A splendid meteor was seen over the southern region of Scotland on August 13 at 9h. 16m. It was fortunately recorded by Mr. A. King from near Edinburgh, and Mrs. F. Wilson saw the object near the N. by W. horizon, though her station at Harrow-on-the-Hill was distant about 370 miles from the place of the meteor.

The following are the particulars of fifteen non-Perseids seen during this year's display and computed by Mr. Denning:—

Night	G.M.T.	mags.	Height at first	Height at end	Path length	Velocity per sec.	Radiant point	Meteor's name
	h. m.		m.	m.	m.	m.		
Aug. 10	9 33	1>1	68	52	154	38	40+29	Muscid
	10 23½	2½-2	84	45	52	20	290+11	ε Sagittid
	11 0½	3-2	81	55	63	42	40+38	β Perseid
Aug. 12	10 18	2½-2	74	42	32	16	281+43	α Lyrid
	10 18	2½-2	80	55	67	—	46+44	α Perseid
	10 44½	2-1	56	58	192	35	39+7	α Centid
	11 28	2-1	77	54	32	40	315+13	δ Delphid
Aug. 13	9 16	2>Q	52	43	19	19	280-13	δ Antinoid
	10 40	4-2	69	46	28	56	300+20	η Sagittid
	10 40½	2-2	68	51	27	36	332+10	ε Pegasid
	11 11	5-2	77	59	44	28	343+14	ε Pegasid
Aug. 14	10 14	4-4	67	52	84	25	194+64	ε Ursid
	10 25	1>1	49	41	82	16	153+41	μ Ursid
	10 36½	2-1	67	61	7	12	302+13	α Aquilid
Aug. 18	10 40	3-2	59	52	29	58	72+44	η Aurigid
Aug. 19	9 20	>1	79	57	65	44	135+59	ν Ursid

THE TUBE ARC SPECTRUM OF IRON.—The installation of a 100-kw. transformer in the Pasadena laboratory has enabled Dr. Arthur S. King to extend his investigation of the spectrum peculiarities of the tube arc, and he has now carried out a comparison of typical iron lines in tube-arc and spark spectra. In these later experiments, according to a paper in the *Astrophysical Journal* for June, the best results are stated to have been obtained when energy was being supplied at the rate of 40 kw. at the moment of rupture of tube (*i.e.* formation of tube arc), the exposure being made whilst the current fell from 1000 to about 600 amps.; the second order of a 4-inch plane grating was used in the vertical telescope with an objective of 30 ft. f.l., the dispersion being 0.9 Å. per mm.

The tube arc is found to resemble the disruptive spark in imparting unsymmetrical structure to many of the stronger lines, the magnitude of the effect being closely related to their furnace and pressure classification. The least affected lines are the flame lines. In the spark, very curiously, the enhanced lines remain symmetrical. The conclusion is reached that strong electrical excitation, together with high vapour density, produce displacements resembling the effect of pressure, and the suggestion is advanced that the density of high-speed electrons is the operative common factor.

A brief account of the same investigation forms No. 9 in the series of Communications from the Mount Wilson Solar Observatory to the National Academy of Sciences (U.S.A.) Proceedings, vol. i., p. 371, June, 1915.

CONTROL OF AUSTRALIAN OBSERVATORIES.—From an Australian daily contemporary we learn that the Public Service Commissioner has recommended the transference of the Victoria Observatory to the Federal Government on the grounds that it is a national, and not a State, institution. It is added that there is a consensus of opinion among the astronomers of the various States that it would be well to hand observatories over to Federal control.

PROPER MOTIONS OF THE STARS BY STEREOSCOPE.—M. J. Comas Solà (*Comptes rendus*, vol. clxi., p. 121, August 9, 1915) describes an interesting attempt to employ the stereoscope in the study of stellar motions. By means of a camera, aperture 160 mm., f.l. 800 mm., mounted on a 6-in. equatorial as finder, photographs of the globular cluster M. 11 (*Aquila et*

Antinous) were taken on July 12, 1912, and again on July 20, 1915. The negatives were then viewed in an ordinary stereoscope with striking results. On a surface 20 degrees square, no fewer than 200 stars exhibited sensible proper motion, and it proved specially easy to pick out groups of stars having common or related proper motions. It is suggested that it should not be difficult to obtain quantitative results in employing a stereocomparator or stereometer. The preliminary qualitative survey indicates that the greater part of the stellar trajectories in the region studied make a large angle with the mean line of the Milky Way.

