

## UP IN A BALLOON, BOYS!

By J. M. BACON.

NOWADAYS, when the paths of knowledge are so well trod, when those who seek after new discoveries must wander far and on difficult tracks, it is strange indeed to find a vast field, and one lying to our very hands, neglected and almost unexplored, though offering ample promise of reward to the investigator.

Of the great oceans that wash our shores man is never tired of learning and seeking, but of the far greater ocean of air above us how little comparatively is known. Sixty years ago, when it first began to be recognised that ballooning opened up facilities for research as yet undreamed of, ascents for scientific purposes were made in several places, and later, under the direction of Glaisher, Coxwell, and others, regularly organised experiments with balloons were carried out with much success, leading to valuable results and pointing the way to further investigation. But, curiously enough, of late years the work thus ably commenced has been allowed to drop almost entirely, and though on the Continent and in America more has been attempted, yet, in our own country, ballooning, with its scientific possibilities, has for the most part degenerated into mere pastime and entertainment.

The work that aerial research opens up is vast and various. Acoustics alone offers a wide field; for instance, the question of how far intensity of sound is influenced by altitude, presence of cloud, etc., the velocity of sound between earth and upper strata, the pitch and audibility of instruments taken aloft. The quiet of the upper regions, too, is admirably suited for experimenting on those much-vexed points, the comparison of sounds heard

down and across the wind, and the capabilities of various forms of speaking-trumpets, horns, bells, gongs, hooters, syrens, fog-signals, and the like; a question of the highest importance to us all as bearing on the great point of signals at sea, on lighthouses and light-ships.

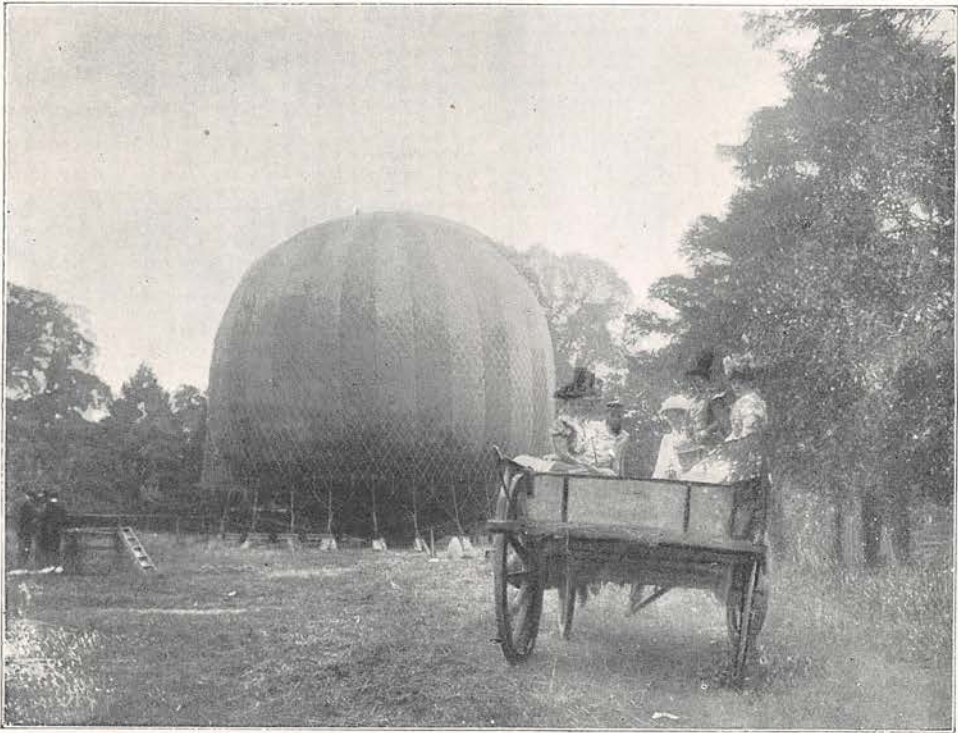
Observations, too, of value to the astronomer, may be made during a high ascent. Conspicuous stars may be looked for before sunset; the spectrum may be photographed aloft and below, and the results carefully compared. It has lately been asserted that markings on the surface of Venus have been seen with very low telescopic power; in the clear air aloft, away from disturbing terrestrial influences, this assertion could be verified or disproved. More important still, it is quite within the bounds of possibility that at a great height, where the sky is darker and there is less diffused light, the astronomer might be able to accomplish what he has so often wished and vainly tried to do—photograph the Corona without a total eclipse.

