quiet ascent of air, in a slanting direction if there were any wind. Such ascending currents may be of small area, not much larger than the circles described by birds when soaring. It seems possible that the object of describing circles may be to keep within the ascending current, though it is true they sometimes describe circles when the ascending current is up a slope and not limited to a small area. If a plain much heated by the sun border on the sea, ascending currents will soon start a sea-breeze, and the cold air from the sea will soon restore the stability of the atmosphere. In summer the sea-breeze blows over the Canterbury Plains four or five days a week, beginning between 8 a.m. and noon. When delayed till near noon, the soil and lower strata of air are much heated, and as the previous nights are cool, the conditions for causing the unstable state are present. I long ago remarked that the best time to look out for soaring birds is at the commencement of the sea-breeze when it is late. Soaring is much oftener seen here in summer than in winter, and is, I believe, more common, and the species of soaring birds more numerous, and the birds larger, in hot than in cold climates—that is, in climates where the unstable state of the atmosphere is oftenest caused by the sun's heat.

Mr. Peal says: "That there are no uprushes of air I have fairly good proof in the small tufts of cotton from the *Bombyx malabaricum* which cross the field of my telescope when examining the Noga Hills at ten, twenty, or thirty miles; these are always beautifully horizontal at elevations of from 200 to 2000 feet, coming from the plains and hills to the north-east of us." The presence of light bodies at great heights seems to show that there *are* upward currents: no doubt uprushes of air at a large angle with the horizontal, and of considerable area, might be detected by a careful observer from the movements of small floating bodies, but upward slanting currents of small area might easily escape observation.

It is obvious that upward currents over a plain, caused either by variations in the velocity of the wind or by the unstable state of the atmosphere, must be almost insensible near the ground, and could not attain their full strength under a considerable height. This accounts for the fact that over plains birds do not begin to soar at less than about 200 feet. If soaring were possible in a uniform horizontal current, they would save themselves the muscular effort of rising 200 feet and over by the active use of the wings, and would begin to soar immediately on leaving the ground, as they do in currents blowing up a slope.

I have often observed gulls with extended motionless wings following a steamer in the same relative position for several minutes. In every case it was clear that they used the current diverted upwards by the hull. Before the upward energy of this current is exhausted, a fast steamer has gone a good many yards, so that a bird is supported at some distance astern. Also an upward current of considerable strength would flow off the mizen sail of a ship sailing near the wind and leaning over.

Christchurch, N.Z. A. C. BAINES.

Rain-making in Florida in the Fifties.

THE article on "Rain-making in Texas" (NATURE, p. 473) recalled to my memory a passage of Dr. Th. Reye's book ("Wirbelstürme, Tornados, &c.," Hanover, 1872), in which (at p. 12 and following) the author in question translates quotations from J. P. Espy's "Second and Third Report on Meteorology, 1851, auf Befehl des Senates der Union gedrukt" (Reye's note at his p. 235; quoting also fourth Report, 1857). The facts related were observed by the surveying officers George and Alexander Mackay. They (in Florida) had at their disposal great quantities of rushes (saw-grass), which they set in flame, and the huge conflagrations were invariably followed by rain.

September 22. G. P.

A Dog Story.

THE following dog story may interest your readers.

As I went to the train one morning, I saw a brown retriever dog coming full speed with a letter in his mouth. He went straight to the mural letter box. The postman had just cleared the box, and was about 20 or 30 yards off when the dog arrived. Seeing him, the sagacious animal went after him, and had the letter transferred to the bag. He then walked home quietly.

Putney, September 23. JOHN BELL.

SOME NOTES ON THE FRANKFORT INTERNATIONAL ELECTRICAL EXHIBITION.[1]

II.

A Page of Modern History.

ELECTRIC transmission of power to great distances bids fair in the near future to change the whole commerce of the world, and yet the history of its development is all comprised within the last fourteen years. In a long paper read in the early part of 1877 before the Institution of Civil Engineers, "On the Transmission of Power to a Distance," the author, Prof. Henry Robinson (now the engineer to various electrical companies), does not even suggest the possibility of employing electricity for this purpose. So that in the discussion Sir William Siemens remarked, "He might also refer to another method of transmitting power to a distance, which did not seem to have occurred to the author, perhaps because it was of recent date, viz. by electric conductors."

A week later, Sir W. Siemens, in his Presidential address to the Iron and Steel Institute, throws out the idea of utilizing the power wasted in the Falls of Niagara; and after referring to the use of high-pressure water mains and quick-working steel ropes for transmitting power over one or two miles, he says, "Time will probably reveal to us effectual means of carrying power to great distances, but I cannot refrain from alluding to one which is, in my opinion, worthy of consideration—namely, the electrical conductor." And he adds, "A copper rod three inches in diameter would be capable of transmitting 1000 horse-power at a distance of, say, thirty miles."

The use of the electric current for the transmission of power over considerable distances was, therefore, fully present in the mind of Sir William Siemens in 1877, but not apparently the employment of the high potential differences which are absolutely necessary to make such a transmission commercially possible. For a copper rod of three inches diameter, such as he speaks of, has a cross-section of nearly seven square inches, and could carry some 5000 or 6000 amperes without undue heating. Therefore, even when the problem of transmitting 1000 horse-power over thirty miles was in question, he did not contemplate, apparently, using a pressure of more than about 100 volts.

At the commencement of the following year, 1878, in his Presidential address to the Society of Telegraph Engineers, he refers to his previous statement, and adds, "Experiments have since been made with a view to ascertain the percentage of power that may be utilized at a distance." The result obtained, he says, is that "over 40 per cent. of power expended at the distant place may be recovered"; but Sir William adds, in reference to the 60 per cent. loss, "This amount of loss seems considerable, and would be still greater if the conductor through which the power were transmitted were of great length."

The length of the conductor employed in the above experiment is not given, but its approximate length, as well as what is understood by "great length," may be gathered from the context; for Sir William goes on to consider the problem "of distributing the power of a steam-engine of, say, 100 horse-power to twenty stations within a circle of a mile diameter"; and although the distance to which it is proposed to transmit the power is only one mile, he assumes that the loss is what was found in the above experiment, viz. 60 per cent. He further adds, "The size of the conductor necessary to convey the effect produced at each station need not exceed half an inch in external diameter." Clearly, then, as the power proposed to be transmitted by the half-inch conductor to each station one mile distant was only 5 horse, there was no idea of using

[1] Continued from p. 497.