to the best system that can be devised for overcoming the difficulties of trans-alpine railways rather by adding to the powers of the locomotive-engine, and by other mechanical appliances for reducing the cost of traction on steep inclines, which methods are capable of indefinite improvement, than by burying in gigantic tunnels enormous sums of unproductive capital, that, when once expended, are irrecoverably lost.

— We learn from *Nature* that the electric railway from Portrush to the Giant's Causeway was opened Sept. 28 by Earl Spencer; and among others present, were Sir William Thomson, Sir William Siemens, and Sir Frederick Bramwell. It is over six miles long, and has cost £45,000. The line, after passing through the principal street of Portrush, follows the seaside road, a portion of a footpath six feet broad being reserved for the railway. The gauge is only three feet; and the gradients are very steep, — in places as much as one in thirty-five; and in parts of its course the curves are sharper than might have been desirable had the route which it takes been chosen by the engineers. The force to work it is generated by a waterfall in the river Bush, with an available head of twenty-four feet, the electric current being conveyed by an underground cable to the end of the tramway. The water-power passing through turbine water-wheels, which utilize the whole force of the fall, is said to amount to ninety horse.

— At the meeting of the Engineers' club of Philadelphia, Oct. 20, Mr. John Haug exhibited and described very complete sets of drawings for two vessels designed by him, — the one a tug-boat for the Philadelphia board of health, and the other a barge for the transportation of freight and passenger cars. Mr. J. H. Harden read a paper, prepared for publication as part of the Report of the second geological survey of Pennsylvania, relating to the "Early mining operations in Berks and Chester counties, including the present condition of the Jones mine." Prof. L. M. Haupt presented notes on conventional colors for drawing.

— Before the Biological society of Washington, at its meeting, Nov. 2, the communications were: Dr. George M. Sternberg, U.S.A., Micrococci; Dr. E. M. Schaeffer, Further remarks on manna, with exhibition of specimens; Dr. T. H. Bean, Arrested asymmetry in a flounder, with exhibition of specimens; Professor Lester F. Ward, Mesozoic dicotyledons.

— The autumn meeting of the Society of mechanical engineers, which has just closed in New York, has been unusually well attended, and some important lines of discussion have been drawn out. Considerable interest was shown in the proposed re-appointment of a board to supervise the work with the Watertown testing-machine.

— The Massachusetts agricultural experiment-station at the Agricultural college in Amherst, Mass., was established by an act of the legislature approved on the 12th of May, 1882. Its management is vested in a board of control, consisting of the governor of the state, two members of the state board of agriculture, two members of the board of trustees of the Massachusetts agricultural college, one member of the Massachusetts society for promoting agriculture, and the president of the Massachusetts agricultural college. The present officers of the station are all members of the college faculty, and are Prof. C. A. Goessmann, director and chemist; Prof. M. Miles, superintendent of field and stock experiments; and Prof. S. T. Maynard, superintendent of horticultural experiments, microscopist, and draughtsman. The station proposes to publish monthly bulletins, of which two have already appeared. The first contains an account of the organization of the station, and a general statement of its purposes, and also analyses of ten samples of fodders. The second and third bulletins contain analyses of four samples of fodders and of fifty-six of fertilizers and fertilizing materials.

— An extended review of the results of the German census of 1881 is given by Ch. Grad in the *Revue scientifique*, 1883, 109.

RECENT BOOKS AND PAMPHLETS.

Bachmann, O. Unsere modernen mikroskope und deren sämmtliche hilfs- und neben-apparate für wissenschaftliche forschungen. München, *Oldenburg*, 1883. 15+344 p., illustr. 8°.

Burr, W. H. The elasticity and resistance of the materials of engineering. New York, *Wiley*, 1883. 15+753 p. 8°.

Campagne, E. Les météores. Rouen, *Mégard*, 1883. 189 p., illustr. 8°.

Denza, F. La meteorologia e le sue più recenti applicazioni. Torino, *Speirani*, 1883. 364 p. 8°.

Fallet, C. Les mers polaires. Rouen, *Mégard*, 1883. 160 p., illustr. 8°.

Gérardin, L. Les bêtes, éléments de zoologie théorique et appliquée. Paris, *Masson*, 1883. 2+418 p., illustr. 18°.

Landolt, H., and **Börnstein**, R. Physikalisch-chemische tabellen. Berlin, *Springer*, 1883. 12+249 p. 8°.

MacCord, C. W. Kinematics: a treatise on the modification of motion, as affected by the forms and modes of connection of the moving parts of machines; illustrated by diagrams of mechanical movements, as practically constructed; for the use of draughtsmen, machinists, and students of mechanical engineering. New York, *Wiley*, 1883. 9+335 p. 8°.

Malte-Brun. Lectures géographiques: l'Europe, description générale. Limoges, *Barbou*, 1883. 141 p. 12°.

Ollivier-Beauregard. En Asie, Kachmir et Tibet, étude d'ethnographie ancienne et moderne. Paris, *Maisonneuve*, 1883. 144 p. 8°.

Petit, H. Notes sur l'habitat des coléoptères de France. Châlons-sur-Marne, *Martin*, 1883. 66 p. 8°.

Physik, die, im dienste der wissenschaft, der kunst und des praktischen lebens. Red. G. Krebs, unter mitwirkung von J. van Bebber, C. Grahwinkel, E. Hartwig. lief. i. Stuttgart, *Enke*, 1883. 112 p., illustr. 8°.

Reusch, H. H. Die fossilien führenden krystallinischen schiefer von Bergen in Norwegen. Autorisirte deutsche ausgabe von R. Baldauf. Leipzig, *Engelmann*, 1883. 4+134 p., 92 illustr., map. 8°.

Trautvetter, E. R. Incrementa florae phaenogamae rossicae. fasc. i. Berlin, *Friedländer*, 1882. 4+240 p. 8°.

Tschermak, G. Die mikroskopische beschaffenheit der meteoriten, erläutert durch photographische abbildungen. lief. i. Stuttgart, *Schweizerbart*, 1883. 12 p., 8 pl. 4°.

Van Overbeck de Meijer. Les systèmes d'évacuation des eaux et immondices d'une ville. Paris, *Baillière*, 1883. 143 p. 8°.

Weismann, A. Ueben die ewigkeit des lebens. Freiburg-i.-Br., *Mohr*, 1883. 79 p. 4°.

Weselsky, P., and **Benedikt**, R. Dreizig uebungs-aufgaben als erste anleitung zur quantitativen analyse. Wien, *Tre-ſlitz & Deuticke*, 1883. 41 p., illustr. 8°.

Weyr, E. Die elemente der projectivischen geometrie. heft i.: Theorie der projectivischen grundgebilde erster stufe und der quadratischen involutionen. Wien, *Braumüller*, 1883. 9+231 p. 8°.

Witthaus, R. A. The medical student's manual of chemistry. New York, *Wood*, 1883. 370 p., illustr. 8°.

Wright, E. P. Animal life: being the natural history of animals. New York, *Cassell*, [1883.] 8+618 p., illustr. 8°.