

Tested thus broadly and philosophically, the meteoric bombardment hypothesis appears in its true colours as a monstrous physical absurdity. It assumes a perpetual flow of solid masses converging continuously from everywhere towards everywhere; or otherwise a state of things which could only endure through the time which these meteoric masses would occupy in travelling the semi-distance between the neighbouring suns. These little journeys ended, the interstellar space must, according to this hypothesis, become a sterile vacuum, all the lights of heaven must go out, eternal darkness must rest upon the face of the deep, and everlasting death pervade the universe.

W. MATTIEU WILLIAMS

The Cockroach

I HAVE only to-day noticed the Rev. C. J. Robinson's letter on this subject in your issue of the 29th Sept. A friend of mine, whom I have known all my life, who occupied an important trust as Bank Manager in India last year, and who is at present home on sick leave, assures me that Dr. Norman Macleod is wrong when he denies the nail-nibbling propensities of the cockroach. My friend had been in Kurachee for some time, and on his journey from that town to Bombay by sea he was annoyed one night in his berth by some insect crawling over his face; half asleep and half awake he put up his hand to his face and sent the insect to the foot of his berth. Shortly after he was awake by a pain at his great toe, and on looking at it he discovered that a cockroach had nibbled off all the nail down to the quick.

JAMES DURIE

Aberystwith, Oct. 8

Were Cockroaches known to the Ancient Greeks and Romans?

YOUR correspondent, Rev. C. J. Robinson, drew attention in your columns (NATURE, Sept. 29) to the question whether these troublesome insects were known to the Ancient Greeks and Romans; he says, "there is a good deal to lead one to suppose that the *μυλακρίς* mentioned by Aristotle, and the *Blatta pistorum* of Latin writers was the same as our loathsome pest." I think Mr. Robinson is mistaken in supposing that the *μυλακρίς* is mentioned by Aristotle, at least I can find no mention made of this insect in the writings of the Stagirite. The word *μυλακρίς*, meaning some kind of insect, occurs in the fragments of Aristophanes preserved by Pollux, who amongst other meanings of the term gives the following one:—ζῶν ἡ ἐν τῷ μύλωνι γινόμενον, and then quotes this couplet from Aristophanes,

Ἴνα ξυνῶσω ὅπερ ἤδεσθον βίω,
Σκώληκας ἐσθιοντες, καὶ μυλακρίδας.

"where they may partake of the food of which they are fond, eating worms and *mylacrides*." It would not be possible to say what the *μυλακρίς* here denotes, but from the creature being often produced in mills, it may possibly mean a "Cockroach," though a "meal-worm" (i.e., the larva of the beetle, *Tenebrio molitor*) would suit equally well. The Greeks, however, had a word which may well represent the Cockroach, though it is even here impossible to speak with certainty. The word, *σίλφη*, it is probable denotes this insect. Aristotle (Hist. Anim. viii. 19. § 4) uses the word once; he enumerates the *σίλφη* amongst insects which cast their skins. The Scholiast in the "Peace" of Aristophanes says the *σίλφη* is an ill-smelling insect (*δυσώδης*). Aetius (8. 33.) speaks of "the fat of the stinking *σίλφη* which inhabits houses." The epigrammatist Evenus (Analect. i. p. 167) speaks of the *σίλφη* of the booksellers' shops, and applies to it the epithets, page eating (*σελιδηφάγος*), destructive (*λωβήτειρα*), black-bodied (*μελαινόχρως*). Lucian speaks of the mere book collector as providing pastime for mice and habitations for *σίλφη*, and cuffs his slaves for not keeping the mice and *σίλφη* away. (Advers. Indoct. iii. 114, Ed. Hemsterhus.) The Scholiast here gives a description of the *σίλφη* which Schneider with some reason refers to some kind of *Lepisma*. Elian (H. A. i. 37) says that the *σίλφη* infest swallows' nests; these cannot be cockroaches. Galen and Paulus Aegineta apply the epithet, *βδέονσαι*, to the *σίλφαι*. Dioscorides (ii. 38) says that the inside of the *σίλφη* found in bake-houses when pounded with oil is good for pains in the ear. This leads me to the *Blatta* of the Romans. "On pulling off," says Pliny, "the head of a *blatta* it gives forth a greasy substance, which, beaten up with oil of roses, is said to be wonder-

fully good for affections of the ears." He speaks of the disgusting nature of this insect, one kind of which is known by the name of *Myloecoon*, and found in mills (Nat. Hist. xxix. 39). In another place (xi. 34) Pliny says, "It is the nature of the *blatta* to seek dark corners and to avoid the light; they are very often found in baths." According to Virgil, "the light-avoiding *blatte*" find their way into bee-hives (Geor. iv. 243). Horace (Sat. ii. 3, 119) ridicules an old miser for sleeping on straw and leaving his bed clothes in his chest, the food of *blatta* and *tinea*, "*Blattarum ac tinearum Epulæ*." Martial (Lib. iv. Ep. 37.) says unless his books are well put together they become the prey of *tinea* and *blatta*.

