

neath the balloon and near the rear, and it is kept in position at the bottom by a horizontal yard 19 ft. 8 in long, turning round a pivot on its forward extremity. The height of this sail is 16 ft. 4 in., and its surface 161 square feet. Two ropes for working the rudder extend forward to the seat of the steerer, who has before him a compass fixed to the car, the central part of which is large enough to carry a crew of 14 men. The forward and aft parts are formed with a framing of bamboo.

The screw is carried by the car. The shaft can be easily lifted from the rear, and thrown upon a forward support, so that no damage can arise to it, either on departure or arrival. The screw is driven by four men, or by eight men working at a capstan. The gas-escape valves, of which there are two, are placed at the top of the balloon, immediately over the pendent tubes, before spoken of, and through which the cords for working the valves pass into the car. The balloon is made of white silk, weighing about 7 oz. per square yard, with seven thicknesses of caoutchouc superimposed; the envelope also is of white silk. The joints are so arranged that they are stronger than the material itself. On the inner face, three coats of varnish were applied, formed of gelatine, glycerine, pyroligneous acid, and of tannin. Such a varnish is impermeable to hydrogen.

The balloon, properly called, weighs about half a ton, and the total weight of the whole machine is 1.753 tons. The crew, luggage, provisions, instruments, &c., weigh 1.446 tons. Of ballast two-thirds of a ton are taken. Collectively, these figures give 3.85 tons, equal to the full ascensional power of the balloon at the ground level.

M. Dupuy de Lôme had calculated that, with a speed of 5 miles an hour, the resistance of the balloon in the direction of its main axis, would be 24.26 lb., and that the speed of the screw should be 21 revolutions per minute to overcome this resistance. This speed could be easily obtained by four men working for half an hour, and being relieved at the end of that time by four others; with the eight men working together at a capstan 27 or 28 revolutions could be obtained, which would give a speed of about 8 miles an hour.

The stability assured by the system of suspension adopted, is such that even under the maximum effort of eight men working the screw, the equilibrium was only disturbed half a degree, and a man, in walking from one end of the car to the other, only affected it by half a degree.

The apparatus for producing the hydrogen by the action of diluted sulphuric acid and iron turnings, consists of two batteries of 40 casks, each producing at one operation lasting three hours, 5,375 cubic feet of hydrogen, and working alternately.

At the trial trip three days were required to fill the balloon. It was ready on the 1st of February, in the evening, and it was kept inflated all night, but at two in the morning it was allowed to ascend sufficiently to attach the car, rudder, fan, connexions, &c. The loss of gas during the night had been inappreciable, and previous experiments showed that the varnished silk was perfectly reliable. The wind had risen, and the meteorological bulletins were far from being encouraging. However, the inventor decided to make the ascent, and after having repaired a slight damage, he left the ground at 1 p.m.

There were about two-thirds of a ton of ballast on board, and the balloon was in perfect equilibrium. Three hundred and fifty pounds of ballast were thrown out, and the ascending force thus produced carried the balloon up rapidly.

A strong wind was blowing from the south. A few minutes after the departure, the shaft of the screw was lowered upon its bearing, and was started by the eight men together, slowly at first, and then with an increased speed. The rudder was first moved to the right, then to the left, and then was adjusted in order to ascertain how far its influence would be felt by the balloon. When the screw was set in motion, the effect of the rudder was immediately felt, as desired, proving that the balloon had acquired a sufficient speed with relation to the surrounding air.

The experimental trips had a threefold purpose; to ascertain the stability of the balloon, the relative speed that could be obtained, and the manner in which it obeyed the rudder, either on a fixed course, or in tacking. An anemometer previously regulated gave the relative speed of the balloon; a compass attached to the car indicated the direction of movement. To measure the course followed in relation to the ground, a planchette was fixed to the side of the compass parallel to the vertical plane, and in the direction of the true north. The field of the planchette was painted black, the part forming a vertical surface being white. By this arrangement it was very easy to obtain a visual ray in a vertical plane, the verticality of the planchette being assured by the mode in which the compass was hung. By observing any clearly defined object on the ground, passing beneath the observer, and then by turning the planchette in the direction of the same object, when it was shifted from the vertical plane, the direction of the route followed by the balloon could be read direct off the compass.

