

In chapter iv. he explains a "physiological hypothesis," that the natural impression given by binary rhythm arises probably from the naturally symmetrical structure of the human body, and the binary action of its functions, such as breathing and the beating of the heart, whereas a ternary rhythmic motion seems something heterogeneous and unnatural. In chapter v. he discusses the effects of rhythms on our organism, simple or natural rhythms giving an agreeable impression, and unnatural or complicated rhythms giving one of a contrary description. Then follows a long chapter of formulæ and complicated arithmetical statements of rhythmical combinations of various kinds.

These remarks, on rhythms generally, occupy two-thirds of the pamphlet; the remaining third is intended to show how they may be applied to the nature and effects of musical sounds. Chapter vii. contains a description of the major musical scale as harmonically deduced by the aid of the monochord; and after that we begin to get a glimpse, though obscurely, of the nature of the general argument. The following extracts may give an idea of it:—

"The only sounds of the scale which are in binary rhythm are the first, 1 : 1, and the last, 1 : 2; and these are in fact the only ones which imply rest. The fifth, 2 : 3, is constituted by a ternary rhythm, and is, in fact, the sound of greatest motion which is contained in the scale. This most powerful motive action gives to this sound the greatest tendency towards the sounds of rest, authorizing it to fall directly on them, however distant from it.

"The ratio 4 : 5, which represents the major third, is constituted by a quinary rhythm—a rhythm of semi-motion which has such an action that while it makes us feel faintly the need to pass to the fundamental, it may almost supply it coming after the fifth."

Thus we arrive at the kernel of the theory, which appears to be that the effects of different combinations of rhythmical blows or noises are assumed to be applicable to the vibrations causing musical sounds, and to account for the effects of such sounds in an emotional point of view. It is something akin to the old Euler doctrine of the "simplicity of ratios," but it professes to be more comprehensive.

It is not carried out very far in this book, but the author promises that if he lives long enough, and has sufficient means, he will complete it in a larger treatise. Then, perhaps, we shall see how it will explain the construction of "Israel in Egypt," Haydn's Quartettes, and Beethoven's Ninth Symphony.

THE MUSEUMS ASSOCIATION.

THE first annual meeting of the Museums Association was held in Liverpool on June 17, 18, and 19, under the presidency of the Rev. H. H. Higgins, M.A. Liverpool was represented by the President, Mr. J. T. Moore, Mr. R. Paden, Mr. J. Chard, Mr. P. Cowell, Mr. H. A. Tobias, and a number of other gentlemen. In addition to the home contingent, the following were present:—Mr. F. W. Rudler, Mr. R. J. Howard, Mr. R. Ashton (Blackburn); Mr. J. Vicars, Mr. J. J. Ogle (Bootle); Mr. W. W. Midgley (Bolton); Mr. Butler Wood (Bradford); Mr. John Storrie (Cardiff); Mr. Montagu Browne (Leicester); Mr. C. G. Virgo (Manchester); Mr. T. J. George (Northampton); Mr. J. W. Carr (Nottingham); Mr. R. Howse (Newcastle); Prof. Boyd Dawkins, Mr. W. E. Hoyle (Owens College); Major Plant (Salford); Alderman Brittain, Mr. E. Howarth (Sheffield); Lieutenant-Colonel Turner, Mr. John Tym (Stockport); Mr. Robert Cameron, Mr. J. M. Bowley (Sunderland); Mr. L. Greening, Mr. H. Roberts, Mr. F. W. Moncks, Mr. C. Madeley (Warrington); Mr. H. M. Platnauer (York).

The proceedings were opened by Mr. J. T. Moore, as Mr. S. W. North, chairman at the last meeting (held in York), was unavoidably absent. The Rev. H. H. Higgins gave his presidential address, and the following papers were read and discussed:—"On Museum organization and arrangement," by Prof. W. Boyd Dawkins, F.R.S.; "Suggestions for aid in the determination of natural history specimens in Museums," by Mr. F. W. Rudler; "A new method of mounting Invertebrates for Museum and lecture purposes," by Dr. H. C. Sorby, F.R.S.; "Notes on the Liverpool Free Public Museum," by Mr. T. J. Moore; "Circulating school cabinets for elementary schools," by Mr. John Chard (Assistant in the Liverpool Museum); "The best means of making Museums attractive to

the public," by Mr. R. Cameron; "A plea for local geological models," by Mr. T. J. Moore; "Museum cases and Museum visitors," by Mr. E. Howarth; "Notes on the Moscow Museum," by Mr. Willoughby Gardner; "Winter evening lectures in Museums," by Mr. R. Paden (Assistant in the Liverpool Museum).