Constrictos nisi das mihi libellos
Admittam tineas trucesque blattas.

From the above passages it will be seen that the *blatta* was a destructive insect to clothes, books, &c., that it avoided the light, and was fond of warm places, that it frequented mills and exuded a greasy substance from its head, that it was a disgusting creature (probably in allusion to the smell) all of which particulars are true of cockroaches, and as there are many species of the family, and are widely distributed over all parts of the globe and must have been known to the ancients, I think there is good reason for concluding that the cockroach was known to the Greeks by the name of *σίλφη*, and to the Romans by that of *blatta*.

W. HOUGHTON

The Aurora Borealis

I SHALL be obliged if you will put on record a few scattered notes which I took of the splendid Aurora Borealis of October 25, seen from Arthingworth, Northamptonshire. When I first observed it at half-past five P.M., a crimson glow extended in an irregular band from N.N.E. to W., most prominent at about 20° to 30° above the horizon. This increased in height and breadth until it nearly reached a point S.W. of the zenith, and about 15° W.N.W. of the star Vega. At this time the northern part of the sky was perfectly free from aurora; gradually that part and the whole dome of the heavens, with the exception of a section from W. to nearly S., became filled with luminous streamers. These, for about 20° on each side of N., were white, the others crimson striped with white or rather greenish light, but the green I believe to be an effect of contrast, as where similar streamers were distant from the red light they were white.

The white or green streamers appeared to eclipse the red light, they changed their size, shape, and position, while the red continued comparatively unchanged. There were also dark streamers which, at first, I believed to be mere spaces without light, and to be caused by the darkness beyond, but I became ultimately convinced (as far as one could be convinced by appearances so subject to illusion) that they formed a part of the phenomenon itself. These streamers or long brushes could be seen beyond and clear of the luminous portion of the aurora, leaving the normal light of the sky between them and it, and hanging like long horse-tails, or like the fringes of rain seen on the edges of a distant rain cloud; changing their shape and position just as the luminous streamers are seen to do.

The most remarkable part of the phenomenon, however, was the circle of sky, or what may be called the pole of the aurora, to which the streamers converged. It appeared to embrace about from 7° to 10° of space. To an ordinary observer it might have appeared occasionally to shift its position to some extent, but, as far as I could judge during an hour's observations, this was not really the case, flickerings at times covered portions of it, and at other times the whole became faintly luminous; but by marking its position with reference to some small stars, this seemed to me to be unaltered. Most singular were the terminations of the streamers they culminated at this circle, not being undefined or gradually evanescent, but having angular tips far brighter than the portions immediately beneath, the nearest illustration to which I can give is an inverted fish-tail or bating gas burner, except that this gives a feeble light at the point, while the aurora tips were whitest and brightest there, the streamers now fading off, and now becoming brighter and tinged with red as they got to 40° or 50° from the horizon; the tips varied constantly, but preserved the mean distance from the pole or focus of the aurora. The position of this was, as far as I could ascertain without star maps or instruments for observation, about 15° W.N.W. of Vega. The convergence of the beams was not in appearance conical, but dome or cupola shaped; this was, however, in all probability an optical illusion. Whether

there was really a convergence or whether the beams were parallel, and the convergence an effect of perspective, can only be decided if some approximative measures of the distance of the streamers be ascertained. It appears to have been at a greater distance from the earth than is usually attributed to aurora borealis, having been seen in different parts of Europe and I believe in America. Doubtless the comparison of these observations will give some parallax or approximation to measurement of the distance. I remember about seven or eight years ago seeing an aurora at Chester, where the flashes appeared close to the observer, so that gleams of light continuous with the streamers could be seen between the houses of the town and myself, like the portions of a rainbow intervening between terrestrial objects and the observer. I tried then to ascertain if there was any reflection or other cause of optical illusion, but could not see it as other than a real effect; I seemed, so to speak, to be in the aurora. The effect on the 25th was very different, and gave me the idea of great distance.

The light was sufficient to enable me to tell the time by my watch easily, but not to read newspaper print.

Between half-past six and seven o'clock it faded away, and at from half-past seven to ten had become an ordinary white aurora, confined to the northern portion of the heavens.

115, Harley Street, Nov. 2

W. R. GROVE

ON the evening of the 24th ult. the aurora was most beautifully seen here, and if you have space for it, I will add a further spectroscopic observation to those you have already recorded. I found no continuous spectrum, but two of the lines described by your other correspondent.

1. A line in the light green, much reminding one of the line from the larger nebulae, but more brilliant and with a peculiar flickering in it. This line was well seen in all parts of the sky, but was specially bright in the auroral patches of silver light.

2. A line in the red, very much like the lithium line, but rather more dusky. This line was only well seen in the rosy patches of the aurora, but could be faintly traced wherever the rose tint at all extended.

When the display of rose-coloured light was at its height, the spectrum from the most vividly coloured portion gave the red line very distinct, while the green line still remained bright by its side. I am quite inclined to agree with your correspondent, T. F., in the conjecture that both these lines are due to hydrogen, though (probably through difference in temperature or pressure) they do not quite agree with the lines of that gas as taken from the discharge in a vacuum tube.

