group. Fruit set on the morning glory stocks was prevented by removal of flower buds. In this test the flower buds appeared on the sweetpotato scion about 30 days after grafting and the first blooms appeared in about 60 days. Flowering was usually initiated at the seventh node of the scion and continued for 3 to 20 nodes, depending on the number and the continued vigor of the leaves on the morning glory stock. As the leaves of the morning glory stock became yellow with age and dropped off the scion of the nonflowering sweetpotato reverted to the vegetative phase and remained so indefinitely. The number of flowers that appeared on the Orlis scions varied directly with the number of active leaves on the morning glory stocks. No flower buds appeared on the grafted scions in the absence of leaves on the stock.

Fruits developing on stock inhibited flowering of scion. The Orlis variety was again used as grafted scion. Fourteen grafts were made and divided into two groups. Fruit set was allowed on the morning glory stock in the first group while in the other fruit set was prevented. Flowering of the sweetpotato scion was greatly favored by the defloration of the morning glory stocks since an average of 46 opened flowers per scion resulted. When fruit set was permitted on the stock, the scions bloomed sparsely (average 5 blooms per scion). It appeared that the growing fruits monopolized the flowering hormone provided by the foliage of the stock to the extent that flowering in the scion was retarded or inhibited entirely.

Flowering response of different sweetpotato varieties when grafted on I. tricolor. The Orlis, Nemagold and P-114 sweetpotatoes, varieties most difficult to induce to bloom, were used as grafted scions. The morning glory stocks were uniform with reference to the number of leaves and total absence of fruit set.

The results (Table 2) show that many more flower buds appeared on scions or Orlis and Nemagold than on those of P-114.

Table 1. Flowering response of Orlis sweetpotato scions as affected by grafting on different related species.

Grafting stock used	Date of grafting	Flowering condition of stock species*	Flowering response in Orlis scion
A. (Nonstorage root)			
I. repens	Oct.	moderate	none
I. tricolor	Oct., Nov.	many	many
I. hederacea	Oct., Mar.	many	many
I. Nil	Mar.	many	none
Quamoclit pennata	Oct., Mar.	many	none
Calyonction aculeatum	Mar.	few	none
Other species (total of 8)†	Mar.	none	none
B. (Storage root)			
I. batatas (P-47)	Oct.	many	none

* Extent of flowering in normal (ungrafted) plants grown as control.

† Plant Introduction Nos. 20916, 209127, 209130, 207818, 207821, 207822, 207823, 209319.

Table 2. Flowering response of scions of three varieties when grafted on *I. tricolor.*

Variety	No. of grafted plants	Node on which the first flower appeared	No. of flowering nodes per scion	No. of flowers per scion
Orlis	10	7 to 13	23	46
Nemagold	5	8 to 13	19	38
P-114	5	8 to 13	12	7

Conclusions. In these experiments there is no indication of direct relationship between flower bud initiation and the accumulation of carbohydrates in the grafted sweetpotato scion. In the terminal shoot ½ to 1 in. in length used as scion, about 6 to 8 nodes are differentiated. The appearance of the first flower bud at the seventh node (or first node differentiated after grafting) indicates a very rapid flowering response in the sweetpotato scion following grafting. The rapid initiation of flowering in the scion, the association of flowers on the scion with the leaves on the stock, the influence of growing fruit on the stock, all point toward the conclusion that a flowering hormone (florigen) originating in the leaves of the morning glory stock is translocated to the meristematic region of the sweetpotato scion where it exerts its morphogenetic effect.

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The Binding Energy of Ammonia in the Calcium and Barium Chloride Ammines

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The problem of the bonding between ammonia and metallic cations has been of interest for many years. Biltz (*1*) has correlated the stability of this bonding with the physical and chemical properties of the metal salts. Recently, Katzin and Ferraro (*2*) introduced a method by which it is possible to calculate the binding energies of molecular ligands to various metallic cations. Most of their work was concerned with the hydrates and pyridinates of cobalt (II) salts with

Table 1. Binding energies of ammonia in the calcium and barium chloride ammines.