The same observation gives the speed of the balloon, the height being observed by a barometer.

Between 1.15 p.m. and 2.35 p.m. eight observations were taken of the height of the balloon, of the temperature, of the route measured on the ground in relation to the magnetic meridian, four times with the screw not working, and four times whilst it was being driven by eight men. At 2.35 p.m. it was resolved to descend, and at 3 p.m. the balloon touched ground at Mondécourt, exactly at the village indicated on the map of the route laid out beforehand from the calculated deductions of direction and of speed.

The landing was effected with perfect success and without accident, in spite of the force of the wind. M. Dupuy de Lôme arrives at the following conclusions from the results of the trial. That the stability of the balloon was perfect, that it manifested no signs of oscillation under the action of the eight men working the screw, and that the shifting of the weight in the car produced no sensible movement. The vertical axis was only shifted—under the most trying conditions—a small part of a degree, and longitudinally there was no change.

In comparing the direction of the balloon drifting freely before the wind, with the direction given to it when the screw was in operation, it was found that the resultant made with the normal direction an angle of 12°. It is stated also that the speed given to the balloon, with 27½ revolutions of the screw, was 6½ miles an hour, whilst the rate due to the wind alone was from 26 to 37 miles an hour.

With the same weight for a mechanical motor as that re-

quired by the eight men for driving the screw, a force ten times as great might have been obtained, and the speed due to the balloon under such improved conditions would be 13.60 miles per hour. With such a power it would apparently be practicable not only to make a considerable angle with the wind's direction, but also under favourable circumstances to shape the course of the balloon according to will.

EXPERIENCE OF AN AMERICAN TRAVELLER.—Mr. Brooks, of the *New York Express*, has been travelling in the East, and has done India, China, and Japan. Wherever he goes he seems to have been forcibly struck with the presence of British authority, and the evidences of its power. Coming to Aden, he exclaims; *Encore Anglais! Toujours Anglais!* England for ever and ever and ever! There is the British flag once more on the top of these volcanic crags of Aden! There is the British (white) regiment, and there is another (coffee coloured) regiment; and there is a battalion of British artillery, a fort, &c., &c. Is there no end of England? There is a British steam-engine, condensing ocean salt water for these poor, exiled soldiers to drink, and there is a British steam machine, making ice to cool off the wretches when the volcanic sun is roasting. A few hours' steam beyond this is the little British island of Perim, in the mouth of the Straits of Babel-mandeb, seized by the English, and covered with British guns, to command the entrance to and exit from the Red Sea. Aden, and this whole country round about here, looks as if it had never been finished; never covered with grass, never adorned with trees, but left, as laid out, for the sun to roast and bake, with all who would venture to dwell thereon. Nevertheless, the British have made Aden habitable. They have laid out excellent roads. They have re-made the ancient tanks, where once water was, but not a drop now. They have tempted over the Somali—a bright sort of darkies, without woolly heads—from the African coast, to work for them; and they have tempted the Arabs from the interior to come in on their camels, and sell them notions of many kinds.

REFORMERS AT DINNER.—Warner, in his "Back-Log Studies," in *Scribner's* for April, makes one of his characters get off the following delightful bit of satire on a certain class of moral reformers:—"I attended a protracted convention of reformers of a certain evil once, and had the pleasure of taking dinner with a tableful of them. It was one of those country dinners accompanied with green tea. Every one disagreed with every one else, and you wouldn't wonder at it if you had seen them. They were people with whom good food wouldn't agree. George Thompson was expected at the convention, and I remember that there was almost a cordiality in the talk about him, until one sallow brother casually mentioned that George took snuff,—when a chorus of deprecatory groans went up from the table. One long-faced maiden in spectacles, with purple ribbons in her hair, who drank five cups of tea by my count, declared that she was perfectly disgusted, and didn't want to hear him speak. In the course of the meal the talk ran upon the discipline of children, and how to administer punishment. I was quite taken by the remark of a thin, dyspeptic man, who summed up the matter by growling out in a harsh, deep bass voice, "Punish'em in love!" It sounded as if he had said, "Shoot'em on the spot."

