

It is significant that this game cannot be played by the blind boys in windy weather. And yet the allowance for windage on a heavy bowl can be no very large quantity.

The boys also play football with great zeal and considerable skill. Bells are rung at the goals throughout the game, and the ball contains two little bells. With these guides the boys manage both to follow the ball and to direct it to the goals.

Clifton College, February 15

H. B. JUPP

### Migration of the Wagtail

THE inclosed extract from the New York *Evening Post*, a newspaper of high standing for accuracy and intelligence, contains statements which are not, I think, generally known in regard to the migration of the water-wagtail, and your insertion of the same may be the means of drawing from other correspondents some evidence in confirmation or disproof. Though riding is not quite unknown among animals other than men, yet such purposeful riding as is here described is, to say the least, very extraordinary.

E. W. CLAYPOLE

Antioch College, Yellow Springs, Ohio, Dec. 12, 1880

*The Singular Methods of Travel the Wagtail adopts to Cross the Mediterranean Sea.*—In the autumn of 1878 I spent several weeks on the Island of Crete. On several occasions the papas—village priest—a friendly Greek with whom I spent the greater part of my time—frequently directed my attention to the twittering and singing of small birds which he distinctly heard when a flock of sand-cranes passed by on their southward journey. I told my friend that I could not see any small birds, and suggested that the noise came from the wings of the large ones. This he denied, saying, "No, no! I know it is the chirping of small birds. They are on the backs of the cranes. I have seen them frequently fly up and alight again, and are always with them when they stop to rest and feed." I was still sceptical, for with the aid of a field-glass I failed to discover the "small birds" spoken of. I inquired of several others, and found the existence of these little feathered companions to be a matter of general belief among both old and young. I suggested that possibly the small birds might go out from the shore a short distance and come in with the cranes. "No, no," was the general answer, "they come over from Europe with them." I certainly heard the chirping and twittering of birds upon several different occasions, both inland and out upon the sea. But in spite of the positive statements of the natives I could not believe their theory until convinced one day while fishing about fifteen miles from the shore, when a flock of cranes passed quite near the yacht. The fishermen, hearing the "small birds," drew my attention to their chirping. Presently one cried out "There's one," but I failed to catch sight of it. Whereupon one of them discharged his flint-lock. Three small birds rose up from the flock and soon disappeared among the cranes.

I subsequently inquired of several scientific men, among whom were two ornithologists, as to the probability of such a state of affairs. They all agreed that it could not be, and I, too, was forced to cling to my original judgment, and let the matter go. Recently however while reading the *Gartenlaube* my attention was attracted to an article bearing directly upon the subject. The writer, Adolf Ebeling, tells the same story, and adds the statements of some ornithologists of distinction, which makes the whole matter so striking and interesting that I quote the paragraph from his book:—

"Shortly after my arrival in Cairo I greeted various old German friends among the birds that I observed in the palm-garden of our hotel. First, naturally, was the sparrow, the impudent proletariat—I had almost said social democrat, because the whole world to-day has that bad word in the mouth. He appeared to me to be more shameless than ever in the land of the Pharaohs, for he flew without embarrassment on the breakfast table, and picked off the crumbs and bits from every unwatched place. But the mark of honour we paid to the wagtails, and in truth chiefly because we did not then know that the wagtails were birds of passage. We had thought that they passed the winter in Southern Europe, or at farthest as many of them do, in Sicily and the Grecian Islands. That they came to Africa, and especially to Nubia and Abyssinia, was then unknown to us. This appeared to us singularly strange, nay, almost incredible, particularly on account of the peculiar flight of the wagtail, which it is well known always darts intermittingly through the air in longer or shorter curves, and apparently, every few moments, interrupts

its flight to sit again and 'wag its tail.' But there was the fact, and could not be denied. Everywhere in the gardens of Cairo you could see them under the palms that border the banks of the Nile; on the great avenues that lead to the pyramids; nay, even on the pyramids themselves in the middle of the desert. And there it was that I first heard of this singular phenomenon.

"One evening we were sitting at the foot of the pyramid of Cheops, sipping our cup of fragrant Mocha and in jolly conversation, rolling up clouds of blue smoke from our Korani cigarettes. We were waiting for the sinking of the sun to make our return to Cairo. The deep silence of the surrounding desert possessed something uncommonly solemn, only now and then disturbed by the cry of the hoarse fishhawks far above us. Still higher the pelicans were grandly circling. Their flight, though heavy when seen from anear, possesses a majesty in the distance attained by no other bird. Right before us several wagtails were hopping around and 'tilting.' They were quite tame, and flew restlessly hither and thither. On this occasion I remarked, 'I could not quite understand how these birds could make the long passage of the Mediterranean.' Sheik Ibrahim heard this from our interpreter. The old Bedouin turned to me with a mixture of French and Arabic as follows, which the interpreter aided us to fully comprehend:—

"'Do you not know, Hadretch (noble sir), that these small birds are borne over the sea by the larger ones?'

