marsh would not suit it. The figured vegetation recalls to me rather foreshortened date-palms with branching fruiting stems, showing in addition the cabbage—prized as a vegetable—in the crown of the palm. Sir Flinders Petrie, however, is of opinion that they are "aloes in tubs or vessels around which the leaves hang," as they are "never represented as springing from the ground." If so, the tubs must be standing in the watery mud. The stem of the plant (Petrie's "tub" I take it) shows palm-like growth-rings; and though it does not reach the water or ground, neither do always the "oars," the birds' or the ruminants' feet. The fan-like objects (*tom. cit.* plate xx. 44D) among which the flamingoes are wading, appear to me to represent young palms growing from the nut (which in palms sprouts without necessarily being covered) in or on the edge of the water, as I have seen them throwing up a single leaf on the marshy edge of the river of Hadibu in Sokotra.

The two erections midships on the deck (resembling cabins on paintings of unmistakable boats), each flying its Nome ensign, may be entrance gateways, or perhaps shelters. The gangway between them is invariably situated over the gap in the piles, the discontinuity of which would facilitate landing at the lodge from a reed-bundle float or small boat, or afford a passage-way underneath the lodge. The over-hanging branch at one end may serve for shade—perhaps branches with dates for refreshment—just as it does at the look-out end of navigable Nile boats; while the tying-up rope dangles from the stem for the purpose of mooring any visiting boats.

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The Supposed Constancy of the Hybrid between the Common and the Water Avens, *Geum urbanum* × *rivale*.

IN several publications issued during the last few years,[1] M. L. Blaringhem has asserted that the hybrid *Geum urbanum* × *rivale*, sometimes described as *Geum intermedium*, retains its character unaltered during subsequent generations, and he cites this plant therefore as an example of the constancy of an interspecific hybrid. In making this assertion M. Blaringhem neglects to take account of the result of experiments carried out by us,[2, 3] which are in direct contradiction to the view he puts forward. We should like therefore to direct attention to the facts observed by us and confirmed by further experiments.

Our observations were made quite independently, and have resulted in the establishment of the fact that a distinct segregation of characters takes place in the f_2 generation of this hybrid. This segregation concerns a considerable number of characters.

1. The *inclination of the peduncle* varies both towards the pendant condition of *G. rivale* and equally towards the erect position of *G. urbanum*.

2. The *presence of anthocyanin* in the peduncle and calyx, which the f_1 generation inherits from the Water Avens, varies considerably in degree in the f_2 generation, and this colouring matter may be almost absent in some specimens.

3. The *calyx*, which is more or less expanded in the f_1 generation, shows this condition in the majority of cases in the f_2 generation, but some individuals possess the closer calyx of *G. rivale* and others the reflexed calyx of *G. urbanum*.

4. The *colour of the flower* in the f_1 generation partakes of the character of both parents, the petals being yellow on their inner and red on their outer surfaces. In the f_2 generation there is a distinct segregation of yellow colour, about 75 per cent. having this colour and 25 per cent. lacking it, according to the observations of one of us. This proportion agrees with the Mendelian ratio 3 : 1. The red colour varies considerably in degree in f_2, but scarcely any individual is found to lack this colour entirely. This may be explicable by supposing this colour to be due to several factors.

5. A segregation is also presented by the *form of the petals*. Thus, one of us has shown that in the f_2 generation 49 individuals had notched while 159 had entire petals, figures which approximate very closely the Mendelian ratio of 1 : 3.

6. The *stipules* were observed to show considerable variation in size in the f_2 generation, tending towards those of the respective parents.

It seems curious that, in spite of such obvious segregation to which we have directed attention, M. Blaringhem should still maintain the former but erroneous view that *Geum urbanum* × *rivale* is an example of the constancy of hybrids between different species. This is all the more remarkable as M. Blaringhem admits in his publication of 1922 the occurrence of some variation in this hybrid. We can only imagine that he has not recognised that such variation is due to segregation because some of the characters may be due to two or more factors; so that to obtain completely recessive forms it is necessary to cultivate a very large number of individuals.