A SOUTH WIND LONGING.

Here is something timely and delicious from Warner's "Back-Log Studies," in the forthcoming April number of *Scribner's*:

Perhaps the influence of the four great winds on character is only a fancied one; but it is evident on temperament, which is not altogether a matter of temperature, although the good old deacon used to say, in his humble, simple way, that his third wife was a very good woman, but her "temperature was very different from that of the other two." The north wind is full of courage, and puts the stamina of endurance into a man, and it probably would into a woman too if there were a series of resolutions passed to that effect. The west wind is hopeful; it has promise and adventure in it, and is, except to Atlantic voyagers America-bound, the best wind that ever blew. The east wind is peevishness; it is mental rheumatism and grumbling, and curls one up in the chimney-corner like a cat. And if the chimney ever smokes, it smokes when the wind sits in that quarter. The south wind is full of longing and unrest, of effeminate suggestions, of luxurious ease, and perhaps we might say of modern poetry,—at any rate, modern poetry needs a change of air. I am not sure but the south is the most powerful of the winds, because of its sweet persuasiveness. Nothing so stirs the blood in spring, when it comes up out of the tropical latitude; it makes men "longen to gon on pilgrimages."

I did intend to insert here a little poem (as it is quite proper to do in an essay) on the south wind, composed by The Young Lady Staying with Us, beginning:—

Out of a drifting southern cloud
My soul heard the night-bird cry—

but it never got any further than this. The Young Lady said it was exceedingly difficult to write the next two lines, because not only rhyme but meaning had to be procured. And this is true; anybody can write first lines, and that is probably the reason we have so many poems which seem to have been begun in just this way, that is, with a south-wind-longing without any thought in it, and it is very fortunate when there is not wind enough to finish them. This emotional poem, if I may so call it, was begun after Herbert went away. I liked it, and thought it was what is called "suggestive," although I did not understand it, especially what the night-bird was; and I am afraid I hurt the Young Lady's feelings by asking her if she meant Herbert by the "night-bird,"—a very absurd suggestion about two unsentimental people. She said, "Nonsense;" but she afterwards told The Mistress that there were emotions that one could never put into words without the danger of being ridiculous; a profound truth. And yet I should not like to say that there is not a tender loneliness in love that can get comfort out of a night-bird in a cloud, if there be such a thing. Analysis is the death of sentiment.

AN EDITORIAL BRUTUS.—Hear us for our debts, and get ready, that you may pay; trust us, we have need, as you have long been trusted; acknowledge your indebtedness, and dive into your pockets that you may promptly

fork out. If there be any among you—one single patron—that don't owe us something, then to him we say, step aside, consider yourself a gentleman. If the rest wish to know why we dun them, this is our answer: Not that we care about ourselves, but our creditors do. Would you rather that we went to gaol, and you go free, then pay your debts and keep us moving. As we agreed, we have worked for you; as we contracted, we have furnished the paper to you; but as you don't pay us, we dun you. Here are agreements for job work, contracts for subscriptions, promises for long credit, and duns for deferred payment.

Who is there so ignorant that he don't take a paper?
If any, he need not speak, for we don't mean him.
Who is there so green that he don't advertise?
If any, let him slide, he ain't the chap either.
Who is there so mean that he don't pay the printer?
If any, let him speak, for he's the man we're after.

"FORBIDDING TO MARRY."—Recently an Austrian settler in St. Gall who had resolved to be bound in the bonds of wedlock with a Swiss damsel belonging to the Reformed Church, requested his native parish, Tartsch, to send him the requisite certificate of approval. The parochial authorities, however, informed him in reply that "they could give no marriage consent; if the wooer could find no partner in Switzerland of his own faith he should come to the Tyrol, where there are still enough Catholics of the fair sex able and willing to form matrimonial engagements, and in that case he would find no difficulty in obtaining the approval of the parish."