"I laughed, as did our friends; for at first we thought we had misunderstood him; but no: the old man continued quite naturally:—

"'Every child among us knows that. These little birds are much too weak to make the long sea journey with their own strength. This they know very well, and therefore wait for the storks and cranes and other large birds, and settle themselves upon their backs. In this way they allow themselves to be borne over the sea. The large birds submit to it willingly; for they like their little guests, who by their merry twitterings help to kill the time on the long voyage.'

"It appeared incredible to us. We called to a pair of brown Bedouin boys, pointed out the wagtails to them, and inquired:—

"'Do you know whence come these small birds?'

"'Certainly,' they answered. 'The Abu Saad (the stork) carried them over the sea.'

"At supper, in the Hôtel du Nil, I related the curious story to all present, but naturally found only unbelieving ears.

"The only one who did not laugh was the Privy Councillor Heuglin, the famous African traveller, and, excepting Brehm, the most celebrated ornithologist of our time for the birds of Africa. I turned to him after the meal, and inquired of his faith. The good royal councillor smiled in his caustic way, and with a merry twinkle remarked: 'Let the others laugh: they know nothing about it. I do not laugh, for the thing is known to me. I should have recently made mention of it in my work if I had had any strong personal proof to justify it. We must be much more careful in such things than a mere story-teller or novel-writer; we must have a proof for everything. I consider the case probable, but as yet cannot give any warrant for it.'

"My discovery, if I may so call it, I had kept to myself, even after Heuglin had thus expressed himself, and would even now maintain silence on the subject had I not recently discovered a new authority for it."

I read lately in the second edition of Petermann's great book of travels the following:—

"Prof. Roth of Munich related to me in Jerusalem that the well-known Swedish traveller, Hedenborg, made the following interesting observation on the Island of Rhodes, where he stopped. In the autumn tide, when the storks come in flocks over the sea to Rhodes, he often heard the songs of birds without being able to discover them. Once he followed a flock of storks, and as they lighted he saw small birds fly up from their backs, which in this manner had been borne over the sea. The distance prevented him from observing to which species of singing birds they belonged."

Thus wrote the famous geographer Petermann. Prof. Roth and Hedenborg and Heuglin are entirely reliable authors. This was a matter of great curiosity to me, and after I found others had made similar observations and expressed them in print, I thought they would be of no less curiosity and interest on this side of the Atlantic, and equally deserving of public notice. I hope that connoisseurs, amateurs, and experts may be excited by this to extend their observation in this line also. The instinct of animals is still, in spite of all our observations and experience,

almost a sealed book to us. By a little attention we might hear of still more curious things in this field.

New York, November 20, 1880

PHONE

### Subsidence of Land caused by Natural Brine-Springs

A THEORY has been put forward to account for the subsidence of land in the salt districts of Cheshire. It is said that, supposing the manufacturers of salt ceased to pump up the brine, it would run away to the sea, and subsidence would go on at as rapid a rate as now. Can any of the readers of NATURE tell me of any facts to substantiate such a theory, or refer me to any district where such rapid subsidence is going on, owing to the escape of natural brine-springs to the sea? Any reference to works giving information on this point will be thankfully received.

THOS. WARD

Northwich, February 15

### Chlorophyll

THE following experiment may be interesting in its bearing on the relation between chlorophyll-development and light.

If cress seed are grown for a few days in the dark on damp cotton-wool, and then, beneath the surface of water, introduced into an inverted glass jar filled with water, they may be exposed to daylight for an indefinite time without chlorophyll being developed. But the plants are not dead; for if, after a few days' exposure, the cotton-wool on which they have been grown is cut in two beneath the surface of the water, and one half, with its plants, is restored to the inverted jar of water, while the other is placed under an inverted glass jar containing air only, and then these two jars be exposed to full daylight, the plants beneath the jar containing air rapidly become green, while the others never do so.

Light therefore cannot always cause the development of chlorophyll in the etiolated leaves of living plants.

Liverpool, January 24

WILLIAM CARTER

[This is an interesting observation, but seems to need some further investigation. As shown by Sachs ("Text-book," pp. 665, 666) the formation of chlorophyll has a complicated dependence upon light. If the temperature be sufficiently high it is formed in the cotyledons of conifers and the leaves of ferns even in complete darkness. The seedlings of angiosperms require exposure to light for the production of chlorophyll, but it does not take place at low temperatures. All the visible parts of the spectrum possess the power of turning etiolated grains of chlorophyll green, although the yellow and adjoining rays are most effective. The failure of the seedlings immersed in water to become green can hardly therefore be attributed to the absorption of the heat rays. Is it possible that their water-bath keeps their temperature too low?]

### Squirrels Crossing Water

IN NATURE, vol. xxiii. p. 340, I read that Mr. Godwin-Austen never had heard of a squirrel taking to the water. As here are perhaps more readers of NATURE in Mr. Godwin-Austen's case, I take this opportunity to transcribe what Bachman related to us about that matter in the year 1839.

