

mixed in a stout test tube and confined by a greased cork. This was placed upright on a little wooden stand, and kept in its place by a brass clip. About an inch of magnesium ribbon was suspended in a small tin shade by means of a wire clip. The magnesium being placed near the tube and lighted, the gases united with a report, jerking the cork to the ceiling, but in no case breaking the tube. W.

A NEW BUBALE, FROM ABYSSINIA

THE British Museum has just received a series of skins of a new Bubale from Abyssinia called Tora. It is like the Hartibeest for having a white patch on the rump, and white inside the ears, but it is without any black on the face or on the outer side of the limbs. It is of a bright pale bay colour, with black tuft on the tail, and the horns are much more slender than in the Hartibeest. I propose to call it *Alcephalus tora*.

J. E. GREY

FROM AMERICA TO ENGLAND BY BALLOON

THERE appears every likelihood that before the end of the year a feat will be attempted which seems to have been first seriously proposed thirty years ago by Prof. Wise, an American aeronaut, who is now making preparations to cross the Atlantic to England in a monster balloon. The American correspondent of the *Standard* has given full details of the elaborate construction of this balloon, and states the reasons which inspire Prof. Wise with unhesitating confidence that he will be able successfully to accomplish his aerial voyage.

The balloon, when completed, will be 160 ft. high, and the globe will be over 100 ft. in diameter. It will be able to lift from the ground, including its own weight, 14,000 pounds, and will have a net carrying capacity for passengers and ballast of 6,900 pounds. It will contain 600,000 cubic feet of illuminating gas, though only 400,000 feet will be put into it to allow for expansion in the higher regions of the atmosphere. The other details of construction are most elaborate, and every precaution seems to be taken to insure success and to provide for the safety of the four persons who are bold enough to risk their lives to gratify their curiosity and endeavour to increase the sum of human knowledge. The four voyagers will be Prof. Wise, Mr. Donaldson, an agent of the *Daily Graphic*, and a skilled mariner—for a copper-fastened cedar life-boat, 22 ft. long and 4½ ft. beam, forms part of the appurtenances.

The hypothesis on which the enterprise is projected, is that there is a prevailing east-going current of air at an attainable elevation, in which a balloon can pass eastward from the American continent to Europe. The current is believed to be half-a-mile or more above the surface of the earth, and to move at the rate of from 50 to 150 miles an hour. It was a knowledge of this current that made Mr. Charles Green, the celebrated English aeronaut, say, in 1840, that he should start from America rather than from England to traverse the Atlantic in a balloon. The cause of the current is less definitely known than the fact. A French *savant* attributes it to "a decrease of participation in the rapidity of the rotary motion of the earth." Prof. Wise believes that this upper current of air, in the temperate zones, moves from west to east, because of the mingling of the south-west and north-west trade-winds in their circuits, in accordance with the laws of temperature and the aerial motion of the earth. The two currents, he believes, slide over each other, and the balloonist who knows his business can strike such a point as will carry him eastward, as it were, between them. That is to say, the zone lying between the 35th and 36th parallels is "a nodal zone," in which the south-west and north-west winds induce an intermediate current which moves nearly

due east. In this highway the motion is about a hundred miles an hour.

The theory of the east-going current seems to be pretty well admitted. The direct experience which bears most strongly upon it is limited. There are three memorable balloon trips which are noteworthy. The current seems to set persistently eastward, deflected slightly towards the north by the rush of equatorial air towards the north. Prof. Wise, in 1859, in his trip from St. Louis to Jefferson county, in the State of New York, found the current almost due east; he travelled in balloon 1,156 miles in 19 hours. The speed here was only 61 miles an hour; but this can be accounted for. The great balloon voyage made by Nadar from Paris to Hanover was almost due eastward. This journey of 600 miles was made in about six hours—about a hundred miles an hour, although it was over the uneven surface of the Continent, diversified by hill, vale, stream, and so on. In the trip of Mr. Green, from London to Wellburg, in Nassau, the journey was about 600 miles, and was performed at the rate of about a hundred miles an hour, and there were the British Channel and other irregularities in the way of smooth sailing.

On the other hand, however, Mr. Glaisher in his experiments, in consequence of what Mr. Green had stated with regard to the constant prevalence of a current from the west, paid special attention to this point, and in his reports to the British Association in 1863 and 1864,* collected together the different directions in which the balloon had moved at different heights in his several ascents. From these it appears that the direction of the wind was quite as capricious at heights exceeding 5,000 ft. as it is on the surface of the earth. In Mr. Glaisher's winter ascents he did generally meet with a current from the south-west, certainly; but the number of such ascents was not great, and they were not to sufficient elevations to afford very trustworthy results. It is certain, however, that if there existed over England anything like a current of air constant in direction, it must have manifested itself distinctly in the course of Mr. Glaisher's thirty ascents, in all of which the direction of the wind at different elevations was a subject of careful observation.

Again, Prof. Newton of Yale College has written a letter to a recent number of the *Daily Graphic*, in which, from the observed behaviour of the luminous trains sometimes left by the brighter meteors at from forty to seventy miles high, he draws certain inferences which do not seem altogether favourable to Prof. Wise's theories. What these inferences are will be seen from the conclusion of his letter:—

"We have, then, at the *bottom* of the atmosphere, inconstant winds. We have just above us strata of air moving in diverse directions, for the lower clouds may move one way, the upper clouds another, while at the surface the winds may perhaps blow in a third. At two islands at short distances from each other we often have different winds.

"Again, we have for air near the top of the atmosphere, at least so high up that the density is exceedingly small, this fact, that lines (usually inclined to the horizon) only five or ten miles long almost always have their ends in air that is moving in different directions.

"Between the highest cloud and the lowest meteor trains lies an unknown region. It may be that here are uniform westerly winds. In the absence of direct observation neither this nor the contrary may be asserted. But it seems to me more rational to suppose that the complex system of currents at the bottom of the atmosphere is in direct connection with that at the top, and that there is a like complex system of currents and winds throughout the intermediate space. Of course, the general drifting of the air in the temperate zone to the east is unquestioned.

Prof. Joseph Henry, of the Smithsonian Institution,

* British Association Reports, 1863, p. 507, and 1864, p. 313.