The spectroscope was one of Mr. Browning's small direct-vision 5-prism instruments adapted for star purposes.

It may be worthy of note that the belts of Jupiter are highly coloured at the present time. The equatorial zone is of a distinct dark ochre colour, deepening to red brown as it approaches the lower edge (in an inverting telescope); two thin belts above are slate purple, and a darker belt below is of a deep purple, with a faint trace of rose colour.

The planet was thus seen on Nov. 2, at 9 p.m., not far above the horizon, and in bright moonlight, in a 8½ Browning's silvered spectrum with achromatic eye-pieces—144, 305, and 450; best I think with 144.

Guildford, Nov. 5

J. R. CAPRON

Clouds

I do not think Prof. Poey's "New Classification of Clouds," published in NATURE of Sept. 8th, does much to advance science. I see no use in any classification of clouds, unless it is based on their mode of formation, and, so far as I see, there are but three ways in which it is possible for clouds to be formed. These are:—

1. The cooling of a mass of air *in situ* by radiation. This forms stratus.

2. The cooling of a mass of air by diminished pressure when it flows in an ascending column. This forms cumulus. A modification of this process is when (according to Espy) sudden expansion takes place above, so as to diminish the pressure through the entire height of a column of air, and, in consequence of the cold due to the diminution of pressure, to produce condensation of vapour throughout the column. This is Espy's explanation of waterspouts.

3. The cooling of a mass of air by coming into contact with a cooler mass of air than itself. This forms cirrus.

Of course these three modes of formation may be modified and combined in endless ways. To mention one of the simplest: A cloud which has begun to form as a cirrus or cumulus, may become a centre from which heat is radiated, and thus go on forming as a stratus.

It is in the highest degree unphilosophical to reject stratus as a species of cloud on the ground that it is "not a cloud properly so called, but a mist or hoar frost." A cloud and a mist do not differ fundamentally.

Prof. Poey is, however, right in saying that cumulus is not a distinct species of cloud. It is only a cloud which (in consequence, I believe, of the loss of electrical tension) has begun to run together into raindrops.

JOSEPH JOHN MURPHY
Old Forge, Dunmurry, Co. Antrim

Extreme Seasons

A GREAT deal of speculation has been indulged in to account for the extreme seasons that have prevailed over so large a part of the northern hemisphere during the last few months. In this country, as we are subject to extreme seasons, more particularly as regards the rainfall, the subject is one of peculiar interest. In a paper read before the California Academy of Sciences in February on the subject of our extreme seasons, I brought forward a number of observations to show that these were due to broad polar and equatorial currents occupying large portions of the earth's surface continuously, and without much perpendicular or horizontal disturbance, except at the borders where the currents meet. The facts I then brought forward showed that from October to the middle of February a northerly current prevails over this portion of the American continent, extending from one to two hundred miles to the westward of San Francisco to the eastern edge of the Mississippi valley, whilst a southerly current prevails over the eastern side of the continent as far as the Atlantic. The southerly current to the westward extends uninterruptedly across the whole breadth of the Pacific to the coast of Japan. This same distribution of air currents without much perpendicular or horizontal mixing has apparently continued during the summer, and accounts, I think, satisfactorily for the extreme heat that has marked the continental climates over so large a part of the northern hemisphere. Nor is it surprising that the summer temperature on the continents should be so universally hot, as a horizontal wind, either from the north or from the south, blowing over the land in summer must necessarily be a hot wind. That there is no cosmical cause for this elevated temperature is proved by the extremely low summer temperature prevailing over the Pacific between this place and Japan. The mean temperature, as ascertained by observations made on board the mail steamships between here and Japan was, for Nov. 1869, 70°·2, for January, 62°·9, for May, 1870, 61°·9, for July, 65°·7, giving a mean of 2°·7 less for May and July than for January and February. The difference in favour of the winter temperature would be still more marked were the coast temperatures eliminated, as they perhaps should be; as these were much above the mean in summer and below the mean in winter. As to the causes that lead to the peculiar distribution of the air currents in certain seasons, I have not the slightest idea, but I think that, admitting the fact, it affords a satisfactory explanation of anomalous temperatures both in winter and summer.

San Francisco, California, Sept. 4

JAMES BLAKE

Cyclones

CYCLONES are commonly regarded as exceptional phenomena of the atmospheric circulation; and we see in text-books statements as to the seasons of the year at which they are most apt to occur, descriptions of the premonitory signs which herald their approach, and directions to aid ships in avoiding the most dangerous portions of the storm-field. In short, each cyclone is regarded as an exceptional fact, an isolated burst of fury from the old storm-god Hurakan.

The writer has lived all his life on the great highway of cyclones, at Charleston, South Carolina; and from the observations of many years, has been led to conclude that this commonly received view embraces only those cyclones which, on account of their rotatory violence, really do threaten destruction on land and sea; and that consequently it overlooks a most important series of phenomena, which, though they do not so forcibly arrest attention, are even perhaps more significant in a scientific point of view. Though destructive cyclones or hurricanes are