Salt	Density (*5*)	ΔH (kcal/mole)	U (kcal/mole)	E (kcal)	Transition
$CaCl_2$	2.1741§		513.6*		
$Ca(NH_3)Cl_2$	1.8049	17.0	443.9†	86.7	Mono → anhydrous
$Ca(NH_3)_2Cl_2$	1.6060	15.0	413.5	45.4	Di → mono
$Ca(NH_3)_4Cl_2$	1.3816	10.1	370.4	53.1	Tetra → di
$Ca(NH_3)_8Cl_2$	1.1877	9.8	320.6	59.6	Octa → tetra
$BaCl_2$	3.8888		408.5‡		
$Ba(NH_3)_8Cl_2$	1.5260	9.0 (*6*)	318.4†	99.1	Octa → anhydrous

* Assume a rutile lattice.
† Assume a fluorite lattice.
‡ Assume a layer lattice.
§ Density of solid at 25° relative to water at 4°C.

some preliminary results on the hexammines of the alkaline earth halides. The total binding energy of the ammonia ligands was calculated for these salts and was found to be of the order of magnitude of 145–180 kcal. The problem that presents itself is to see how the binding energy of ammonia to the metallic cation changes from the lower ammines to the ammines of greater magnitude.

If one knows the lattice energies for the anhydrous salt and the ammine complex and the energy for the transition between them, it is possible to calculate the energy with which the ammonia forming the difference between them is bound. From the crystal type, the lattice energy U can be calculated by use of the equation

$$U = 279.0(\rho/M)^{1/3}A_d\left(1-\frac{0.345}{R}\right),$$

where A_d is the appropriate Madelung constant, ρ is the density of the solid, M is the formula weight of the substance, and R is the ion-distance parameter (in angstroms). For purposes of calculation,

$$R = 10^8/(3\times 6.023\times 10^{23}\rho/M)^{1/3}.$$

The binding energy E is the energy necessary to dissociate the ammonia molecules from the gaseous amminated cation, the end products also being in the gaseous state. It can be expressed as

$$(b-a)E = (U_a - U_b) + (b-a)\Delta H,$$

where ΔH is the heat of formation of the ammine calculated from the Nernst equation (*3, 4*). The calculated binding energies for the ammines of calcium and barium chlorides are shown in Table 1.

The results in this table show the same trends as the work on the pyridinates of cobalt (II) salts (*2*). In the calcium chloride ammines, it can be seen that the ammonia in the transition from mono-ammine to anhydrous has a binding energy of twice the magnitude of the di-ammine to mono-ammine transition. Then as ammonia is added, the binding energy decreases considerably, falling off to 59.6 kcal for the transition, octa-ammine to tetra-ammine. Since barium chloride forms only an octa-ammine, only one transition, the octa-ammine to anhydrous, is possible, and it has a much smaller value than the similar transition in the calcium chloride system.

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Transparent Light Baffle for Electrophysiological Recording

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One difficulty encountered by investigators who are dependent on photographic records of electric phenomena is the reflection of light from the face of the cathode-ray tube. Shielding from direct and ambient light can become a cumbersome and expensive task.

This problem can be mitigated when Eastman Kodak Linagraph paper or film is used for recording from the face of a P7 cathode-ray tube (orange-blue fluorescing). Since Linagraph paper and film are both insensitive to red light, a light baffle constructed of transparent red Plexiglas may be used. A baffle of this type permits continuous observation of the cathode-ray tube while a photographic record is being obtained from the same tube. It is possible to focus the electron beam with the baffle in place. This item has proved satisfactory in shielding the light of a 75-w bulb reflected directly onto the tube face from a distance of 2 ft (Fig. 1).

A shield of this type has been constructed in our laboratory as follows: ⅛-in. transparent red Plexiglas sheet (catalog number 2444, Rohm & Haas or equivalent) was used to construct a box open at each end and a truncated pyramid open at each end (Fig. 2). The opening in the box was made large enough to receive the small shield around the face of the