currence of nearly planar H-bonded furanose rings, separated by approximately 5 A and tilted 20° to the fiber axis, is responsible for the great intensity seen in this area. It is these reflections, in fact, which constitute the most striking similarity between the diagrams of adenine polynucleotide and ribonucleic acid (RNA) and their greatest contrast to that of deoxyribonucleic acid (DNA).

Because the x-ray diffraction pattern of adenine polynucleotide resembles that of RNA (*16*) (and differs from that of DNA), it is expected that the structures of adenine polynucleotide and RNA are similar. The form of H-bonded backbone described for structure I above can serve as a basis for the structure of RNA, since any sequence of purines or pyrimidines can be accommodated on either chain and the configuration depends, for its regularity and stability, only on that feature of the chain which distinguishes RNA (and the synthetic polyribonucleotides) from DNA—namely, the hydroxyl group on C′-2 of the sugar moiety. Furthermore, the 6-keto and 6-amino groups of both purines and both pyrimidines would, in this kind of structure, fall at almost exactly equivalent positions. This offers the possibility of their bonding to amino acids or other molecules in a structurally regular way despite their seeming disparity of size. Chargaff and Elson (*17*), who have demonstrated the numerical equality of these groups, have also suggested such a type of bonding (*18*).

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Role of Parenchyma Cells in Graft Union in Vanilla Orchid

The successful grafting of numerous monocotyledons has been previously reported (*1, 2*). This work demonstrated that grafts could be made in several grass species and in certain monocotyledonous tropical lianas. It was shown that, contrary to accepted usage, a cambium was not essential for graft union but that any meristematic tissue was suitable for this purpose. The principle that any meristematic tissue is capable of forming a union between scion and stock was extended to another monocotyledonous group, the Orchidales, in the study described in this report.

The vanilla orchid of commerce, *Vanilla planifolia* Andr., is susceptible to a root rot, *Fusarium* sp., which has nearly destroyed the industry in Puerto Rico. Attempts were made, therefore, to graft *Vanilla planifolia* on another species, *V. phaeantha* Reichenb., which is resistant to the fungus. The method used was similar to that previously described for grafting lianas (*2*). Like the lianas, *Vanilla* has no definite intercalary meristem, but the actively growing tips remain meristematic. The stem of the *V. phaeantha* stock was broken in the third to fifth internode. A paper tube dipped in paraffin was slipped over the stock, and a scion of *V. planifolia* of equal diameter was inserted into the tube. The scion, also, had been obtained by breaking of the parent stem in the actively growing region. The scion was placed firmly in contact with the stock and tied, to hold it in place. Both intra- and interspecific grafts were attempted. The graft union in the *Vanilla* was different from that in the grasses and lianas in that the process of union was arrested at the point where parenchyma bridges were formed between scion and stock. Two months after grafting of the *Vanilla*, parenchyma bridges were found, but after 2 years there was no evidence of the formation of vascular tissues across the graft union. This was true both of intra- and interspecific grafts. In the grasses, vascular connections were found within 6 to 8 weeks after grafting and in the lianas, within 12 to 16 weeks.

Approximately 5 percent of the *V. planifolia* scions survived for over 2 years. Growth was extremely variable. Some scions began growth within 2 months and grew to a length of several feet, whereas others lived for a year or more before growing. During this time, they retained their original leaves. Growth was slow in the majority of cases. If the nodal roots which hold the plant to its support were permitted to grow into the soil, the stock died, and the scion then persisted on its own roots.

Tests were made in which the bases of scions were dipped in coconut milk, in coconut milk plus one part per million of 2,4-D, and in one part per million of 2,4-D in water solution. Coconut milk appeared to have a beneficial effect, and it was possible to pick out the scions dipped in coconut milk by their better color and vigor. Dipping in coconut milk plus 2,4-D, or in 2,4-D water solution, was deleterious.

Wardlaw (*3*) found that if the shoot apex of certain ferns was isolated from the surrounding leaf primordia and stelar tissue by vertical cuts, it continued to grow and produce both vascular tissue and leaf primordia. No connection took place between the newly formed vascular tissue and that formed prior to the surgery, and all translocation was across parenchyma cells. The experiments reported in the present paper demonstrate that *Vanilla* grafts can survive and grow for at least 2 years on parenchyma unions. These parenchyma cells must, therefore, serve for both upward and downward translocation, since they form the only union between scion and stock. These results suggest the possibility that parenchyma cells could play a similar role in intact plants.

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Amino Acid Factor in Control of Abscission

The role of indoleacetic acid in the control of abscission of plant organs has been demonstrated repeatedly since Laibach (*1*), in 1933, first observed that orchid pollinia retarded the abscission of debladed petioles. Addicott and Lynch (*2*) have reviewed other factors which may affect abscission, including acidity, ethylene, mineral metabolites, carbohydrate level, auxin gradients, oxygen, and carbon dioxide. Several of these have been shown to exert indirect effects in the control of abscission. The effect of