the back side of the plate. Other liquid or solid bodies may even be interposed between the plate and the metal, without the retrograde reproduction ceasing. The various liquids studied would exhibit a different specifical behavior, being more or less permeable. In the case of a chemical reaction occurring between the metal and the liquid, the metal will appear with particularly bright tints on the image. The author thus succeeds in *producing photographic images of chemical processes in a perfectly spontaneous way.*

These phenomena afford moreover a most sensible test of the thermic state of the plate, the images obtained being direct *thermo-photographs.*

As regards the bearers of these phenomena, the author only makes negative statements; they cannot be due to a direct action of H_2O_2, oxygen, or ozone vapors. Nor are negative ions likely to be operative, as no electrical effects are observed. A striking feature is the dependence upon temperature, no similar behavior being known in the case of any other radiation phenomenon. A. G.

OBSERVATION WAR KITES.

As a result of the success which Col. S. F. Cody has achieved in his experiments in aerial flight by means of kites, he is now carrying out a series of trials for the British Admiralty with his aeroplane, which was described at length a few weeks ago in the SCIENTIFIC AMERICAN SUPPLEMENT.

With this apparatus the inventor has completed some remarkable performances. At Newcastle-on-Tyne he succeeded in flying his kites to a height of only 1,000 feet below the record altitude attained at the Blue Hill Observatory. On this occasion he could easily have attained a much greater height, but for the insufficiency of paying out wire on his drum. This flight was carried out purely for meteorological purposes, the kite being equipped with a specially-devised appliance for automatically registering, at the maximum height reached, the wind velocity by means of an ingenious anemometer, the temperature of the atmosphere, and the barometric pressure, the records being obtained upon a paper drum similar to those of the barograph. By means of this ascent some valuable data was obtained relative to the conditions reigning in the upper strata of the atmosphere.

But although it has proved successful in meteorological observations, the kite has been designed for the express purpose of solving the problem of aerial flight. In this direction the inventor's attempts have surpassed all previous efforts. Major Baden-Powell, of the British army, some years ago contrived a kite which succeeded in lifting a man some 12 feet in the air, but as the apparatus was somewhat clumsy in character, and the results achieved of no practical utility, further experiments with this aeroplane were abandoned. Hitherto, the greatest altitude attained by man by means of a kite is about 100 feet, but at Woolwich a few weeks ago Col. Cody eclipsed this limit by ascending to a height of 600 feet quickly and with facility, and he would have risen still higher, but for the fact that this was deemed sufficiently conclusive to the members of the British War Office who were witnessing the experiments. The British military and naval departments are following the trials with the Cody apparatus, with a view to adopting it in the services if its practicability and reliability can be established. At the test at Woolwich, although the weather was rather inclined to be boisterous, the inventor was carried into the air with perfect steadiness, and he had no difficulty in controlling his position while in the air.

The War Office, after its experiences with the balloon during the South African campaign, is inclined to the opinion that it is not an ideal means of aerial reconnoitering of the enemy's country and movements. Being held captive, the balloon is in constant movement, rendering survey by the occupants of the car through field glasses extremely difficult and unreliable. On the other hand, the kite is remarkably still—almost stationary—when flying, so that observations can be carried out with success.

Having established the utility of his kite for military purposes Col. Cody next proceeded to demonstrate its serviceability to the naval authorities. To a fleet at sea some means of reconnoitering from an aerial position is even more important than on land to an army. Attempts with balloons held captive to a vessel have proved that the defects exhibited in military operations are accentuated, especially when we consider that a vessel moves far more rapidly through the water than an army corps can travel over land. With a kite, however, as Cody has shown, when the vessel steams against the wind, the increased atmospheric resistance offered to the planes of the kite only serves to keep it steadier, while if the vessel remains at anchor, the man in charge of the kite has greater possibility of shifting his position while aloft without any assistance from the ship below. With a balloon this is absolutely impossible, since this vessel is quite at the mercy of the wind, and naturally has a tendency to travel in that direction in which the wind chances to be blowing at the time. With his kites, however, Col. Cody has been able, while in the air, and with the ship riding at anchor, to shift his aerial position from a point at an obtuse angle to the deck successively to a position perpendicular, and finally to a point at an acute angle, to the vessel below. The inventor has succeeded in bringing the kite over to an obtuse angle of 140 degrees against the wind by the manipulation of the apparatus from his seat upon the lifting kite.