SOLAR VORTICES.—Having established beyond doubt the existence of the Zeeman effect due to the magnetic field in sun-spots, Prof. George E. Hale has now been able to trace the law of rotation in spot vortices by some highly significant observations communicated to the National Academy of Sciences, U.S.A. (*Proc.*, vol. i., p. 382). The typical sun-spot group consists of two spots of opposite magnetic polarity, and thus rotating oppositely, lying almost parallel to the solar equator. The preceding spot is usually the dominant member, whilst the following spot may consist of small spots or be represented merely by flocculi, the characteristic feature of the group being the presence of magnetic fields of opposite polarity in the regions of its eastern and western extremities. Briefly, the present results indicate that the direction of rotation depends on the phase of the spot cycle, thus in low latitudes (end of cycle) the rotation in the spot vortex (preceding spot) is the same as in a terrestrial tornado, *i.e.* anti-clockwise in the N. hemisphere, but in high latitudes (beginning of cycle) the direction of rotation is the reverse; each spot belt is thus divided into two zones of approximate mean latitudes of 9° and 23° respectively.

In collaboration with Mr. George P. Luckey, Prof. Hale has been conducting some novel laboratory experiments (*Proc. Nat. Acad. Sci.*, vol. i., p. 385) in vortex motion; means have been successfully devised for reproducing the characteristic features, not only of spot vortices, but also to some extent the movements in flocculi.

LIFE-HABITS OF THE OKAPI.

DR. CUTHBERT CHRISTY, known to a good many people by his medical research work and botanical collecting in West and in Central Africa, recently spent several years in the service of the Belgian Congo, and was directed, amongst other things, to give careful study to the okapi in the forests of north-east Congoland. The result is that we have for the first time an accurate and detailed description of the life habits of the okapi. Dr. Christy has also, I believe, been the first to bring to Europe the "soft parts" of this Giraffid. A few years ago this was what many zoologists were longing for; the soft parts (intestines, genital organs, etc.) of the okapi were needed to supplement the study of its skeleton and enable us to fix with precision its position in the giraffe family, and perhaps the basal relations of that group with other Pecora.

Unfortunately, Dr. Christy arrived home (after running many war risks on the way) with his valuable cargo of specimens at a time when we were so completely engrossed by the war that little interest was aroused, and little attention was given to his remarkable researches. The comparative anatomists who might have examined his material are apparently absent from their usual seats of learning engaged in war business. I understand that Dr. Christy has placed the soft parts of his specimens in the British Museum (Natural History), and we may hope perhaps

that they will there receive examination at competent hands.

Dr. Christy adds his testimony to that of his predecessors in the same quest as to the "invisibility" of the okapi, whose markings and coloration—*pace* Colonel Theodore Roosevelt—so break up the surface of its large body and long legs as to cause it to fuse with the dark-brown, russet, white and yellow-white of the twigs and stems and leaf-stalks amongst which it moves. He also points out that the hoofs of the okapi are so closely pressed together that the footprint is almost like that of the single-toed donkey. On the other hand, he does not believe that the okapi feeds on the big leaves of the *Sarophrynium* (an amarantaceous plant), it merely resorts for concealment to these 6-ft. high thickets. Nor does it necessarily feed at night only, but rather in the early morning and late afternoon. It feeds chiefly on the small leaves and twigs of trees, which it "hooks down with its long, mobile tongue." It does not eat grass, but does browse on the coarse herbage on the outskirts of the forest. These notes are extracted from an extremely interesting article in the *Field* of July 10, which contributes likewise a good deal to our knowledge of the Bambute pigmies, almost the only foes the okapi has.