As M. Blaringhem's erroneous view of the constancy of hybrid *Geum urbanum* × *rivale* may gain currency among those who are not familiar with the progeny of this plant, it seems desirable to direct attention to the results of the experiments carried out by us prior to the publication of his conclusions.

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D. ROSÉN.

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[1] Blaringhem, L. Les Problèmes de l'hérédité expérimentale. Paris, Flammarion, 1919. Habilité et fertilité de l'hybride Geum urbanum L. × rivale L., *Comptes rendus Acad. Sci.* T. 170. Paris, 1920. Nouvelles recherches sur les hybrides, *Comptes rendus de l'Ass. Française pour l'Avanc. des Sciences*, 1922.

[2] Rosén, D. Kreuzungsversuche G. urbanum L. × rivale L. *Botaniska Notiser*, 1916.

[3] Weiss, F. E. Geum intermedium (Ehr) and its segregates. Report Brit. Ass., Dundee, 1912.

Fine Structure of X-Ray Absorption Edges.

IN the issue of the *Zeitschrift für Physik* for July 2, 1924, Dr. Coster reports the existence of a white line on the long wave-length side of the absorption edge in the case of the higher valence forms of various elements. Evidence has been obtained in this laboratory that iodic acid and potassium permanganate, two of the substances for which he reports this line, are slowly reduced by X-rays. If this occurs in the absorbing screen, it seems reasonable to expect that the photographic plates will show not only the absorption edge of the original compound, but also that of the reduced portion. According to Lindh's results with phosphorus, sulphur, and chlorine, the absorption edge of the reduced form might be expected to fall on the long wave-length side of the main edge. It seems reasonable, therefore, to raise the question whether the white line Dr. Coster reports may not be the absorption edge of that part of the material in the absorbing screen reduced by the X-ray.

In the effort to discover whether reduction of iodic acid could be demonstrated chemically, we have sealed portions of a 25 per cent. solution of iodic acid in water in thin walled glass test-tubes, with suitable precautions to prevent reduction by the heat of the blast lamp. In one of these tubes of iodic acid we

placed a cubic centimetre of chloroform and in another an equal amount of carbon tetrachloride, both of which give a pink coloration in the presence of free iodine. The other tubes contained only iodic acid and were broken open and tested with chloroform after X-raying for a number of hours. All the tubes gave the test for traces of iodine after exposure to the X-rays. Solid iodic acid crystals take on a brownish coloration when X-rayed, but it has not yet been found possible to demonstrate conclusively that this coloration is due to free iodine. A very dilute solution in water of potassium permanganate was found to have lost its pink colour and to have become distinctly yellow after being exposed to X-rays for an hour, thus indicating reduction of the permanganate ion.

A little evidence has also been obtained on the spectrographic side. We have taken plates of the iodic acid L_3 absorption edge with a Siegbahn spectrograph, using two different absorbing screens, one containing iodic acid free from all traces of iodine by the chloroform test and the other containing iodic acid contaminated with traces of iodine or iodide. The white line on the long wave-length side of the edge was more pronounced with the impure iodic acid.

The spectrographic data available would also seem to support our hypothesis in that it shows a rather remarkable agreement between Dr. Coster's values for the white lines with highly oxidised compounds and the values for the absorption edges with the free elements. In the case of iodic acid, he gives 2711·5 X units for the white line and 2712 for the absorption edge of free iodine. For tellurous acid, he reports the white line at 2846·9 X units and his value for the edge of metallic tellurium is at 2847·1. We have just obtained the absorption edges for metallic antimony and metallic tin, and the agreement with the white lines Dr. Coster reports for the oxidised compounds of these elements is equally striking. He reports white lines at 2991·1 and at 3147·5 for the oxidised compounds, and we have found the absorption edges for the free elements at 2991·5 and 3146·9 respectively. Thus, in the case of all four elements, the absorption edge for the free element is within a fraction of an X unit of the value Dr. Coster gives for the white line. This, coupled with the fact that X-rays can act as a reducing agent, would seem to be definite evidence in favour of the hypothesis that a part of the highly oxidised compound in the absorbing screen is reduced and that the white line reported is the absorption edge of the reduced portion. KATHERINE CHAMBERLAIN.

