before or at the time the walls gave way, the wind forced in some portion of the south wall, as a window or door, thus probably accounting for the outward pressure on other walls." The most important observation in connection with these exploded houses, however, was the record of a barograph, which just at this moment showed a remarkable *rise* in pressure. In the Louisville tornado, also, a barograph within a mile or two of the track showed first a slight sudden fall and recovery, due probably to the wind, and afterward the tornado-rise, as at St. Louis. This evidence is cumulative; and when we consider that the wind blows away from the tornado in front, and that of two similar objects standing side by side, one very heavy and the other light, the former is swept away while the other remains untouched, the evidence seems almost conclusive that there is no diminution of pressure in a tornado. It is probable that there is no fact in the whole observation or make-up of a tornado of such extreme importance as this, and it will be touched upon again in an explanation of a seeming rush of objects into the funnel. It will undoubtedly be thought, that, after all that has preceded, we really know very little of the mechanism of a tornado. This is true; but, if we have advanced far enough to be able to say what it is not, we may congratulate ourselves, and feel that our labor has not been entirely in vain. H. A. HAZEN.

## THE MANUFACTURE OF OZONE.

A COMPANY has been formed in Berlin for supplying the necessary plant for the conversion of oxygen into ozone on a larger scale than has hitherto been attempted, and the idea is gaining favor in many quarters that ozone can be economically employed for many sanitary purposes, says London *Industries*. Steps are being taken for extending the operations of the company to New York and London, as they have secured the patent rights for certain improvements in the electrical production of ozone from atmospheric oxygen in most countries. The Berlin doctors have repeatedly employed ozone, with very satisfactory results, in individual cases, and recently the company above alluded to have placed on the market a so-called ozonized water, which is stated to be a solution of ozone in that liquid. It is, however, well known that ozone is not very soluble in water, and that it readily undergoes decomposition, forming hydrogen peroxide and oxygen. The commercial name for this new antiseptic is "antibacterikon," and it possesses remarkable oxidizing properties. When added to water containing any appreciable quantity of living organic matter in the dark, it at once causes a phosphorescent appearance, and the organisms are completely destroyed in a short time. Such ozonized water is stated to have a faint metallic taste, and is used for producing sterilized water, or sterilized fluids, for bacteriological research. At present the ozone is manufactured from oxygen obtained by heating pyrolusite in the old way; but of course, with a greater demand, the Brin's oxygen process could be employed. The conversion takes place in a Siemens tube, or series of Siemens tubes, which do not differ essentially from the orignal form of ozonizer. The electric discharge is made by a Ruhmkorf coil in the usual way, or an accumulator is employed and a mercury contact breaker. It is proposed that ozone should be produced in this manner in large manufactories, and thus contribute to their sanitary improvement. Dr. Förster of Berlin has recently urged the importance of endeavoring to supply a small quantity of ozone to the air of towns and other thickly populated districts, and the company believe that their system can be worked economically and at the same time produce very satisfactory results from a hygienic point of view. It has been pointed out that many epidemics, e.g., influenza, appear to take place at those seasons of the year when the atmospheric ozone is at a minimum, and it is thus argued that an artificial supply of this gaseous oxidizing agent would possibly prevent, and at any rate considerably modify, such outbreaks of disease.

## THE OIL-FIELDS IN NEW ZEALAND.

The New Zealand Government attach a great deal of importance to the indications of extensive oil fields in Taranaki. The report of the inspecting engineer of the mines department, who has made a special examination of the territory at the instance of the government, says the *Australasian Journal of Commerce*, is strongly confirmatory of the presence of mineral oil. In the neighborhood of New Plymouth there are many surface indications, particularly along the shore, gathered under bowlders and floating on the water. Farther inland the water gathering in the wells which are sunk is found to have a strong taste and smell of petroleum, so as to be quite unfit for drinking. If all these indications should turn out to be well founded, and oil be discovered in paying quantities, the find will be of great value to New Zealand in many ways, the most important of which, perhaps, is as a fuel for smelting purposes. Vast quantities of iron sand — according to the "New Zealand Year Book," a sand formed by the grinding-up of iron ore by the action of the waves — lie for hundreds of miles along the coast of the North Island; and this pulverized ore is practically worthless at present from lack of a sufficiently cheap fuel to smelt it. Should oil be obtained in such close proximity to these supplies of ground iron ore, a new and important industry may be developed into large proportions. Such, at least, is the hope of those who are investigating the matter on the spot. Independent of this, however, a new and extensive oil-field in the South Pacific would speedily become the source of supply for the whole of Australasia and the entire East. New Zealand would become an active competitor with the Baku wells, even if the Russian supply should falsify present indications of failure, and continue. The proximity of the supposed New Zealand field to the coast and port of New Plymouth would give it an advantage over both Russian and American oils in lessening the cost of both crude and refined on shipboard.

## THE USE OF OIL.

ATTENTION is called by the United States Hydrographic Office to the fact that the Chamber of Commerce of Bordeaux, France, has offered a series of prizes in order to induce masters and officers of vessels to make thorough trial of the use of oil at sea, especially as regards the best way to use it and the practical benefits to be derived from such use. There are three sets of prizes, each set consisting of a first prize of 200 francs ($40) and a second prize of 100 francs ($20), to be awarded for the best reports received by Jan. 31, 1891, based upon actual experience. Programmes for the three competitions are as follows:—

1. STEAMERS.—Trials of the use of oil must be made under various conditions, particularly the following: heavy head sea, heavy quartering sea, towing in bad weather, engine or rudder disabled.

2. SAILING-VESSELS.—Trials to be made under various conditions, but especially when crowding sail with a strong wind abeam.

There must also be considered, in connection with the first and second competitions, the use of oil in lowering and hoisting boats, taking a pilot aboard, saving life at sea, riding out a gale in an unprotected anchorage, loading and unloading in a seaway, wearing and tacking ship.

3. FISHING-VESSELS, PILOT-BOATS, YACHTS, LIFEBOATS, etc.—Experiments in using oil when crossing bars, landing in a surf, etc.

GENERAL RULES FOR THE COMPETITIONS.—Each experiment must be described fully as soon as possible, and an account inserted, under the proper date, in the vessel's log book. In the case of fishing-vessels and pilot-boats, however, this may be dispensed with; but upon return to port a full statement must be made to the maritime authorities. Full details must be given regarding the direction and force of the wind, the state of the sea,