your remembrance the help you promised me last year. Sincerely yours,

(Signed) K. LINSBAUER.

L. B. BECKING

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REQUEST FOR PAPERS ON GEOLOGIC DIFFUSION

I HAVE received from Professor Raphael Ed. Liesegang, of the Institut für physikalische Grundlagen der Medizin, Schloss Str. 21, Frankfurt am Main, who is well known for his studies of diffusion and of the phenomena generally referred to as "Liesegang rings," a letter in which he requests that geologists who may publish, or who have recently published, papers dealing with the relation of ore deposition to colloid chemistry or diffusion will forward to him copies of their works. He explains that he desires these for abstracting for the "Kolloid Zeitschrift" and for use in the preparation of new editions of his books on *Geologic Diffusion* and on *Agates*. Hitherto he has obtained such papers by personal letters to their authors, but the present postage rate from Germany is so high as to make a continuance of this practice a heavy burden on his resources.

GEO. OTIS SMITH,
Director
UNITED STATES GEOLOGICAL SURVEY

ATMOSPHERIC POLLUTION

READERS of SCIENCE have been in touch with the work of the Committee for the Investigation of Atmospheric Pollution. In the issue for April 22, 1921, a review of the Sixth Report is given, and in the issue for November 28, 1919, a summary of the Fourth Report.

The Seventh Report has now appeared[1] giving results of measurements of the deposits from 31 stations. During the year, automatic apparatus for measuring suspended impurity was set up at six stations.

The tables are similar to those in previous reports, and cover:

1. Monthly deposit for two selected stations, representative of high and low deposits such as central Birmingham and Rothamsted.

2. Total solids deposited monthly at all stations.

3. Mean monthly deposits at all stations for the summer half years, *i. e.*, April to September, 1919 and 1920.

4. Mean monthly deposits at all stations for the winter half years, *i. e.*, October to March, 1919-1920 and 1920-1921.

5 and 6. Classification of the stations according to amounts of various elements of pollution.

7 to 10. Totals of stations as classified for each element of pollution.

There is also a discussion of the type of deposit gage. The metallic gage, even when varnished, gave traces of metallic salts; and the glass gage proved too fragile; and finally enameled stoneware was adopted. One set of gages has been provided with Nipher shields to improve the catch; and it would seem as if the amount so caught now agreed closely with the catch of the rain gage, which was not the case previously.

A twin atmospheric pollution gage has been devised and put in operation at Rochdale by Dr. Ashworth and an attempt made to measure the quantity of impurities brought into the town and the amount carried out.

The west wind brought 14.8 tons per square kilometer; and 11.84 tons were carried out by the east wind. The data covered a period of five months. The amount brought in by the west wind, however, is not sufficient to account for Rochdale's high atmospheric pollution.

From the records of the instruments at the Meteorological Office it would appear that in London domestic fires are responsible for nearly two thirds of the total smoke.

The relation between health and impurity is discussed by Dr. J. S. Owens.

Curves were prepared in which the daily deaths of London were plotted with the data for maximum suspended impurity in the air. Temperatures were also considered.

There is a tendency for the death rate to reach a maximum when the impurity is highest or rather a little later.

On the whole there is no obvious relationship between the quantity of impurity and the number of deaths in London.

Dr. Owens also contributes an article on "London Fog in November," describing measurements made of the black particles. These

[1] M. O. 249. Meteorological Office, Air Ministry, London, 1922. Price 2s.

varied from .00013 mm to .00026 mm in diameter. The thickness of the water film was probably .0014 mm. He compares these with the diameters of fog particles measured by Barus in his experiments on atmospheric nucleation. He also treats of the sources of solid particles in London fogs. These come quickly, the air being relatively clean at 6 a.m.; and heavily laden with smoke fog by 9 a.m. When the air in London is fairly clear in winter, the amount of suspended matter is approximately 1 milligram per cubic meter; during a dense fog it rises to 5 mgs/m^3. A rough estimate of the weight of the impurity in a fog for an area of 310 square kilometers (120 square miles) and a height of 122 meters gives 193 tons. According to Dr. Owens the amount of smoke produced between 6 a.m. and 10 a.m. from domestic fires and factories is sufficient to account for this load of suspended matter over London on a foggy day at 10 a.m.

Dr. Owens touches on the amount of dust in expired air. It has been assumed by medical men that the air passage through nose and throat practically trapped all the solid impurities. He doubts this and some experiments which he made seem to prove that in ordinary breathing the expired air contained about 70 per cent. of the suspended impurity which entered during inspiration. It seems certain that suspended matter is not entirely removed by action of the respiratory passages. In fact, only about 30 per cent. is removed.

Quite a good deal of space is given to a discussion of the relation of visibility to suspended impurity. The discussion is technical and no definite conclusions are reached.

Research work on measurements of acidity in the suspended matter of air is in progress.

ALEXANDER MCADIE

SPECIAL ARTICLES

STUDIES OF THE POLLEN TUBES AND ABORTIVE OVULES OF THE GLOBE MUTANT OF DATURA

THE Globe mutant, like the twelve or more other ($2n+1$) mutants already described (1 and 3), owes its mutant character to the presence of a single extra chromosome, the somatic number being 25 instead of 24. One of us (2) has shown by means of breeding tests that the inheritance of Globes is almost exclusively through the ovules, by which it is transmitted to only one quarter of the offspring whether the parent Globe is selfed or is pollinated by a normal diploid. Pollen from a Globe when applied to stigmas of a normal parent transmits the Globe complex to considerably less than 3 per cent. of the offspring.

Our colleague, Mr. Belling, finds that half of the pollen grains of Globe plants receive the extra chromosome. The fact that some of the ovules transmit the character, while some give rise to normal plants, indicates that a similar segregation takes place in the formation of the ovules. While the back-cross of Globes x normal pollen does not produce more than about one quarter Globes in the offspring, there are more than enough small aborted ovules in the seed pod to account for the missing Globes necessary to satisfy the expected 1:1 ratio of Globes to normals. We may safely infer, therefore, that half of the mature megaspores within the ovules receive the extra chromosome.

If there were no losses through bad pollen or abortion of ovules, the expected result of selfing ($2n+1$) Globes would be 25 per cent. normal diploid plants with the formula $2n$, 50 per cent. ($2n+1$) Globes, and 25 per cent. ($2n+2$) Globes with two extra chromosomes in the Globe set. Instead, we get mostly normals, with only about 25 per cent. ($2n+1$) Globes and but rarely a ($2n+2$) Globe.

The problem here is to find if possible exactly where the losses are incurred, whether in pollen grains which fail to germinate, in pollen tubes which fail to grow fast enough to reach the ovary, or which fail to fertilize the ovules, or entirely in zygotes which are lost in the aborted ovules.

Aborted ovules were counted in seed pods that were nearly ripe. These can be seen with a hand lens or binocular dissecting microscope on the enlarged fleshy portion of the placentæ among the seeds.

Two classes of aborted ovules were recognized, the tiny apparently unenlarged ovules and those that were distinctly enlarged. The