In connection with this subject might I again put forward the suggestion that the very puzzling remains of so-called "antelopes" recently found, not only in southern California, but actually in Maryland (eastern North America), may be the bones and teeth of primitive Giraffids and not of "elands" or *Tragelaphs*, as surmised by American zoologists. The nearest relation of the isolated giraffe group at the present day would seem to be the pronghorn of western North America. It is quite conceivable that the Giraffids may have arisen from the indeterminate *Antilocaprid* group (intermediate between the Deer and the Bovids) in North America, and thence have spread to north-eastern Asia and eventually to India, Persia, Africa, and southern Europe. There are giraffine remains found fossil in China, and north-west India would seem to have been the area of greatest variation and specialisation.

H. H. JOHNSTON.

THE SOUTH AFRICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.¹

PRETORIA MEETING.

EXCLUDING the purely formal meeting of 1905, in which year we joined forces with the visiting British Association for the Advancement of Science, this is the second session of the association to meet in the Transvaal and the first to meet in Pretoria. Our association was started in 1903 at Capetown, and in 1904 the meeting was held in Johannesburg, but on that occasion one day was spent in Pretoria. This year we hold our meeting in what is now the administrative capital of the Union, but we are invited to spend one day in Johannesburg, visiting the Crown Mines, when visitors will have a favourable opportunity of seeing the conditions under which our staple industry is conducted, especially with regard to modern views on hygiene and the preservation of life.

The calm atmosphere of our association is especially suitable for discussions upon the broad principles underlying polity. In the present times these principles are being profoundly modified; old standards of government seem to be weakening day by day, and our association affords a common ground where tendencies can be examined for what they are worth, instead of through the distorting lenses of party passion.

¹ Abridged from the address of the president, Robert Thorburn Ayton Innes.

War and Science.

We meet this year under extraordinary circumstances, during a period of war unequalled in the history of mankind in its extent and intensity. A superficial view would be that our association has nothing to do with wars at any time, and should ignore the present war. This view would be entirely wrong. The war touches humanity at every point, in every interest. I am therefore going to deal with it, but in such a way that no one could say to which side my sympathies lean. I have, like everyone else, very decided views upon the rights and wrongs of the war, but these concern one of the aspects with which we as a scientific body have nothing to do.

A certain school of thought—not particular to any one nation—has praised the value of war as a discipline, and even as a moral force. Another school looks upon war as a curse for which no defence is possible. Science is impersonal, and looks merely to facts. Yet science cannot but feel degraded when it finds so great a part of its recent advances applied so freely and almost solely as aids to the destruction of human life. The pre-eminent inventions of our present generation—wireless telegraphy, the airship, the flying machine, the submarine, thermite, and other allied heat producers—seem to have found their culmination in use in war. How different is this from the ideal of the man of science—the most altruistic possible—the lightening of the burdens of humanity by the mastery of natural forces—the transformation of inanimate power to relieve mankind from arduous work—the conquest of pain and disease—the improvement of agriculture—and, by no means least, the enlargement of the human mind. Greek culture—that extraordinary efflorescence of a limited community of small cities, which we prize so highly to-day, and whose lesson seems to be valid for all time—we are told was only possible because the Greek civilisation was built upon slavery; the helot was the pivot on which it turned. The man of science looks forward to a period of leisure and culture equally founded upon a slavery, but not upon the unwilling slavery either of man or beast, but upon the willing slavery of machinery and of the powers of nature harnessed for use.

An increasing and unflinching search for truth, with a belief in the betterment of humanity through knowledge, is the ethical basis of science, and none other. If science could only serve material ends—the increase of money—profit, or serve to rivet the domination of one State over another—then it would be worthless; nay, it would be unclean.

We perceive to-day that when any one nation deliberately uses the resources of science as an aid to war, a burden of terrible import is thrown upon other nations. And herein is another apparent great evil of science, because its advance makes war both more terrible and more destructive. I say an apparent evil, because if it is not controlled it will lead to exhaustion, and so limitation will have to come by necessity. I believe that in earlier ages the individual, or at least the family, the patriarchal group, was to a great extent, like a nation is now, each a law unto itself, and it was only as weapons got more expensive and deadly that the small group was willing to abandon the right of private revenge or redress. In yet later ages the baron in his great castle could defy the king, but the invention of the cannon and the control of the manufacture of gunpowder by the king made even the most powerful barons willing to accept the king's peace. To-day we would not tolerate any man or group of men turning their buildings into fortresses; to-morrow, I hope, I believe, that nations, or a federation of nations, will likewise refuse to allow any other