formed per 100 ev where 52.4×10^{18} ev is equivalent to 1 Mrep) may be obtained by simple calculations from values in Figs. 1 and 2.

It was qualitatively determined that gamma irradiation at similar dosages also results in the formation of oxalates from the afore-mentioned bicarbonates and ammonium carbonate.

The yields of oxalic acid, obtained by permanganate oxidation, for varying concentration and dosage levels are presented in Figs. 1 and 2, respectively.

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Paradamite, a New Zinc Arsenate from Mexico

A suite of minerals from the Ojuela Mine, Mapimi, Durango, Mexico, was received recently for examination. The principal minerals identified were legrandite, $Zn_{14}(OH)(AsO_4)_9 \cdot 12\ H_2O$; plattnerite, PbO_2; murdochite, $Cu_6\ PbO_8$, and a new species having the composition $Zn_2(AsO_4)(OH)$, which has been named paradamite (*1*). The material was collected by George Griffith, and submitted for study by George Burnham. The type specimen is in the U.S. National Museum, catalog number 107443.

A chemical analysis of paradamite gave ZnO, 56.22; FeO, 0.45; Fe_2O_3, 0.12; As_2O_5, 40.17; H_2O (+), 3.44; H_2O (−), none; sum 100.40 percent (G. Switzer, analyst). The theoretical composition of $Zn_2(AsO_4)(OH)$ is ZnO, 56.77; As_2O_5, 40.09; H_2O, 3.14. Paradamite is triclinic and is a dimorph of adamite, which is orthorhombic. It is also the arsenic analog of tarbuttite, a triclinic form of $Zn_2(PO_4)(OH)$.

Paradamite occurs in sheaflike aggregates of triclinic crystals and in somewhat rounded and striated equant crystals up to 5 mm in size. It has a perfect {010} cleavage. It is transparent and pale yellow in color, with a white streak. The luster is vitreous and, on the cleavage, pearly. Optically it is biaxial (−) with $2V = 50°$, $\alpha = 1.726$, $\beta = 1.771$, $\gamma = 1.780$ (± 0.002). The specific gravity is 4.55 ± 0.02. Paradamite was found with mimetite and adamite on a matrix of limonite but not on the same hand specimen as legrandite, plattnerite, or murdochite.

Table 2. X-ray powder diffraction data for paradamite, tarbuttite, and adamite (copper Kα radiation, $\lambda = 1.5418$A, camera radius = 114.59 mm).

Paradamite		Tarbuttite		Adamite	
d (A)	I	*d* (A)	I	*d* (A)	I
6.33	10	6.19	10	5.99	8
5.44	6	5.44	5	5.47	1
4.77	2	4.60	5	4.96	10
3.99	3	3.88	1	4.29	8
3.71	10	3.71	8	3.79	6
3.34	5	3.28	6	3.31	1
3.16	6	3.09	4	3.06	3
3.08	7	2.99	7	3.00	10
2.99	9	2.88	8	2.71	9
2.84	9	2.78	9	2.64	6
2.76	1			2.59	5
2.73	1	2.71	2		
2.57	6	2.54	5	2.54	5
2.53	1				
2.49	8	2.48	6	2.47	10
2.45	3	2.42	7	2.43	8
2.39	3	2.36	6	2.36	7
2.32	1	2.29	1	2.09	2
2.18	2	2.22	2	2.01	2
2.13	1	2.10	3	1.97	4
2.11	7	2.06	7	1.92	3
2.08	5	2.02	3	1.89	3
1.99	1	1.95	3	1.86	2
1.95	1			1.82	1
1.91	2			1.78	1
1.88	1			1.75	2
1.84	1	1.85	4	1.72	4
1.82	2	1.82	2	1.67	5
1.79	4	1.80	2	1.64	3
1.76	2	1.74	4	1.62	7
1.72	4	1.71	4	1.60	3
1.67	3	1.60	3	1.58	5
1.58	4	1.58	1	1.52	5
1.55	2	1.54	2	1.49	5
1.54	4				
1.51	3				
1.48	4	1.48	1		

Table 1. Physical properties of paradamite, tarbuttite, and adamite.

Property	Paradamite (Mapimi Mexico)	Tarbuttite (Broken Hill, N. Rhodesia)	Adamite (Mapimi, Mexico)
Crystal system	Triclinic	Triclinic	Orthorhombic
Optical	(−) $2V = 50°$ $\alpha = 1.726$ $\beta = 1.771$ $\gamma = 1.780$	(−) $2V = 50°$ $\alpha = 1.660$ $\beta = 1.705$ $\gamma = 1.713$	(+) $2V = 88°$ $\alpha = 1.722$ $\beta = 1.742$ $\gamma = 1.763$
Cleavage	{010} perfect	{010} perfect	{010} good, {010} poor
Specific gravity	4.55	4.12	4.43
Color	Pale yellow	Colorless to pale yellow	Colorless, pale yellow, light yellowish green, bluish green

Properties of paradamite, tarbuttite, and adamite are compared in Tables 1 and 2 (*2*).

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Notes

1. Publication of this paper was authorized by the secretary of the Smithsonian Institution, Washington, D.C.
2. A detailed crystallographic description of the new mineral is in preparation.

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Loss of Nutrients from Plant Foliage by Leaching as Indicated by Radioisotopes

That nutrients can be absorbed by the foliage of plants from sprays has been adequately demonstrated through the use of radioisotopes (*1*). The results obtained by many workers (*2–6*) indicate that nutrients may also be lost from leaves. However, the implication is that these losses in large part occur as the plant approaches maturity. By use of isotopically labeled nutrients, it is now possible to study the magnitude of these losses, the nature of the compounds lost, and the physiological factors that may affect the rate of loss (*7*).

Young, rapidly growing plants were allowed to absorb phosphate and potassium solutions labeled with P^{32} and K^{42} through the roots, or P^{32}-labeled phosphate through the bases of cut stems. The plant material was then leached under a mist of distilled water for 4 to 48 hours, and the runoff (leachate) was collected. The leachates were then passed through anion or cation exchange resin columns (*8*), and the collected ions were eluted with 5-percent NaOH or HCl. The eluates were evaporated to dryness, made to a standard volume, and the radioactivity of aliquots was ascertained. Bean (*Phaseolus vulgaris*), sweetpotato (*Ipomoea batatas*), or poinsettia (*Euphorbia pulcherrima*) plants lost no significant quantities of root-absorbed P^{32}. However, cuttings of bean and rose (*Rosa spp.*) lost 1.5 and 12.8 percent respectively, of the labeled phosphate that had previously been absorbed through the bases of cut stems during a 4-hour period. Ten-day-old bean plants that absorbed