Physical Laboratory,
University of Michigan,
August 31.

Low-Voltage Arc Spectra of Copper and Silver.

IN NATURE of July 21, 1923 (vol. 112, p. 100), was published a letter from me giving results I had obtained on the ionisation potentials of copper and silver vapour by the low-voltage arc method. The spectroscopic examination of these metals is complicated by the fact that the spectrum of the ordinary arc contains large numbers of spark lines. By using a three-electrode arrangement *in vacuo* such as was used by Foote and Mohler, I have succeeded after some difficulty in obtaining spectrograms of the ultra-violet arc spectrum of silver vapour entirely free of spark lines. The only lines appearing are the first two pairs of the principal series. The wave-lengths of the second pair, as measured by Pina, are not correct. The small quartz spectrograph which was used in these experiments, and was in perfect focus, gave values always within 0·1 Å of the calculated wave-lengths quoted by Fowler. This is sufficient evidence that the value of the ionisation potential given in my former letter is incorrect.

The arc spectrum of copper is, of course, complicated by the presence of at least one "X" level between $1S$ and $1\pi_1$, which makes it possible for arc lines other than principal series lines to appear below the limit of the subordinate series at about 3145 Å. The arc in vapour at 8 volts gives a large number of lines terminating with a single line. This line I have measured on five plates of the ordinary arc, and have obtained values 2024·30 Å, ·35, ·30, ·34, ·36, giving an average of 2024·33, the value calculated for $1S - 2\pi_1$. This line is very strong in the low-voltage arc and it certainly cannot have any accompanying line of comparable intensity at 2025·67, the wave-length calculated for $1S - 2\pi_2$. This throws much doubt on the accepted interpretation of the X-combinations leading to these values.

The three-electrode apparatus which gave only arc lines in silver shows the copper lines given in List I., when operated at 8·2 volts and 6 m.a. These lines are almost certainly arc lines, and must, therefore, be combinations either with $1S$ or with terms of type X. They should be important in the disentanglement of the copper arc spectrum.

LIST I.

2165·08	2824·42
2179·39	2883·00
2181·74	2961·19
2225·68	3010·90
2230·11	3036·09
2441·67	3063·41
2492·15	3247·55
2618·39	3273·96
2766·38	

List II. contains lines extra to List I. which appear on a plate taken with an 8-volt arc in copper vapour. These lines must be either arc lines or easily excited spark lines. The wave-lengths are those given by Huppers. All the lines are so faint that intensities cannot very well be given, but the very faint lines are indicated with an f.

LIST II.

2024·33 (calc.)	2238·46 f
2138·54 f	2244·22 f
2199·64	2260·48
2214·58	2263·07 f
2215·68	2293·85
2227·74	2392·64
2236·28 f	2997·38 f

The difficulty of obtaining spectrograms of the visible region is much greater because of the high temperature of the filament and furnace, and so far only one rather unsatisfactory photograph has been obtained. It is hoped, however, to cover this region in the near future. A. G. SHENSTONE.

University of Toronto,
August 18.

Organisation in Chemical Societies.

IN common with all other members of the Chemical Society, I have received a notice to the effect that there is to be a virtual increase in the annual subscription, in that an extra charge will be made for the Annual Reports, which have hitherto been supplied to members free of charge, and at the same time directing attention to the need for increasing the membership of the Society. I have little doubt that the result will be that many members of the Society will not purchase the Report; but as this publication appeals particularly to students, and as it is from men