfaces placed in contact, M. Stroh finds that the adhesion always arises from the fusion of the superficial layer by the electrical current.—*L'Electricité.*

WATER JETS AS A SOURCE OF ELECTRICITY.

Mr. J. Elster, a pupil of the celebrated Professor Quincke, is about to present a thesis, at Leipzig, upon this interesting question. The following, according to the *Journal Philosophique*, are the conclusions to which this young *savant* has arrived:

If any electro-motor force whatever is produced by a jet of water, there must have been contact of the particles of the water with a solid body. This condition proves that the electro-motor force is produced by the friction of the particles of water with the metal, so that only a small portion of the liquid contributes to the production of electricity.

Furthermore, when the rapidity of the water jet is increased or diminished, the effect obtained is proportional to the active force of the particles of the liquid, and depends also upon the nature of the body placed in contact with the water.

This theory seems to be very similar to that by which Faraday explained the production of electricity in the Armstrong machine. The conclusions reached by the author are opposed to those of many *savants*, notably the Swedish electrician, Ed. Lund.

1. The movement of a liquid, of itself, cannot produce electro-motor force.

2. The currents called electro-capillary are in the same case whether the fluid moistens or does not moisten the walls of the tube. In the first case the friction takes place between the adherent portion of the liquid and the molecules in motion. In the second case, the molecules of the liquid rub distinctly against the sides of the tubes.

Finally, his conclusion is that the electro-capillary currents, which he claims were discovered by Professor Quincke, are identical with the currents developed by friction, which have been demonstrated by Zollner on the rubber of electrical machines.—*L'Electricité.*

A NEW ELECTRIC PILE.

M. Reynier has devised a hydro-electric pile, comparable in energy, to the nitric acid couple, without its inconveniences. The zinc is immersed in a solution of caustic soda. The porous cup is made of parchment paper. The new couple is about twice as strong as the ordinary Bunsen couple, and is surpassed only by the rectangular Bunsen couple (after the model of Ruhmkorff). M. Becquerel, Sr., has already used a similar pile.—*La Science pour Tous.*

THE METRIC SYSTEM.

To the Editor of Science.

In connection with Prof. Ward's able "Plea for the Metric System in Microscopy," in SCIENCE for July 31st, it may be well to state that the "American Metric Bureau," of Boston, 32 Hawley street, has for some years been advocating the general use of the system, not only by publication of "The Metric Primer," and of various circulars and bulletins, but in the very practical way of supplying standard metric articles at much less than ordinary prices. As Prof. Ward well says, "the way to introduce the metric system is to use it ourselves," and judging by the experience of the students in my laboratory, who are advised not even to name the antiquated weights and measures, a pocket or desk rule is a more convincing argument than exhortation.

BURT G. WILDER.

GENERAL NOTES.

THE transformation of alcoholic liquids into vinegar has long been a matter of discussion. Pasteur holds that the formation of vinegar is a physiological phenomenon caused by vegetation of a particular bacterium, the *Mycoderma aceti*, while Liebig sees in it merely a chemical action of oxygen on alcohol. Recent observations by Herr Wurm, at the Breslau Institute of Plant-Physiology, are regarded as putting the former view beyond a doubt, and Herr Wurm has succeeded in effecting the industrial manufacture of vinegar in accordance with Pasteur's idea.

MR. BISSINGER, M. E., at Carlsruhe, Germany, gives the following results as obtained in his examinations of the several motors in regard to their relative cost per horse-power for each hour. It will be observed that the examination pertained principally to small motors. The relative cost per effective horse-power per hour is as follows:

100 h.-p.	steam engine	7.6
2 "	"	44.3
2 "	Lehmann's caloric engine	26.5
2 "	Hock's motor	40.0
2 "	Otto gas engine	26.4
2 "	Otto Lang gas engine	26.4
2 "	Schmidt's hydraulic motor, supplied with water from the city waterworks	95.00
2 "	obtained by horses and a gin	45.00
2 "	obtained by manual labor	200.00

A CALCULATION of the height of the atmosphere has been recently made by Herr Ritter (*Wied. Ann.*), starting from this principle: The quantity of heat which must be communicated to a mass of air cooled to absolute zero to bring it, under constant pressure equal to the atmospheric, to the state of the lowest layer of the atmosphere, is the calorific equivalent of the mechanical work which would have to be expended to lift this same mass of air from the earth's surface to the limits of the atmosphere. Supposing, first, our atmosphere to consist of a gas which would retain the properties of a perfect gas to absolute zero, he gets the height 25km. Then, making the same calculation for an atmosphere of pure water-vapor, he gets 350km. Considering, lastly, that while it is not possible to make an exact calculation for real gases, which certainly condense and solidify like water-vapor before reaching absolute zero, one must obtain a result little different from that found in the case of such vapor, he concludes that the height of our atmosphere must differ little from 350km.—a number which agrees well with that deduced by Schiaparelli from observation of falling stars.

ACCORDING to some recent experiments of M. Goulier, the coefficient of expansion by heat of a metal is independent of any pressure put upon the metal, and is the same under a tensile strain as under one of compression.