In addition to all these experiments there are many others, meteorological, electrical, photographic, etc., for which a balloon is particularly adapted. The field for research is certainly a wide one, and it is with a view of endeavouring to throw light upon these various points that a series of scientific ascents are now in progress. The aeronautical party and prime movers in this enterprise are Dr. R. Lachlan, late Fellow of Trinity College, Cambridge, well known in scientific circles as one of our leading mathematicians, and the Rev. J. M. Bacon, F.R.A.S., whose name will be remembered

in association with one of the late successful Indian Eclipse Expeditions. These gentlemen are ably supported in their work, being assisted by the unrivalled mechanical skill of Messrs. J. N. and Nevil Maskelyne, and having, moreover, the help or advice of such scientific pioneers as Lord Kelvin, Sir W. Huggins, Professor J. J. Thomson, and others.

The first of these ascents took place

the ground was manipulated by the Messrs. Maskelyne and Captain R. Lynn-Smart, who, on behalf of the Cotton-Powder Company, most courteously lent his aid for comparison of the relative carrying powers of gunpowder and guncotton and other determinations. Mr. H. H. Turner, the Savilian Professor of Astronomy at Oxford, was also present and rendered much assistance. The various experiments,



FILLING THE BALLOON.

at Newbury in the grounds of Shaw House, of historic fame, and in the presence of a couple of thousand spectators. Conditions were not altogether favourable, for the sky was murky and the distance obscured, so the experiments tried were chiefly of an acoustic nature, for which the stillness of the day was well suited. The balloon was one of Messrs. C. G. Spencer and Sons' newest, and Mr. Percival Spencer conducted the ascent, which was made by Dr. Lachlan. Mr. Bacon, and Mr. Henry Eyre. The apparatus on

which had been previously well rehearsed, commenced directly the balloon left the earth. The ascending party took with them special receivers of novel construction, which the event proved to be eminently well suited for catching even the faintest sounds from below. Chronometers in exact accord were used both in the car and on the ground, and the various events were timed to take place at carefully regulated intervals.

The power of the human voice alone was first tested through a nine-foot



THE BALLOON FILLED.

speaking - trumpet ; next, various wind instruments were sounded singly, in unison, and in discord. When the balloon reached greater altitudes steam-hooters and syrens replaced the feebler horns and trumpets, and a Volunteer party fired their rifles in volley and in sequence. Finally, the explosion of several pounds of gunpowder and the terrific report of the cotton-powder cartridges shook every window in the neighbourhood, and sent faint echoes to the balloon then fading from sight in the distance.

It is understood that the result of all these sound trials has been both interesting and satisfactory, and when carefully reduced, and in conjunction with others yet to follow, may prove of very real value.

Nor were the experiments conducted from the car entirely acoustic. An apparatus for determining the presence of bacteria in the upper air was successfully manipulated. Meteorological and electrical measurements were recorded. Professor Aitkens's "dust counter" was made to show the presence of much matter in suspension even at the greatest height attained, and even a kinematograph picture of the view from a rising balloon was secured in a previous captive ascent.

It is to be hoped that the observations thus happily inaugurated will be continued at the Crystal Palace and elsewhere as time and opportunity may allow.



Professor H. H. Turner. Dr. R. Lachlan.  
SCIENTISTS IN THE CAR.