TOMATO CULTURE IN THE SOUTH.

BY GUY E. MITCHELL.

The place where tomato culture can be said to have attained its highest degree of perfection is Crystal Springs, Miss., and the methods employed by the growers of that section can be advantageously followed by every gardener, if not commercial grower. The unusual feature of the system consists in pruning the plants, and the plan has been followed by the writer in his home garden since 1895, when he learned of it in the Florida winter tomato section.

Coincident with the appearance of the third leaf of a young tomato plant will come a sucker or branch; and as the plant grows, additional suckers will appear in the axil of each leaf until a vigorous plant will have twenty or more branches, the larger ones having branches of their own, and the whole plant spreading over an area of ten or twelve square feet. Such a plant of course requires an immense amount of soil nutrition and moisture to support its foliage. The Crystal Springs planters set their tomatoes somewhat nearer than do ordinary growers—as close as three by three and one-half feet—and when the first sucker is two inches long it is pinched out, as are likewise all suckers appearing thereafter. Before the plant begins to fall, light pine stakes are driven in the ground and the plants tied to them with ordinary white cotton strings. The tomato is then trained up this stake, requiring three or four tyings, until it reaches the top, four feet from the ground. Then the bud is pinched out. This gives a plant with about twelve or fourteen great leaves, four times the size of the ordinary tomato leaf, and five or six clusters of magnificent, perfect fruit. The patch now looks like a diminutive orchard loaded with fruit. Bushels of ripe tomatoes are in plain sight as the eye wanders over the field. Under this method there is no danger of tomatoes rotting or mildewing; they ripen seven or eight days earlier than if the plants are left to their own devices or stalked in the ordinary way, and it is practicable to get through the rows at any time and keep down objectionable weeds, and perhaps the most important, the plants having a comparatively small leaf surface for transpiration do not require nearly so much moisture to mature their fruit.

If a somewhat bushier plant is desired, the vine can be trained to two instead of to a single stem.

A KITE COMPETITION.

An interesting competition is to be carried out under the ægis of the Aeronautical Society of Great Britain, to ascertain the maximum height to which it is possible to fly kites. The trials will take place on the Sussex Downs. The contest is of an international character, so as to obtain considerable data relative to the utility of kites for meteorological operations, and the best type of kites with which to attain high altitudes. There is no stipulation regarding the size of the kites, but only single kites must be employed, and a height of 3,000 feet is fixed as the minimum. The duration of flight must be one hour. Each kite will carry a weight of two pounds to represent scientific instruments. Several enthusiastic kite fliers have decided to participate in the contest. Various materials in the manufacture of the kites will be employed. Most of them will be made of canvas, but one will be flown constructed of aluminium. This is a decided novelty, but it is anticipated that it will work satisfactorily. The string is steel wire wound upon a big reel, and weighing 15 pounds to the mile, so that at an elevation of 15,840 feet the kite will have to support a weight of 45 pounds. There will also be an exhibition flight by Mr. Patrick Alexander of almost every kind of kite used by man, inclusive of the Japanese and Chinese. In the event of there being insufficient wind to lift the kites from a stationary position, it is proposed to employ motor cars to give them a flying start, in precisely the same manner in which a boy runs, dragging his kite behind him in order to obtain sufficient atmospheric resistance to cause the kite to rise.