Readers may remember the shower of prophecies with which Continental journals received the news of the success of the Suez Canal. Great Britain was to lose first her commerce, then her commercial navy, then her supremacy at sea, and finally her Indian possessions. The Mediterranean States were to recover their long-lost Oriental trade, and M. Lesseps was to be the avenger of a hundred sea-board cities ruined by the avarice of England. Well, here is the official return of the tonnage and nationality of the ships passing through the Canal in 1871:—British, 546,621; French, 91,841; Austrian, 43,113; Italian, 29,400; Turkish, 16,959; Egyptian, 13,394; Dutch, 6,711; Russian, 4,820; Belgian, 4,400; American, 4,170; German, 3,520; Spanish, 3,157; Norwegian, 1,316; Portuguese, 919; Danish, 660; Burmanian, 408. Total, 771,409.

Mr. G. H. Lewes writes the following of Dickens:—"One night, after one of his readings, he dreamt that he was in a room where every one was dressed in scarlet. (The probable origin of this was the mass of scarlet opera-cloaks worn by the ladies among the audience having left a sort of afterglow on his retina.) He stumbled against a lady standing with her back towards him. As he apologised, she turned her head and said, quite unprovoked, 'My name is Napier.' The face was one perfectly unknown to him, nor did he know anyone named Napier. Two days after, he had another reading in the same town, and before it began, a lady friend came into the waiting-room accompanied by an unknown lady in a scarlet opera-cloak, 'who,' said his friend, 'is very desirous of being introduced.' 'Not Miss Napier?' he jokingly inquired. 'Yes, Miss Napier.' Although the face of his dream-lady was not the face of this Miss Napier, the coincidence of the scarlet cloak and the name was striking."

Apropos of the Royal Thanksgiving, in Field-Marshal Viscount Combermere's *Memoirs* we read that, at the coronation of George IV., the common councilmen appointed to meet the procession at Temple Bar, mounted themselves on horses hired at Astley's Circus—animals trained, it was hoped, to acquiesce in any decorative pageantry. Secure as they hoped on their red velvet embroidered saddles, the Corporation awaited the advent of Royalty. It came—but, alas! accompanied by certain musical strains to which the fourfooted performers of Astley's were not trained to dance equine quadrilles of elaborate evolutions. A popular air started the neighing votaries of Terpsichore, and *en avant deux, chassez croisez*, unseated some cavaliers, while the released horses of others, accompanied by the unwilling riders of the rest, completed the figure, unchecked by active bystanders, or the imprecations of their angry riders. The *grande ronde*, however, soon dispersed all interference, scattered the crowd, and seated the persistent equestrians in the mud, from which they were extricated with damaged robes, cracked garments, and sprains and bruises—prolonged mementoes of a day's horsemanship in honour of Royalty!

A traveller once lost on a Yorkshire moor, after desperately pursuing a rather hopeless track for some time, had the good fortune to meet a member of a shrewd and plain-speaking sect. "This is the way to York, is it not?" said the traveller.

To which the other replied:
"Friend, first thou tellest me a lie, and then thou askest a question."

The Emperor of China is going to be married, and has imported a pair of elephants for the ceremony. His bride's preparations are even more *grandiose*. For three years the looms of Nankin, Hangchow, and Canton have been making the silks and satins for her trousseau, which will cost half a million sterling. The bridegroom, personating the sun, goes forth in a car with his elephants, while his lady-love is borne in a palanquin formed entirely of strings of pearls. What will the "Women's Dress Association" say to this?

Recently a strange comedy, entitled "A Misunderstanding," was produced at Genoa. The author, Luigi Marchese, had composed it as early as 1811, as a literary curiosity, for the whole work does not contain the letter "r." It was never brought out on the stage until the "Society of Authors" of Genoa, of which Marchese himself had been a member, induced the manager of the theatre to have it performed. It met with a brilliant success.

A lady has found the principle which differentiates the finite from the infinite. She asks the Academy of Sciences a million sterling for the secret.