TABLE III

Synonymy of chromosomes as published by various workers

New chromosome number	Tjio and Puck[6]	Chu and Giles[2]	Levan and Hsu[5]	Ford, Jacobs and Lajtha[3]	Böök Fraccaro and Lindsten[1]	Lejeune, Turpin and Gautier[4]
1	1	1	1	1	1	G1
2	2	2	2	2	2	G2
3	3	3	3	3	3	G3
4	4	4	4	4	4	G4
5	5	5	5	5	5	G5
6	6	6	6	6*	6	M1
7	7	7	7	(8)	7	M2
8	8	8	8	(9)	8	Md1
9	9	9	9	(11)	9	M3
10	10	10	10	10	10	Md2
11	11	11	11	(12)	11	M4
12	12	12	12	(13)	12	Md3
13	18	14	20	14	14	T1
14	19	15	18	15	15	T2
15	20	13	19	16	13	T3
16	13	17	15	19	16	C1
17	14	16	13	17	17	P1
18	15	18	14	18	18	P2
19	16	19	16	20	19	C2
20	17	20	17	21	20	C3
21	21	21	22	22	21	Vh
22	22	22	21	23	22	Vs
X	X	X	X	?(7)	X	X
Y	Y	Y	Y	Y	Y	Y

* In the published *idiogram* the chromosomes of group 6–12 (including X) were indicated by discontinuous lines and left unnumbered owing to the uncertainty of discrimination at that time. For the purpose of this table, these chromosomes have been assigned the numbers shown in brackets, in serial order of length.

1. Böök, J. A., Fraccaro, M. and Lindsten, J., "Cytogenetical observations in Mongolism," *Acta Pædiatrica*, 1959, **48**, 453.
2. Chu, E. H. Y. and Giles, N. H., "Human chromosomes complements in normal somatic cells in culture," *Am. J. Hu. Genetics*, 1959, **11**, 63–79.
3. Ford, C. E., Jacobs, P. A. and Lajtha, L., "Human somatic chromosome," *Nature*, 1958, **181**, 1565.
4. Lejeune, J., Turpin, R. and Gautier, M., "Le Mongolisme, premier exemple d'aberration autosomique humaine," *Ann. Génét.*, 1959, **2**, 41–49.
5. Levan, A. and Hsu, T. C., "The human idiogram," *Hereditas*, 1959, **45**, 665–72.
6. Tjio, J. H. and Puck, T. T., "The somatic chromosomes of man," *Proc. Nat. Acad. Sci.*, 1958, **44**, 1229–37.

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THE UPTAKE AND REDUCTION OF IODATE BY WHEAT-ROOTS

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INVESTIGATING the toxic characteristic of halogenate anions, Aberg[1] put forward the idea that in plant tissues the iodate is reduced to iodide and its toxic activity is shown in this form. So far we have been at a loss in producing proofs about the iodate-iodide transformation possibly because the reaction, owing to the slow rate of iodate uptake, could not be studied by means of traditional chemical analytical methods under physiological conditions (diluted solutions, relatively short experimental period).

In our experiments we used I^{131}-iodate made from I^{131}-iodide by means of chlorine gas. The free chlorine left in the solution was boiled out and the hydrochloric acid formed during the reaction was neutralized by KOH. Investigating the iodate solution produced, by adopting paper chromatography, we obtained only 0·4% iodide

contamination; apart from chloride there was no other anion to be found.

In the uptake experiments the excised roots of 20 F. 481 winter wheat seedlings grown at 26° C. for 3 days in darkness were used in each variant. The uptake was made from a continually aerated solution of 100 ml. kept at room temperature and it took 6 hours. At the end of the experimental period the roots were washed twice in 50 ml. distilled water. Then the material was homogenized in 96% ethyl alcohol and after filtering, the rest was washed in 80% ethyl alcohol and distilled water. The washing solution was added to the original filtrate. The rest of the alcohol extraction was put for 24 hours in 0·2 N NaOH and then it was filtered and washed again. After filtering and washing, samples were made from the rest and both from the alcoholic and basic extracts, and their activity was measured by 1·3 mg./cm.^{2} end-window GM tube. (Data given about the activity of the rest are only of informatory value, since the self-absorption of samples have not been taken into account.) The chromatography of the alcoholic extract was carried out on Whatman 1 paper with 5 : 1 : 2 *n*-butanol : etanol : 2 N NH_4OH. Autoradiograms of the chromatograms were made on "Forte" high speed X-ray sheets.

In the first experiment an iodate solution of 100 μC activity and a concentration of about 0·1 m. equiv./l. was given in each 100 ml. variant. The variants were as follows: (1) control, (2) control killed by boiling, (3) 10^{-3} M Na-azide, (4) 50 m. equiv./l KNO_3 (see Table I). Using Na-azide the uptake decreased to 18% of the control, nitrate resulted in a reduction to 44% The chromatographic data indicate that the majority of the alcoholic-water extract can be found in the iodide spot (R_f 0·35) and only traces of iodate can be detected (R_f 0·04).

TABLE I

Iodate uptake by wheat roots

Variant	Uptake, counts per minute		
	alcoholic extract	basic extract	the rest
Control	11070	1590	83
10^{-3} M Na-azide	2000	340	8
50 m. equiv./l. KNO_3	4920	700	33
roots boiled	6020	1450	52

In the control variant where there was the greatest uptake, spots are visible at 0·15, 0·21, 0·45, 0·63, 0·81 R_f as well as just under the front line. Comparing data with those of iodide uptake, by wheat-roots (Böszörményi and Cseh[2]) striking differences could be found, particularly in the high R_f compounds (Fig. 1).

In the second experiment a solution composed of 2·5 m. equiv./l. iodate with an activity of 35 μC. was used for incubating intact and boiled roots. During the 6-hour experiment the intact roots took up 0·43 μ equiv. that is 0·17% of the given quantity of iodate. The absorbed quantity, as shown by chromatography, consists almost entirely of iodide, since, because of reduced specific activity, organic compounds of weaker activity cannot be demonstrated in experiments of this type. Surprisingly the "uptake" of boiled roots was of 1·00 μ equiv. and it is mostly iodate with some iodide. In our view the "uptake" of boiled roots is but external solution penetrating the tissues and hardly can it be eliminated by rapid washing.

A B

FIG. 1. Pattern of iodine compounds on chromatograms after the uptake of iodate (A) and iodide (B).

By the end of the 6-hour experiment the I[131] contents of the external solution appeared to be almost entirely of iodate, apart from some iodide traces. The experimental solution of boiled roots, however, showed somewhat higher iodide contents.

1. Aberg, B., *Roy. Agr. Coll. Sweden*, 1948, **15**, 38.
2. Böszörményi, Z. and Cseh E., *Naturwiss.*, 1959, **46**, 584.