Ticlio (15,885 ft.), at the head of the Peruvian Central Railway, should provide an accessible site for the tropics. Alpine meteorologists have their choice of several positions. The mountains of northern Scandinavia, and Spitsbergen, would provide valuable data nearer the Pole. Once charted, mathematicians can calculate from the relative motion of the upper air and the earth how much of the earth's magnetism is explicable, and wireless experts can appraise the influence of the zones in long-range transmission.

In conclusion—a word of warning. I have previously shown that the enormous quantities of positive gas ions poured out from steam locomotives makes observation in England uncertain, and near towns entirely misleading. In Swiss valleys this factor is now negligible; but another disturbance exists there. At Grindelwald the spray from the turbulent Lutschine, and numerous waterfalls and cascades, carries its negative charge to considerable distances—200 yards on either side of the stream near the gorge. Water (like all conductors) in the open air has an induced negative charge on it in fair weather, and on severance the spray carries the negative charge with it.

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### The Motion of Eruptive Solar Prominences.

IN the issue of NATURE for July 4, p. 30, Mr. Evershed has reviewed a paper by Edison Pettit on the "Forms and Motions of the Solar Prominences." Dealing with the motion of eruptive prominences, Evershed thus summarises the opinion of Pettit: "The memoir concludes with a theoretical discussion of the nature of the repulsive force acting on prominences. Radiation pressure is rejected as inadequate, and the periodic ejection of showers of electrons from a disturbed area in the photosphere is suggested tentatively."

I have recently contributed a paper to the *Astrophysical Journal* in which the motion of eruptive prominences is discussed at some length. Working on the lines initiated by Saha and Milne, I have shown that selective radiation pressure provides the motive force for the motion of prominences. The selective radiation pressure is due to the bright patches or filaments which develop on the solar photosphere and are always found associated with eruptive prominences. St. John has recently shown that the spectra of the faculæ and filaments show the lines of $Ti^+$ much enhanced over those obtained from the undisturbed photosphere, and hence the conclusion is that they are regions of higher temperature.

Milne has shown that the high level $Ca^+$ atoms emitting H and K lines are supported against gravity by the pressure of the photospheric radiation. When regions of the photosphere get locally heated the equilibrium in the region above is disturbed, and $Ca^+$ emitting H and K and hydrogen atoms emitting the Balmer lines acquire an accelerated velocity. The motive power is thus obtained from the excess of radiation pressure due to the development of filaments at the base over the solar gravity.

Pettit, however, has shown that the motion is not accelerated but uniform for some time and then actuated by impulses. A steady velocity can only be reached if the particles move in a resisting medium. Probably the frictional force is supplied by the Einstein coefficient of resistance

$$R = \frac{8\pi h^2\nu^4}{3c^5} \cdot \frac{e^{h\nu/kT}}{e^{h\nu/kT}-1} \cdot \frac{B_{1\to 2}}{1+e^{-h\nu/kT}},$$

where $B_{1\to 2}$ is Einstein's probability factor of absorption. Thus Pettit's results are not inconsistent with the theory. But in some cases, as Evershed has remarked, the motions of the eruptive prominences decidedly show continuous acceleration. These cases may be explained thus: The Einstein coefficient of resistance R works out to be a small number. The radiation pressure, on the other hand, may increase to a sufficiently high value, if the fluctuation of temperature or the size of the bright patch at the base is large enough. In this case the prominence will reach a great height before anything of the nature of a constant terminal velocity is acquired. In the meantime the velocity will continually increase, but the absolute magnitude of the acceleration will continually decrease. The impulsive increments in velocities are due to the sudden changes of temperature at the base.

All electrical theories must be discarded, for large motions are observed in the case of lines of hydrogen which are due to neutral atoms. Electrical forces cannot act on neutral atoms.

For detailed argument reference is to be made to the original paper.

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I AGREE in a general way with the view that the motion of the eruptive prominences, and of the absorbing gases in novæ, may be best explained by selective radiation pressure.

The structure of the chromosphere itself suggests an outward movement along innumerable streams or jets, which are perhaps based on the brighter spots in the rice-grain structure of the photosphere.

There is a difficulty when we study the distribution of the larger eruptive prominences with respect to the faculæ, or brighter regions of the sun's disc. While it may be difficult to locate precisely the origin of eruptions when observed at the limb, they often seem to occur in high latitudes outside the spot-zones, and they appear usually to be connected with the larger patches of absorbing gas which are photographed on the disc of the sun in the calcium lines or in Hα. These patches tend to lie outside the faculous regions, either in high latitudes or in longitudes intermediate between the great regions of sunspot disturbance. There is thus no evidence that the photosphere underlying these prominences is brighter than normal.

On the other hand, eruptions of a somewhat different character are observed in the immediate neighbourhood of sunspots, and these may be connected with the faculæ. In rare instances they are accompanied by a phenomenon suggestive of the outburst of a nova, namely, a great but temporary increase of brilliancy in the photosphere, such as was observed by Carrington and Hodgson in 1859. Such disturbances are usually associated with line-shifts indicating motions of the order of hundreds of kilometres per second.

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### Spermatogenesis of Spiders and the Chromosome Hypothesis of Heredity.

FROM certain observations which I have recently made, it would appear that the spermatogenesis of some spiders exhibits interesting peculiarities which do not readily accord with the rigid scheme required by the chromosome hypothesis of heredity.

I have more especially studied the spider *Palystes natalius* Karsch; but certain other spiders have