we have yet seen. We recommend the book not only to those directly interested in the scientific aspect of brewing, but also to those chemists and biologists whose work in any way trends in the direction of brewing or malting problems.

Oberharzer Gangbilder. By Dr. Phil. B. Baumgärtel. Pp. 23+six plates. (Leipzig: Engelmann, 1907.) Price 7 marks.

THE text of this book describes the geological features of the Upper Harz, and the mineral veins that, according to von Koenen, were injected into the old rocks of the region as recently as Miocene times. It serves as an introduction to six very beautiful photographs of large rock-surfaces in the mines. The various minerals of the lodes have been coloured in effective but harmonious tints, so that the relations of each can be traced out precisely. This combination of photographic accuracy with diagrammatic clearness may serve as a model for reproductions in other branches of science. The old coloured geological landscapes of the days of Weaver and Delabeche occur to one's mind, and might thus with advantage be revived.

G. A. J. C.

LETTER TO THE EDITOR.

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of NATURE. *No notice is taken of anonymous communications.]*

Atmospheric Absorption of Wireless Signals.

IN the *Electrical Review*, May 11 and 18, the writer has given curves which show that telegraph messages exchanged between Scotland and Massachusetts are received on some nights with practically no absorption, while on other nights and in daytime nine hundred and ninety-nine one-thousandths (0·999) of the energy is absorbed.

The fact that the daylight absorption was largely reduced between two stations 150 miles apart in Brazil by the use of a longer wave-length suggested that the masses of ionised air which are supposed to produce the absorption are broken up somewhat as clouds are. During the past six months experiments have been made between Massachusetts and stations at Porto Rico, Cuba, Washington (D.C.), and New York which seem to point to the same conclusion.

Two types of transmitting apparatus were used.

The first was an alternating-current dynamo giving 250 sparks per second and generating feebly damped waves. The energy used was between 10 and 12 kw., and the frequencies used were 200,000 per second and 81,700 per second.

Messages sent with the higher frequency from Massachusetts were received very strongly at night-time at Porto Rico and Cuba, and were officially reported on several occasions as having been received by naval vessels in the neighbourhood of Alexandria, Egypt (a distance of nearly 4000 miles), but no messages were received during daytime. The absorption comes on very suddenly, and in the West Indies increases sometimes nearly a thousand-fold in fifteen minutes as the sun rises.

With the longer frequency, however, though at night signals were considerably weaker, probably on account of the receiving stations not being adapted for such a long wave-length, the daylight signals were many times stronger, and it was found possible to work in daylight between Massachusetts and Cuba (a distance of nearly 1700 miles) when using the lower frequency without any increase in sending power. Tests between Boston and Washington now continuing for nearly six months show the same phenomena, *i.e.* that there is great daylight absorption at a frequency of 200,000, but almost no absorption at a frequency of 81,700.

The second type of apparatus used consisted of a high-frequency alternator capable of giving a frequency of 100,000, but for the purposes of this test run at a frequency of 81,700. The open-circuit voltage at this frequency is 150 volts, and its armature resistance six ohms. This apparatus is used for telephoning wirelessly between Brant Rock, Massachusetts, and the City of New York. A detailed description of a similar but less powerful apparatus used for telephoning between Brant Rock and Plymouth, Massachusetts, will be found in the *Electrical Review* of February 15, 22, and March 1, and in the *American Telephone Journal* of January 26 and February 2. The current used in the antennæ is from four to six amperes, and the speech received by the New York station is approximately five or six times louder than the limit of audibility. Tests have now been made with this apparatus over a period of nearly a month, wireless telephonic communication having been first established between these points about July 17. While this apparatus has not been tested for so long a period as the former type, the results obtained are in substantial agreement.

If the masses of ionised air were continuous there is no apparent reason why there should be less absorption with a long wave-length. The above experiments seem to point to the conclusion that the masses of ionised air which are supposed to produce the absorption are not continuous but are broken up in somewhat the same manner that water vapour is into clouds.

The fact that the wave-lengths must be increased as the transmission distance is increased in order to overcome the absorption does not necessarily indicate that the masses are of larger size as the distance above sea-level increases, though it is possible that this is the case.

The writer has found that the absorption at night-time varies with the direction from which the waves are received, and has obtained some results which seem to indicate that measurements of this phenomenon may have a meteorological value, and may assist in extending the range of weather forecasts.

REGINALD A. FESSENDEN.

Brant Rock, Mass., August 9.

PRACTICAL TELEPHOTOGRAPHY.

EARLY in 1881 I described in NATURE (vol. xxiii., p. 334) an experimental apparatus for the electrical transmission of pictures to a distance, in which use was made of one of the sensitive selenium cells devised a few months previously (*ibid.*, p. 58). Fig. 1 shows the arrangement diagrammatically. The transmitting cylinder T is mounted upon a screwed spindle, which moves it laterally through 1/64 inch at each revolution; a selenium cell S is fixed behind the pinhole H, 1/20 inch in diameter, and is electrically connected through the spindle with the line wires L, E; the picture to be transmitted—about two inches square—is projected upon the front surface of the cylinder by the lens *l*. The brass receiving cylinder R is of the same dimensions as T, and is similarly mounted; F is a platinum stylus, which is pressed vertically against the metal by the flat spring G; W is a variable resistance, and B_1, B_2 are batteries at the transmitting and receiving stations respectively. A piece of paper moistened with a solution of potassium iodide is wrapped round R, and, the pinhole H having first been brought to the brightest part of the focussed picture (thereby reducing the resistance of S to its minimum value), the resistance W is adjusted so that no current passes along the "bridge" C D, which, assuming the two batteries to be equal, will be the case when the resistance of W is the same as that of S. If now the Se cell is darkened, its resistance will be increased and a current will pass through the receiver in the direction C D, liberating iodine at the point of the stylus F.

To transmit a picture, the two cylinders are caused to rotate synchronously, at the same time moving from end to end of their traverses; in the course of