Regardless of what the latter had been, cultures which contained healthy and extensive growth tended to be neutral, those which failed to grow had usually become slightly acid, and those that had exhibited extensive growth and then degenerated were most frequently slightly alkaline. These results, however, apply only to solutions containing not more than 0.5 per cent. dextrose, for when 1 per cent. or more dextrose was added to the medium the cultures were often found to be acid when death took place.

In these observations the optimum hydrogen-ion concentration for tissue cultures in Locke-Lewis solution was pH 7. The final concentration depended upon the amount of dextrose in the medium. Cultures in media containing no dextrose usually had a hydrogen-ion concentration ranging from 7 to 7.6; those in media having 0.25 to 0.5 per cent. dextrose ranged between pH 6 and pH 7.8, mostly pH 7.2 and pH 7.4; while those in media to which 3 per cent. and 5 per cent. dextrose had been added were often pH 6 and pH 5.6 respectively.

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AN ELECTRICAL EFFECT OF THE AURORA

DURING the past year I have been making observations on the diurnal variation in electric potential difference between the earth, as represented by the water system of Palo Alto, and an uncharged, insulated conductor kept inside an earthed metal cage. The records of this variation have been registered continuously by a photographic method since July 20, 1920. For two weeks, or more, preceding the great aurora of May 14 these records were different from any which had preceded them, and two days before the beginning of the aurora there was a sudden change in the potential difference being measured which seemed to indicate an increase in the negative charge of the earth.

After the aurora the record of the diurnal variation was of a very different character from anything which had been obtained before. In Fig. 1, the continuous line represents the mean variation of the recorded potential-difference in millivolts for ten days preceding the aurora, and the broken line gives the same data for the ten days following the aurora. The mean daily range of the recorded potential difference on my record was 99.5 millimeters for the ten days preceding the aurora and 35.5 millimeters for the same period following the aurora.

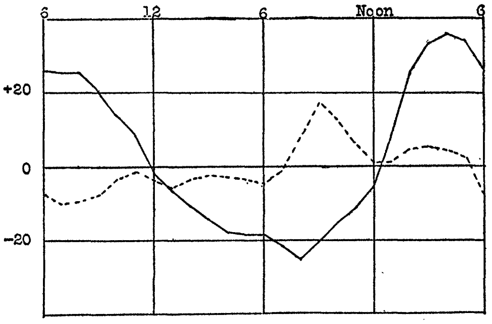

FIG. 1. Diurnal variation in potential difference between the earth and an uncharged, insulated conductor for ten days preceding and ten days following the aurora of May 14, 1921.

The mean diurnal variation in millivolts for the ten months, August, 1920, to May, 1921, is shown by the curve in Fig. 2.

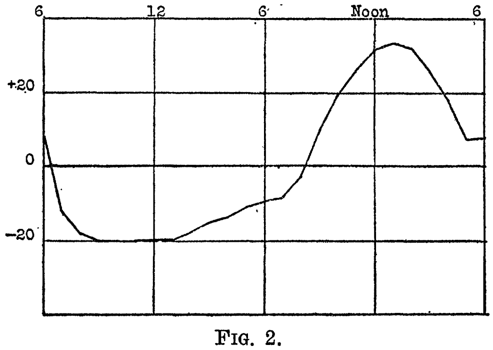

FIG. 2.

A simultaneous record of the change in the north component of the earth's magnetic field was made on the same sheet with the electrical record. For three days at the time of the aurora the magnetic record was too much disturbed to admit of measurement. The mean range of magnetic variation for eight days preceding the aurora was 22.6 millimeters on my record; while for the five days after the record became measurable the mean diurnal variation was 17.7 millimeters.

During the entire month of June the electric records were more than usually disturbed. Early in July the disturbance increased. On July 6, 7 and 8 the disturbances were the greatest that have been observed since August 1, 1920. On the morning of July 10 an aurora was reported as visible in northern California. From that time to the present (July 19) the records have been very little disturbed and the range of variation has been much smaller than the average for the year.

FERNANDO SANFORD

THE AMERICAN CHEMICAL SOCIETY.

(*Continued*)

Increasing the yield of our dyes: J. L. BULLOCK. The first consideration is a thorough knowledge of the intermediates. Tests for quality are essential as small amounts of impurity have a decided effect on the yield. Specialization on few dyes is necessary in order to know them thoroughly. The best intermediates obtainable are usually the cheapest in that they give greatly increased yields. The sedimentation of solutions is advantageous and filtration at every stage adds to tinctorial power of the subsequent dye. In actual synthesis of dyes, intelligent use of equipment is as essential as chemical control. Uniformity in carrying out reactions is a great factor in obtaining maximum yields. Diazotizations should be as rapid as possible. Coupling a difficult condensation; the foam a good indication of its course. It is important to precipitate the dye in an easily filterable state. With triphenylmethane dyes even greater care must be used than with the azo dyes. A knowledge of the dyeing properties, fastness, etc., is very useful in getting the standard of purity to the highest possible point. Attention to the most minute details is repaid by increased tinctorial power and lessened cost of the finished dye.

The preparation in the pure state of certain dyes of the malachite green series: WALTER A. JACOBS AND MICHAEL HEIDELBERGER. It is shown that in many cases in which the chlorides are too soluble or do not crystallize, the nitrates may advantageously be used for isolation of the dyes. Descriptions are given on this basis of salts of malachite green and some of its methyl, halogen, amino, acylamino, alkylamino, hydroxy, and alkoxy derivatives, as well as the nitrate of brilliant green, and the furfurol analog of malachite green.

The electrometric titration of azo dyes: D. O. JONES. The titanous chloride reduction methods originally suggested by Knecht for the analysis of numerous compounds, both organic and inorganic, have, in recent years, come into more general use in the field of dye chemistry. The titanous chloride method for the analysis of azo dyes becomes more generally applicable, when the end point of the titration is determined by the electrometric method. The method in general is similar to the usual oxidimetric analysis as carried out with the electrometric apparatus. In the former methods, employing the use of a sulphocyanide indicator, the end point in the back titration with ferric alum is sometimes difficult to determine. Dark colored material in suspension and the color which is sometimes imparted to the solution by the products of reduction do not interfere in the electrometric method. It also permits the use of larger samples, while the end point is readily and accurately obtained.

Extraction process of wool degreasing: LOUIS A. OLNEY. A thorough study of the subject of wool cleansing is quite sure to lead to the conclusion that the extraction method, *i.e.*, the treatment of the raw wool under proper conditions with certain organic solvents, is far more scientific in principle than the ordinary emulsive process. With efficient apparatus and good management the expense of cleansing wool is reduced to a minimum by this process and the results obtained approach the maximum established through theoretical and economical considerations. Although the early attempts to degrease wool by the use of volatile solvents resulted in complete failure, many practical incentives sufficed to keep interest in the process alive.

Fastness to storage: OSCAR R. FLYNN. Dyed cotton goods sometimes changes unevenly when stored in the folded piece. Regions of change mark out the channels along which air flows due to changes in temperature. This shows that the change in the dye is caused by some substance present in the air in small quantity and not primarily to oxidation, which shows its effect in the interior of a mass of goods. In some cases the change is temporary, and the result of the action of acid alone. In other cases the effect is due in the first place to acid, but followed later by complete destruction of the dye. Alkali sensitive dyes such as Stilbene Yellow show temporary changes due to acid alone. Acid sensitive dyes, such as