

remains the most important instrument of the wood-wind group, and possesses the distinctive feature that the octave and other even-numbered harmonics are absent or but very faint in its tone-colour. Therefore the great interval of a twelfth that has to be bridged over by holes covered with the fingers or key work has led to the application of much ingenious mechanism, as on the flute and the oboe, not merely for convenience of fingering, but to make at all possible the production of the chromatic scale through the interval of a twelfth by means of ten fingers, of which at least one is required for the support of the instrument.

CUP-BLOWN INSTRUMENTS.

In every instrument of the cup-blown or horn kind, the lips take the place of the reed in a reed-instrument. The harmonics, or notes proper to the conical tubes used, follow the natural harmonic series, viz., c , c' , g' , c'' , e'' , g'' , &c., with vibrational numbers 1, 2, 3, 4, 5, 6, &c., and are successively obtained by increasing the compression of the lips. The notes to complete the diatonic and chromatic scales were, in the family of instruments called Cornetti (including the ophicleide), obtained from side holes in the same manner as on the flute and clarinet, but such instruments gradually died out during the 19th century, the ophicleide having been the latest survival of the species. In all these instruments, including the ophicleide, each hole as opened virtually shortened the tube, and thus a basis for a new harmonic series was obtained.

During the 19th century, methods were devised of bringing extra lengths of tubing into the vibrating column, by