speaker, yet that physical E., according to its definition, is not capable of having such epithets applied to it, except in senses which are not intended by those doctors. Active E. would not be E. or "the power of performing work," it would be rather the *performing* of that work. "Active E." being thus incorrect, its above antithetics, or approximate antithetics, are incongruous expressions, or else have meanings different from what is intended. If "reposing," "dormant," "quiescent" E. have any meaning, it is that of "unavailable E." If "quiet" and "tranquil" E. have any meaning, it is that of E. spending itself slowly and equably. Poor P. thinks that the expression, "passive E.," would sound very like a bull, whether used in a tap-room or in a lecture theatre. He dares not entertain the suspicion that these expressions had their origin in a momentary, latent, unconscious confusion between kinetic E. and action in the minds of the writers; but he knows that they are eminently calculated to cause a chronic intentional muddling of them both together in his own brain-pan.

Dublin

(To be continu.d.)

X.

On the Supposed Action of Light on Combustion

THE results obtained in the experiments mentioned by M. C. Tomlinson are to be attributed to the elevation of temperature of the candles exposed to solar light and heat.

The influence of light on combustion has been mistaken for the action of heat, which, in this instance, seems to have accelerated combustion, and in other instances *retards* it by increasing the heat of the air and diminishing the draft. That is why the sun shining over chimney-pots is said to cause smoke; it diminishes the ascensional speed of the air through the pipe.

Jersey, September 2

G. SAVARY

[On referring to Mr. Tomlinson's paper we find that out of four trials, with a number of candles to each, there was a greater consumption of material in the first and fourth trials in the light than in the dark; and in the second and third trials the consumption was greater in the dark than in the light; but in any case the difference was so small, amounting only to from two to seven grains per hour, that it may fairly be referred to accidental circumstances, such as differences in temperature, in currents of air, and in the composition and matter of the candles. Some of the trials were made in the diffused light of day, and in all the trials the differences in temperature between the dark and the light spaces were but small.—Ed.]

OUR ASTRONOMICAL COLUMN

THE SATELLITES OF MARS.—The following ephemeris of the outer satellite is deduced from the elements given in this column last week, except that the daily motion is corrected to $285^{\circ} 5' 147''$ by observations to Sept. 16:—

	At 8h. om.			At 10h. om. G.M.T.		
	Pos.	Dist.		Pos.	Dist.	
Sept. 24	247	75	...	237	61	...
" 25	280	49	...	276	68	...
" 26	52	54	...	26	34	...
" 27	83	70	...	75	77	...
" 28	192	29	...	129	31	...
" 29	252	76	...	243	68	...
" 30	297	35	...	274	55	...
Oct. 1	60	63	...	44	44	...
" 2	90	59	...	80	71	...
" 3	217	38	...	167	25	...
" 4	257	72	...	249	70	...
" 5	328	26	...	286	41	...

For the inner satellite the following elements may be taken as representing closely the Washington measures, August 17—20:—

Passage of Ascending Node, August 17^h 89^m 88^s G.M.T.

Longitude of node	...	82° 48'
Inclination of orbit	...	25° 24'
Period of revolution	...	0.31841 days.
Log. radius of orbit at mean distance of	...	0.9286
Mars from the sun	...	...

They show the following differences of the calculated angles from those observed:—

Aug. 17	...	- 0.1	Aug. 19	...	+ 1.9
" 18	...	- 0.7	" 20	...	+ 0.1

The outer satellite has been observed on several nights by A. A. Common, Esq., of Ealing, with an 18-inch silver-on-glass reflector. On the 15th and 16th inst. excellent measures were made with this instrument, by means of which the period of revolution was corrected before calculating the above ephemeris. Mr. Common has stated to the writer that the satellite is ruddy, even more deeply-coloured than the body of the planet. It has also been observed on several occasions by M. M. Henry at the Observatory of Paris.

Employing Kaiser's value of the mean diameter of Mars at distance unity ($9'' 472$) it results that the inner satellite is distant from the centre of the primary 2.730 and the outer one 6.846 semi-diameters. As seen from the inner satellite the globe of Mars will subtend an angle of 40° , and as seen from the outer satellite, one of about 16° . The orbital motions per minute are respectively seventy-nine miles and fifty miles. Our own moon has a mean orbital velocity of thirty-eight miles per minute.

THE SATELLITE OF NEPTUNE.—The subjoined ephemeris is derived from Prof. Newcomb's tables:—

At 13h. Greenwich M.T.

	Pos.	Dist.		Pos.	Dist.
Sept. 30	30	15.2	Oct. 9	25	13.6
Oct. 1	314	5.7	" 10	101	6.3
" 2	231	14.9	" 11	46	16.2
" 3	209	14.7	" 12	23	13.0
" 4	122	5.7	" 13	294	7.5
" 5	49	15.4	" 14	225	16.5
" 6	27	14.2	" 15	201	12.3
" 7	291	5.9	" 16	86	7.5
" 8	228	15.8	" 17	44	16.7

The motion of this satellite is *retrograde* both with reference to the equator and to the ecliptic, and thus it presents the most decided case of retrograde motion in the planetary system; the motion of the satellites of Uranus, though retrograde upon the ecliptic, is direct upon the equator. For 1877 we have for the satellite of Neptune, from Prof. Newcomb's investigation—

For Equator.

For Ecliptic.

Node	...	183° 3'	...	184° 33'
Inclination	...	121° 42'	...	145° 13'

Adopting the mean of Mr. Lassell's and Mr. Marth's measures of the diameter of Neptune, taken at Malta in 1864-65, as the most reliable value hitherto published, we find that Prof. Newcomb's mean angular distance of the satellite from Neptune corresponds to a true distance of 14.552 semi-diameters of the primary (or about $219,000$ miles), which will therefore present an angular diameter of rather less than 8° as viewed from the satellite. The period of revolution being 5.8769 days, the mean orbital velocity of the satellite is 162 miles per minute.

THE BINARY α CENTAURI.—Mr. Gill has found time to measure this fine star with Lord Lindsay's heliometer at his present station, Mars Bay, Ascension, on four nights between July 22 and August 5. The distance of the components was then little over two seconds, the bright star preceding. The measures are evidently difficult from the magnitude and closeness of the stars, the separate night's results differing by more than 10° ; but Mr. Gill will doubtless establish an important epoch, and we may hope at the end of the year to have something like reliable elements of this the most interesting of all the revolving double stars.

METEORIC ASTRONOMY.—The second part of the publications of the Royal Observatory at Münster has appeared, and is entitled, "Resultate der in den 43 Jahren 1833-1875 angestellten Sternschnuppen-Beobachtungen, von Dr. Eduard Heis." It was close upon completion at the time of Dr. Heis's decease on June 30, the revision of the final sheets having been undertaken by one of his pupils. The work contains the times of occurrence and