NOTES AND EXTRACTS.

APPARATUS FOR REGISTERING THUNDERSTORMS.

Some years ago the late Mr. G. J. Symons constructed a very complete apparatus for registering the time and intensity of thunder. According to Nature for May 15, p. 65 (1902), a new piece of apparatus for thunderstorm registration has been constructed by Fathers Fenyi and Schreiber:

The apparatus consists mainly of three portions; the first consists of a horizontal magnetic needle mounted on a vertical support between a small and sensitive coil of wire, the needle and its stop being connected with a battery, a bell, and a registering apparatus, the needle when in contact with its stop completing the circuit. The registering apparatus is a small electro-magnet which actuates a pen in contact with a disc, and the latter is connected with a clock and moves with regular velocity. The third and very important portion of the arrangement is the coherer, which is composed of two delicately suspended needles nearly in contact; these are connected in a circuit, which includes the coil in which the horizontal needle is placed, a cell, and the long intercepting wire, corresponding to the tall post with wire of the Marconi telegraph system. The apparatus works in the following manner: A distant flash of lightning starts a wave-impulse, and this is led to the coherer by the intercepting wire; the needles move and touch each other, thus completing the circuit, and allow a current to pass through the coil. This coil immediately causes the needle inside it to be deflected to the stop. The second circuit is thus completed, the needle on the registering apparatus marks a deflection on the disc, the bell is rung, and the vibration caused by the latter separates the needles of the coherer. According to the account here given, the instrument is very efficient and has been found to record storms as many as 20 miles away, while on another occasion the instrument during very fine weather was working "apparently rebelliously," but was really recording a great storm raging at Budapest (as shown by the time of occurrence and record at each place), a distance of 110 kilometers from the apparatus.—*C. A.*

LIGHTNING RECORDER.

In the Annual Report for 1901–02 of St. Ignatius College, Cleveland, Ohio, the Reverend F. L. Odenbach publishes an appendix on the work of his meteorological observatory during the past year. This begins with an account of his new lightning recorder, or ceraunograph. He says that on seeing the first working model of the apparatus for wireless telegraphy and its action under the influence of electro-magnetic waves, he came to the conclusion that it was possible to harness lightning and force it to record its own doings. On May 1, 1901, the first warning was received, and two hours later the thundercloud was over the station. The various parts of the instrument were a relay, a telegraph sounder, a coherer, choking coil, two batteries, a recording drum, or chronograph, a copper collector on the roof of the college, and a copper wire leading from it down to the instrument in the observatory. A lightning flash sends out in all directions rays of electro-magnetic waves, which travel like light. The waves from a distant flash strike the copper collector and descend on the wire to the primary circuit of the relay. Their way is blocked by the choking coil, and therefore they pass in great part through the coherer. The moment they do so this tube becomes a conductor for the primary current; the relay goes into action and closes a secondary circuit; the recording magnet moves the pen and makes the record; but at the same time the sounder in this same secondary circuit clicks, shakes the coherer, and all is over until a second distant flash sends another electric wave. This first crude instrument worked successfully during the whole of the summer of 1901, but is now replaced by an improved apparatus. In this new apparatus a graphite coherer is used, consisting of sticks of graphite such as are known as "A. W. Faber's Siberian leads for artists' pencils." The record for 1901 shows that the thunderstorms reach Cleveland from one to three hours after the first record of distant lightning. In a few cases this record is not followed by a thunderstorm, but these are very rare. In general, a Weather Bureau station furnished with this apparatus should be able to give an hour's notice of an approaching local storm. The silent electric discharges attending snowstorms may also enable one to predict the approaching snow.

INDEX FOR WEATHER MAPS.

Father Odenbach has also devised a method of indexing the types of weather maps, by the use of what he calls "symbolic shorthand." He divides the United States weather map into sixteen regions, designated by names and numbers. Each weather map can be described by the position of its areas of high and low pressure, e. g., the expression $\frac{9\text{–}16}{12\text{–}14}$ for January 1, means that on that day there were "highs" in regions 9 and 16 and "lows" in regions 12 and 14. A card bearing the date of the map and the proper descriptive formula is made up for each map for the whole ten years. The cards are then arranged according to the formulæ and all those having the same formula are collected together; after copying the whole series of dates on one card the others are destroyed as no longer needed. With this index the student is able to ascertain whether the combination of highs and lows that he sees on any weather map has ever occurred before, and if so, on what dates.—*C. A.*

RADIO-ACTIVE RAIN.

The newest theories as to the origin of atmospheric electricity and the formation of rain, and in fact as to the very nature of electricity itself, have received interesting confirmation by some recent observations by Mr. C. T. R. Wilson, the assistant of Prof. J. J. Thomson in the Cavendish Laboratory, Cambridge, England. We quote the following from Nature, June 5, 1902, p. 143, as an abstract of the paper read before the Philosophical Society at Cambridge on May 5:

As the experiments of Elster and Geitel and of Rutherford have shown, a negatively charged body exposed in the atmosphere becomes radioactive, apparently showing the presence of some radioactive substance in the atmosphere, it occurred to the author to test whether any of this radioactive substance is carried down in rain. Freshly fallen rain water (less than 50 c. c. was generally used) was found when exposed to dryness to leave behind a radioactive residue. The radioactivity was detected by means of the increase in the ionisation of the air within a small vessel, of which the top, or, in some experiments, the bottom, was of thin aluminum or gold leaf, the other walls being of brass. The metal surface on which the rain had been evaporated was placed close up to the aluminum or gold leaf, and the rate of movement of a small gold leaf which served to measure the ionisation was observed (v. Roy. Soc. Proc., vol. lxviii, p. 151). In many cases the radioactivity obtained from the rain was sufficient to increase the ionization five or six fold. From the evaporation of distilled water, of tap water, or of rain water which had stood for many hours no radioactivity was obtained. Like the induced radioactivity obtained on a negatively charged body, that derived from rain gradually dies away, falling to about half its initial value in the course of an hour.—*C. A.*

LABORATORY WORK IN PHYSICAL GEOGRAPHY AND METEOROLOGY.

There can be no doubt that classes in physiography in our high schools may profit by a laboratory course in elementary meteorology, embracing such observations as can be made by means of the simpler meteorological instruments, and by the eye alone. Such observations, if systematically made and recorded, are valuable *nature studies;* they also lead to a better understanding of the salient features of climate, of the periodic and accidental changes in atmospheric conditions, and of the effect of all these upon health.

The student actually needs and ordinarily uses nothing more than a properly ruled note book in which to record his obser-