

Chapter VIII., by O. Lilienthal, *Artificial Flight*. We would give this chapter in full, had not the editor reserved the right of translation, reprinting even with a statement of the source not being permitted.

Herr Lilienthal gives his reasons for believing that "individual flight"—i.e., that of one man alone—is the proper way to begin, so as to limit the size of the apparatus and learn the tricks of the wind. Then he gives a *résumé* of the facts brought out by his experiments, concerning air reactions on wings provided with a slightly arched profile, with diagrams of the resolution of forces and a table of "normal and tangential" pressures at various angles of incidence. These diagrams and table present the peculiarity that the pressure is said not to be normal to the surface, against the belief of all physicists hitherto, that Herr Lilienthal shows these forces as applied at the centre of figure, instead of at the centre of pressure, and that he deduces the force from what he calls the normal and the tangential pressures, instead of first ascertaining the total pressure and then resolving it into the "lift" and "drift" consequent upon the angle of incidence, as has hitherto been done for planes.

The most remarkable results, however, appear from the table, which shows, for arched surfaces, that at angles of incidence exceeding 3° , the resisting component of the air pressure, the "drift" becomes negative, and acts as a propelling component, which at an angle of 15° becomes equal to one-twelfth of the lift, and does not disappear entirely until 30° is reached—a sort of "aspiration," as it were. This is Herr Lilienthal's great discovery, and holds out good hope that man may succeed in sailing the air; for he says that "A current of air rising at an upward trend of 3° (5 per cent.) above the horizontal, acts upon a horizontal arched surface with a strong uplift, without driving it back, and is the principal reason for the soaring of birds."

After giving a numerical example of the method of calculating the forces by his formula, Herr Lilienthal gives directions for practical flight, a sketch of his apparatus and experiments, and in an advertisement in the back of the book he offers to sell duplicates of his apparatus to amateurs.