The northern grey and black squirrel *Sciurus leucotis*, has occasionally excited the wonder of the populace by its wandering habits and its singular and long migrations. Like the lemming, *Lemmus norvegicus*, of the Eastern Continent, it is stimulated, either from a scarcity of food or from some other inexplicable instinct, to leave its native haunts and seek for adventures or for food in some distant and, to him, unexplored portion of our land. The newspapers from the West contain frequent details of these migrations; they appear to have been more frequent in former years than at the present time. The farmers in the Western wilds regard them with sensations which may be compared to the anxious apprehensions of the Eastern nations of the flight of the devouring locust. At such periods, which usually occur in autumn, the squirrels congregate in different districts of the far North-West, and in irregular troops bend their way instinctively in an eastern direction. Mountains and cleared fields, the head-waters of lakes and broad rivers, present no unconquerable impediments. Onward they come, devouring on their way everything that is suited to a squirrel's taste, laying waste the corn and wheat-fields of the farmer; and as their numbers are thinned by the gun, the dog, and the club, others are ready to fall in the rear and fill up the ranks, till they occasion infinite mischief and call forth no empty threats of revenge.

It is often inquired how these little creatures, that on common occasions have such an instinctive dread of water, are enabled to cross broad and rapid rivers, like the Ohio and Hudson, for instance. It is usually asserted, and believed by many, that they carry to the shore a suitable piece of bark, and seizing the opportunity of a favourable breeze, seat themselves upon this substitute for a boat, hoist their broad tails as a sail, and float safely to the opposite shore. This, together with many other traits of intelligence ascribed to this species, I suspect to be apocryphal. That they do migrate at irregular and occasionally at distant periods is a fact sufficiently established; but in the only instance in which I had an opportunity of witnessing the migrations of the squirrel, it appeared to me that he was not only an unskilful sailor, but a clumsy swimmer. It was (as far as my recollection serves me of the period of early life) in the autumn of 1808 or 1809, troops of squirrels suddenly and unexpectedly made their appearance in the neighbourhood, but among the grey ones were varieties not previously seen in those parts; some were broadly striped, with yellow on the sides, and a few with a black stripe on each side, bordered with yellow or brown, resembling the stripes of the little chipping squirrel (*Tamias lysteri*). They swam the Hudson in various places between Waterford and Saratoga; those which I observed crossing the river were swimming deep and awkwardly, their bodies and tails wholly submerged; several that had been drowned were carried downward by the stream, and those which were so fortunate as to reach the opposite bank were so wet and fatigued that the boys stationed there with clubs found no difficulty in securing them alive or in killing them. Their migrations on that occasion did not, as far as I could learn, extend farther eastwardly than the mountains of Vermont; many remained in the county of Rensselaer, and it was remarked that for several years afterwards the squirrels were far more numerous than before. It is doubtful whether any ever return westwardly; but finding forests and food suited to their tastes and habits, they take up their permanent residence in their newly-explored country; there they remain and propagate their species until they are gradually thinned off by the effects of improvement and the dexterity of the sportsmen around them. (*The Magazine of Natural History*, vol. iii., new series, 1839.)

Leyden, February 16

F. A. JENTINK

### Flying-Fish

WITH reference to the letter of Mr. Pascoe in NATURE, vol. xxiii. p. 312, allow me to offer a suggestion as to the mechanical means by which the flying-fish moves when out of the water. During a voyage to India and back I took a great interest in observing the movements of these beautiful creatures by means of a powerful opera-glass; and soon came to the conclusion that a slight but rapid tremor of the pectoral fins could be seen for a few moments after the fish left the water. In very calm weather I noticed a series of little ripples on each side of the fish as it skimmed along the surface before rising for its flight, evidently caused by the wing-points tipping the water. My idea is that the flying-fish springs from the sea, and by beating the surface rapidly with its pectoral fins obtains an impetus which carries it along for some distance in the air. It then descends to the surface, and in the same manner acquires a fresh accession of speed. This process however is never repeated more than twice, though the fish does sometimes resume its flight after a moment of immersion.

R. E. TAYLOR

### THE TRANSIT OF VENUS

THE President of the Royal Society presents his compliments to the Editor of NATURE, and will be much obliged to him if he will, at as early a date as may be convenient, be so good as to give publicity to the enclosed minute of the Transit of Venus Committee.

The Royal Society, Burlington House,  
London, W., February 21

"THE Committee appointed by the Royal Society, at the request of the Government, to make arrangements for observing the Transit of Venus in 1882, would be glad to be informed whether astronomers have at their disposal, and are willing to lend, for use in the observations, 4-inch, 5-inch, or 6-inch refracting telescopes, and 10-inch or 12-inch reflectors, with equatorial mountings; also portable transits or altazimuths.