Some very pleasant expeditions were made, thanks to the untiring energy of the local Secretary, Mr. H. A. Tobias, who was ably seconded by Mr. Cowell and Mr. McMillan. The members of the Association were most hospitably received; they were entertained at lunch by his worship the Mayor, and received invitations to a *soirée* of the Library, Museum, and Arts Committee, and to a magnificent *conversazione* given by the Japanese Consul, Mr. James L. Bowes.

SCIENTIFIC SERIALS.

American Journal of Science, June.—Prof. Elias Loomis: a memorial address prepared by H. A. Newton at the request of the President and Fellows of Yale College.—The magnetic field in the Jefferson Physical Laboratory, Part II., by R. W. Willson. In the February number of the *Journal* the author gave some observations of the variations of the horizontal intensity in different parts of the Jefferson Physical Laboratory in 1886-87, and upon the disturbance in the magnetic field produced by the presence of iron steam pipes and other iron masses. He now finds from extended observations that brickwork produces a great disturbance of the magnetic field, and thinks, therefore, that in general it would be safer to make exclusive use of wood for buildings and piers intended for refined magnetic measurements.—The electrical resistance of the alloys of ferro-manganese and copper (from determinations made by Mr. B. H. Blood), by Edward L. Nichols. The observations show that ferro-manganese-copper alloys decrease in electrical resistance each time they are subjected to a change of temperature. In one case an alloy containing 80.82 per cent. of copper and 19.12 per cent. of ferro-manganese, was hard drawn in the process of obtaining a strip suitable for measurement. Its specific resistance at 20°, referred to pure copper as unity, was 30.38; this resistance gradually diminished as the strip was repeatedly heated to 100° and cooled to 20°, until after seven such heatings it had fallen to 30.072. The effect of successive annealings upon the resistance of a number of alloys is also described.

—Fluid volume and its relation to pressure and temperature, by C. Barus. The paper contains the introductory part of a series of experiments on the compressibility of liquids, in progress at the Physical Laboratory of the U.S. Geological Survey. Taking the results from 0° to 185° as a whole, it follows that if with the observed thermal expansion compressibility be supposed to increase inversely as the first power of the *pressure binomial* ($A + p$, where A is constant), then temperature and pressure must vary linearly to maintain constancy of volume.—On hamlinite, a new rhombohedral mineral from the herderite locality at Stoneham, Mi., by W. E. Hidden and S. L. Penfield.—On a large spring-balance electrometer for measuring (before an audience) specific inductive capacities and potentials, by Alfred M. Mayer. The chief characteristic of the excellent piece of apparatus described is that it shows *directly*, and not inferentially, that different dielectrics transmit the force of electricity in different degrees.—Notice of new Tertiary mammals, by O. C. Marsh.

THE *American Meteorological Journal* for June contains:—An article on the distribution of cloud over the globe, specially prepared by M. L. Teisserenc de Bort from a former paper on this subject (*NATURE*, vol. xxxvi. p. 15), with diagrams of mean isonephs for March, which is the clearest month over the globe, and for July, which, on the whole, is a cloudy month, and also with figures showing the appearance of the cloud bands on the earth, compared with other planets having atmospheres.—Is the diurnal variation of the magnetic needle a meteorological phenomenon?, by Prof. R. Owen. The object of the paper is to show that our atmosphere is the medium influenced magnetically by the sun, in affecting the diurnal movement of the needle. The author thinks that the facts adduced may aid us in understanding why storms in the northern hemisphere rotate from right to left, and advance from lower to higher latitudes.—A translation of Dr. R. Assmann's paper on the climatological influence of influenza.—Report of the meeting of the New Eng-