AËRIAL NAVIGATION. A PRACTICAL HANDBOOK ON THE CONSTRUCTION OF DIRIGIBLE BALLOONS, AËROSTATS, AËROPLANES, AND AËROMOTORS

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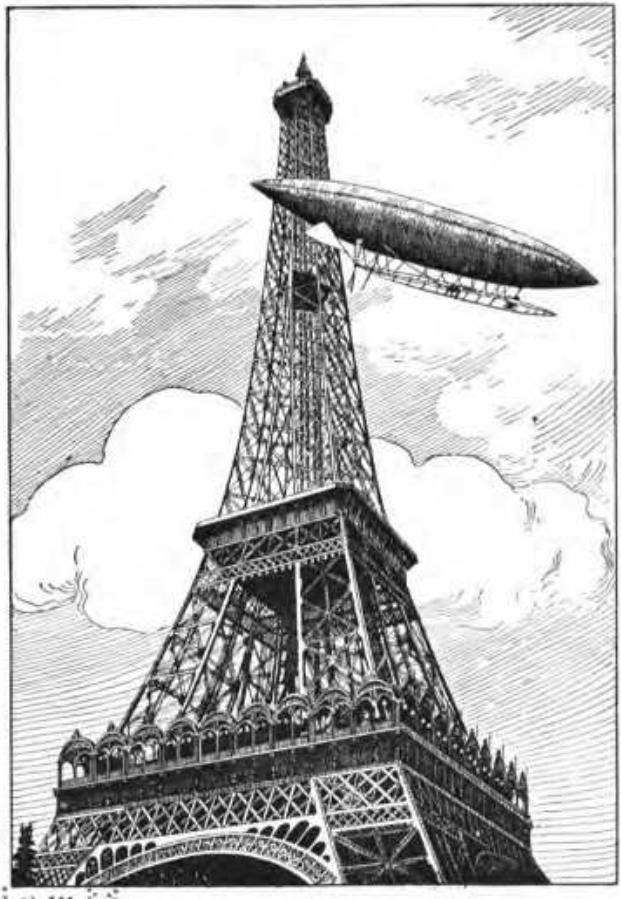

FIG. 105. AËROSTAT ROUNDING THE EIFFEL TOWER (p. 146).

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A PRACTICAL HANDBOOK

ON THE CONSTRUCTION OF DIRIGIBLE BALLOONS,

AËROSTATS, AËROPLANES, AND AËROMOTORS

BY

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PREFACE.

THE practical development of aërial navigation is slow relatively to other modes of locomotion. The chief cause lies in the fact that any disaster is nearly sure to be fatal to human life, and although ocean navigation is attended by a certain amount of danger to both life and property, the risk is minimised by the adaptability of boats, lifebuoys, and a considerable portion of the *débris* incidental to shipwrecks, to float upon the surface of the water and sustain the survivors. It is true that in many cases, in the present stage of rapid ocean transit, such life-saving appliances are not always available or successful, but the existence of them engenders a degree of confidence which has as yet no counterpart in aërial navigation.

There have been disasters in this enterprise—as there always will be, to the end of time, whenever man seeks to conquer the unknown. In olden times, when to the adventurous Phœnician navigator the unknown waste beyond the Pillars of Hercules was the edge of a veritable Plutonian abyss, men went forth and returned no more. And the wise City Fathers at the gates of Tyre prophesied this and that sad fate to the blasphemous seeker of the secrets of the gods. How many

stark ribs and frames of erstwhile stout galleys strewed the Ionian coasts ere the Pillars were won and the far-off Casseritides reached. No Lloyd's agencies, no shipping news, then existed to supply the record; but we may feel assured that the City Fathers expressed no astonishment, but accepted the fact literally when once accomplished. The ocean greyhound is now an every-day sight, and the air-ship will soon cease to cause astonishment.

Since recent successful experiments and commercial enterprise have combined to render aërial navigation a prominent feature in progressive science, no apology is needed in introducing the present volume, which treats of the laws governing flight as exemplified by animals, birds, and insects, and of the construction of dirigible balloons, aërostats, aëroplanes, and aëromotors to be synthetically deduced therefrom and illustrated by various types already made.

We admit the air-ship in practice to combine the aërostat, aëroplane, and mechanical propeller, and to be absolutely safe, but the exact proportions each must bear to the others is not within the province of a work the aim of which is to convey elementary instruction in a popular manner; and this also applies to the aëroplane, the term here being applied in a broad sense. When the area of the plane is subdivided into aërocurves, or reactionary surfaces of which the curvilinear construction is based upon the cissoid curve, the elaborate calculations governing this would be out of place. And in a similar manner we do not go into the intricate problems relating to the screw propeller in air, and its

reaction upon curved aëroplanes, but have endeavoured to present in readable fashion a thoroughly practical basis upon which the air-ship may be constructed and understood in its action.

From a commercial point of view the advantages to be derived from any increased speed due to aërial navigation as against other modes of locomotion are not immediately apparent, except for light postal services. The aëromotor or air-ship will always be of great value in naval and military tactics, and for Ordnance surveying purposes, still with exactly the same effect that applies to seagoing navies and war-craft generally—that is, each Power, whilst proceeding upon the defined primary lines of construction, will strive to possess the best aërial navy, and this spirit of competition will be good for inventors and for commerce generally. Aërial navigation can only effect a revolution in international matters by the discovery and application of the neutralisation and regulation of the force of gravity. Given this as a secret under the control of a peaceful and highly civilised Power, and war and its concomitant horrors would be a story of the past.

The true co-ordination of physical phenomena brings creative imagination to bear upon the dead side of the world turned to us, and causes us to comprehend the pulsations of its real life beyond the screen of materialism. So co-ordinates light, electricity, magnetism, and each new imaginative construction brings us nearer to the conception of a living universe. As an instance, we may take the now well-known "cathode rays," where force takes material embodiment, and we see that all apparently

quiescent matter is really energy at work in various forms; and again, there are the hitherto undeveloped mysteries of radiation.

The attraction of gravitation up to the present time has not co-ordinated with other forces, and there may yet be a mode of applying known forces in aërostation in this wide and all but untrodden field of research.

FREDK. WALKER.

OXFORD, *2nd June* 1902.

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