

ocean results in enlargement of the lower end of the funnel by the formation of an irregularly shaped cloud of vapor or spray. After the disappearance of this waterspout two others, both less perfectly developed, appeared in succession. These were also photographed, but the views are not so striking as in the first case. No authentic scientific account of these waterspouts has, so far as we have seen, been published. The 8 a. m. weather map of August 19th, shows an area of high pressure central north of the Lakes, with cool north and northwest winds over New England. It seems likely, therefore, that these waterspouts were due in part to the low temperatures brought by the winds. Most of the waterspouts which occur over the Gulf Stream in winter are produced under similar conditions of cool offshore northwest winds, although, of course, the temperature contrasts are much more marked in winter than in summer.

SEVEN-DAY THUNDERSTORM PERIODICITY.

KASSNER, of Berlin, has been investigating the matter of thunderstorm periodicity in Germany during the past few years and has reached some interesting results. In 1893 (*Das Wetter*, 1893, 12-16) he found that for the period 1883-92 the thunderstorms of Berlin showed a maximum frequency on Thursdays and a minimum on Mondays. Further study of the records for Berlin from 1830-40 and 1848-92 indicated a Saturday maximum and a Sunday minimum. Polis found that the thunderstorms of Aix-la-Chappelle also had a Saturday maximum and a Sunday minimum. This fact was naturally supposed to be connected in some way with the increased smoke resulting from extensive firing up in factories and foundries on Saturday, when much work often still remains to be done and has to be hurried through, or, as in the case of iron foundries, the

metal is melted on that day in order that it may cool over Sunday. On Sunday, on the other hand, there is little smoke because little use is then made of fires. In *Das Wetter* for August and September, 1896, Kassner has continued his inquiry, using data for other places, and reaches the conclusion that in general the frequency of thunderstorms increases everywhere from Monday to Tuesday, and that a minimum occurs on Thursday or the next adjoining days. In cities with extended industries which require fires on a large scale there is everywhere an increase from Friday to Saturday, and a decrease from Saturday to Sunday, while in places without many factories the reverse is usually the case. The variations in atmospheric electricity are believed to stand in close relation to the variations in the amount of smoke, as previously suggested by Arrhenius and Ekholm (1894).

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NOTES ON INORGANIC CHEMISTRY.

THE manufacture of acetylene, at a low price, from calcium carbide, and its remarkable power as an illuminant, promised rapid development of its production upon a commercial scale. Two schemes are in use for its distribution. In one the plant is local, acetylene being made on the premises where it is used. In the other the acetylene is made on a larger scale and delivered in steel cylinders, condensed under high pressure.

The fact that acetylene is an endothermic compound has given rise to fear that grave danger attends its use, especially when stored in cylinders under high pressure. Hence recent experiments of Berthelot and Vieille (*Comptes Rendus*, CXXIII.: 523) on the explosive properties of acetylene possess considerable interest. They find that, at atmospheric pressure, a decomposition induced by ignition, or by the ex-

plosion of a fulminate, does not propagate itself to an appreciable distance. Hence it would seem that local acetylene generators, where the gas is not exposed to a pressure much above that of the atmosphere, are free from danger of explosion. When, however, the pressure on the gas is greater than two atmospheres, the decomposition induced by an incandescent wire, or otherwise, is propagated through the whole mass, the rapidity of propagation and the pressure of explosion increasing rapidly with increased initial pressure. Thus acetylene, at a pressure of twenty-one atmospheres, when exploded, generated a pressure of two hundred and twelve atmospheres and a calculated temperature of 2750° C. The acetylene is decomposed quantitatively into hydrogen and compact amorphous carbon. Acetylene condensed to a liquid may be similarly exploded by spark, incandescent wire, or detonator, and in one experiment 18 grams of acetylene exploded in a bomb of 49 c.cm. capacity showed a pressure over 5000 atmospheres, an explosive force about that of gun cotton. Experiments as to the effect of shock showed that acetylene is not thus exploded. In one case where the receptacle was broken by the shock, the acetylene was ignited, evidently by the friction of the shattered pieces, the mixture of the liberated acetylene and air forming an easily ignited explosive mixture. In this case no carbon was deposited, the gas burning and not decomposing. There seem to be two prominent dangers in compressed acetylene: the heat generated in the rapid compression of the gas may be sufficient to explode it; in case of fracture of the receptacle the explosive mixture of acetylene and air may be ignited by friction.

The authors conclude that the advantages in the use of the gas more than compensate for the dangers attending its use, which, with sufficient care, may be reduced to a minimum.

Another question has been raised regarding the use of acetylene which is not touched upon in this article. Acetylene forms, with certain metals, very explosive compounds. Whether in its use as an illuminant there is danger of such compounds being formed, is a point which deserves investigation.

IN the last *Chemical News*, Dr. Geo. F. Payne, of the Georgia Department of Agriculture, offers a just criticism of a statement in the last edition of Blyth's 'Poisons.' Dr. Blyth states that cotton seed is poisonous to animals, and its use as an adulterant of linseed cake has caused the death of sheep and calves. Dr. Payne calls attention to the extended and successful use of whole cotton seed, cotton-seed meal and cotton-seed hulls in the South for fattening cattle, and suggests that the cases cited by Dr. Blyth may be due to castor-oil pomace, either accidentally mixed with the cotton-seed meal, or in a mixture intended for fertilizing purposes and inadvertently used for feeding animals.

IN the recently published second edition of 'The Cyanide Process of Gold Extraction,' by James Park (Auckland, N. Z., Champtaloup and Cooper), it is stated on the authority of Johann Antal, a Hungarian toxicologist, that a solution of cobalt nitrate is a perfect antidote to cyanid poisoning. A matter of so much importance if true, deserves very careful investigation and confirmation. J. L. H.

ASTRONOMICAL NOTES.

THE *Astronomical Journal* of October 16th contains a determination by Mr. Eric Doolittle of the secular perturbations of Mercury arising from the action of Jupiter. Gauss's method was employed.

IN the *Astronomische Nachrichten* of October 8th Dr. Marcuse, of Berlin, publishes an account of the new photographic zenith telescope recently constructed for the Geo-