The German government has received a telegram from Lorenzo Marquez, Portuguese East Africa, stating that the captain of the Norwegian bark "Garcia" has delivered to the German consul there a letter from the "Gauss," dated from the Indian Ocean May 5, as follows: "We wintered well off newly-discovered land in 66 degrees 2 minutes south latitude and 89 degrees 48 minutes west longitude. We are now *en route* to Durban. All well." A message from Prof. Drygalski, at Durban, says the ship behaved splendidly. He adds that he is forwarding reports.

SCIENCE NOTES.

Dr. Koldeway announces that the excavation of the Ishtar gate at ancient Babylon is now completed. The gate is of imposing size. Six hundred cases of tiles, reliefs, and other objects, which once decorated the palace of Nebuchadnezzar have been shipped to Germany.

The peach crop this year, owing to the heavy frost which caught the blossoms just as they were swelling and opening, will be very light in the eastern part of the United States, but it will be not less than it was before the landing of Columbus, for the peach is an Asiatic product; the Yang-tse-kiang country being the home of this fruit. The Chinese have always been familiar with the peach from earliest records. In the Celestial kingdom the peach blossom is used in ceremonials, something after the manner of the orange blossom among ourselves. The Department of Agriculture has had an agent in that section of China studying the early history and evolution of this fruit.

Considerable interest has been aroused in this country by the publication of the French method of producing alcohol from calcium carbide. The idea is by no means new. There are two simple processes by which this can be done. One of these was described by Col. J. Colton Lynes in the SCIENTIFIC AMERICAN for June 9, 1897. Col. Lynes has practised the method of producing alcohol from calcium carbide from acetylene for nine years, and has made many demonstrations of it. He first used it in 1894, perfecting and developing the method of Berthelot, which was put forth many years ago. Col. Lynes informs us that he was the first man in the United States to employ this method. According to calculations which he has made, pure alcohol can be produced by this process at the cost of ten cents a gallon.

The following Committee of Organization for the United States, for the Eleventh International Congress of Hygiene and Demography, to be held in Brussels, September 2 to 8, 1903, has been appointed, at the request of the Belgian government, by the State Department. Dr. E. A. de Schweinitz, the Columbian University, Washington, D. C.; Dr. A. B. Richardson, the Columbian University, Washington, D. C.; Dr. John Marshall, University of Pennsylvania, Philadelphia, Pa.; Dr. Harrington, Professor of Hygiene, Harvard University, Boston, Mass. The committee desires to secure the co-operation of all of those in this country who are engaged in hygienic work, both in attendance at the meeting in Brussels and in sending papers to the Congress. The Congress will be divided into two sections: First, Hygiene; second, Demography. The subjects which will be considered are the relation of bacteria and parasites to hygiene, the hygiene of foods, the treatment and prevention of commun cable dieases, etc. The important subject in its vari ous phases of the communicability of tuberculosis will be discussed by prominent men. Those who wish to attend or send are to notify E. A. de Schweinitz, Washington, D. C.

The effect of water impregnated with various chemicals, not only on the public health but on steam boilers, and in the various arts and manufactures will be systematically investigated by the Geological Survey. Heretofore strict adherence to the most approved scientific methods has made the work expensive and has prevented its assuming the general character likely to be productive of the most utilitarian and widespread results. The Geological Survey will endeavor to secure simply results sufficiently accurate for all practical purposes without the additional work and expense essential to the more delicate analyses. The experience of the Survey thus far is that a large number of determinations of approximate accuracy are, in the aggregate, far more useful than a few determinations made according to refined methods. The Survey has endeavored to interest the attention of various chemists in the country in this matter. A widespread discussion has been carried on concerning the most useful means by which rapid and approximately accurate results can be reached. The opinions of these chemists are being collected, and from them there is in process of construction a scheme by which large areas can be chemically surveyed. Many railroads in the United States maintain chemical laboratories, and the results of the analyses of water found along various rights of way furnish a clear conception of the character of the available waters along these narrow lines. The work involved in a chemical survey, however, as it has been carried on in the past, is necessarily expensive and exceedingly slow, and there has been great need of rapid and practical field methods whereby a large number of analyses can be made at small cost.