500 O. u. of penicillin, but not at the lower penicillin levels. With the mixture of L-leucine and glycine, however, some killing was observed at 10 O. u. per ml (after 10 hr), but no appreciable effect was noted at 5 O. u. per ml. It may be concluded, therefore, that the inhibition of bacterial growth by 1–10 O. u. of penicillin per ml cannot be attributed to a bactericidal effect, but appears rather to be due to an inhibition of the utilization of glycine for growth.

In view of these results, the hypothesis may be offered that the assimilation of glycine by strain SF involves its prior incorporation into a peptide, and that the bacteriostatic action of penicillin is due to an inhibition of peptide synthesis. If this interpretation is correct, it may be hoped that further studies of the action of penicillin, and of other peptide antibiotics, on the utilization of amino acids and peptides by strain SF, as well as by other microorganisms, may serve to elucidate important aspects of the biosynthesis of peptide bonds.

TABLE 1

EFFECT OF PENICILLIN ON VIABLE CELL COUNT OF STRAIN SF

Penicillin (Oxford units per ml)	Total viable cells per tube × 10^{-8} *			
	L-Leucylglycine		L-Leucine + glycine	
	5 hr	10 hr	5 hr	10 hr
0	1.1	1.7	0.59	0.97
1	3.8	1.9	0.93	1.8
5	0.82	1.4	0.47	0.64
10	1.1	1.1	0.62	0.32
500	0.52	0.17	0.13	0.0075

* Immediately after inoculation, each tube contained approximately 1.1×10^8 cells.

Clearly, if incorporation into a peptide is an obligatory step in the assimilation of glycine by strain SF, it must, of necessity, be coupled to a process that will provide the requisite energy for peptide synthesis. Such an energy-yielding process may well be associated with the dissimilation of the carbon skeleton of the amino acids, and especially that of leucine. As has been shown by Gale and Taylor (*1*, *2*), the assimilation of some amino acids, notably glutamic acid, by *Staphylococcus aureus* requires the concomitant occurrence of energy-yielding reactions. These authors also made the significant discovery that penicillin impairs the ability of this organism to assimilate glutamic acid.

It is of interest to recall the recent observation (*4*) that the dipeptide glycyl-L-leucine exerts a bacteriostatic effect on the growth of a *leucineless* mutant of *Escherichia coli*, despite the fact that the peptide can be utilized by the mutant as a source of leucine. Since the same bacteriostatic effect of the peptide on the growth of the mutant was observed in the presence and in the absence of added L-leucine, it was concluded that glycyl-L-leucine interferes with the bacterial utilization of this amino acid. These results offer an example of a simple peptide that inhibits a key metabolic reaction of a microorganism in a manner that is strikingly similar to the effect of penicillin on the metabolism of strain SF.

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Effect of 2,4,5-Trichlorophenoxyacetic Acid on Ripening of Apples and Peaches

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Blondeau and Crane (*1*) have reported that the maturation of Lob Injir (Calimyrna) fig fruits in California has been advanced considerably as a result of spraying unpollinated but pollen-receptive synconia with solutions of 2,4,5-trichlorophenoxyacetic acid (2,4,5-T). In previously reported experiments on ripening of harvested banana, apple, and pear fruits, Marth and Mitchell (*2*, *3*) found 2,4-dichlorophenoxyacetic acid to be very active. Of the few compounds tested in the present experiments, 2,4,5-T has proved to be among the most active in bringing about the fruit-ripening response of apples and peaches on the tree.

On August 23, 1948, individual tagged fruits of Rome Beauty apples and adjacent spur leaves were sprayed at the Plant Industry Station, Beltsville, Maryland, with aqueous solutions of 2,4,5-T at 10-, 100-, and 200-ppm concentrations. Fruits that received either the 100- or the 200-ppm spray concentration developed red coloration and were maturing rapidly by September 13. This same stage of maturity on unsprayed fruits was not attained until one month later, October 12, the usual harvest date for this variety. At 10-ppm concentration, the spray had no observable effect. Measurements on fruit softening were made on September 27 with the aid of a fruit pressure tester. At this time the untreated fruits showed an average pressure reading of 25.9 lb, whereas the fruits sprayed with 10-, 100-, and 200-ppm concentrations of 2,4,5-T tested 24.8, 19.8, and 18.9 lb, respectively.

The spur leaves of Rome Beauty trees that received the 200-ppm concentration were burned by the spray. New shoot growth produced in the spring of 1949 was deformed and flowers were late in opening as a result of this treatment. No injury was found in the case of the 10- and 100-ppm sprays, either on foliage present at the time of spraying or on that produced the following year.

In 1949, three early summer varieties of apples also showed a ripening effect from spray applications of 2,4,5-T to foliage and fruit. The Close variety, which matures normally during the last week of June at Beltsville, Maryland, was induced to ripen 5–7 days early by spray applications of either 50- or 100-ppm concentration applied on June 10. The fruits on branches of Duchess apple that received a 50-ppm spray on June 10 colored and

ripened 9 days earlier than those on unsprayed branches, and those sprayed with a 100-ppm concentration ripened approximately 12 days earlier than the controls. Another early variety, Williams, was sprayed on June 28 and produced ripe fruit by July 5. Unsprayed fruits of this variety were not ready for harvest until July 18.

Each of these early-season apple varieties has shown marked foliage injury at 100-ppm spray concentration, and only slight or no injury at 50-ppm. It was noted that unpicked sprayed fruits failed to drop even after the fleshy parts had decayed and fallen away. In general, the early varieties seemed to respond more quickly than did Rome Beauty, a late-fall variety, although the advance in ripening date was less.

The development and maturation of fruits of six varieties of peaches have been accelerated considerably by spray applications of 2,4,5-T to the foliage and fruit. Fruits of the Elberta peach, for instance, that were sprayed on July 1, 1949, with 75-ppm concentration of the chemical were soft and colored by July 20, although the usual harvest date for this variety is late August. Golden Jubilee peaches that received 25-ppm spray concentration on May 20 were ripe by June 27, about one month ahead of the usual time of ripening. In all instances peaches that were sprayed one month or more in advance of harvest have been misshapen and reduced in size and quality. In other experiments, when sprays were applied closer to the usual harvest period for the variety, the size and quality of the fruits were but slightly affected or not affected at all. Elberta fruits that had been induced to ripen one month ahead of the usual harvest date had embryos in the seed with well-developed cotyledons, in contrast to very poorly developed cotyledons in the seeds of untreated fruits. The evenness of ripening of peaches on the sprayed branches was in contrast with the usual unevenness on untreated branches. Redhaven peaches selected at random from branches that received 50-ppm spray concentration on July 5 showed on July 18 a range in pressure test of 6.0–9.5 lb for individual fruits, while a similar sample selected from unsprayed branches showed a pressure test variation from 9.0 to 21.7 lb. Fruits that tested 10 lb or less were soft.

In the case of peaches, marked ripening effects have been obtained with spray concentrations of 25-, 50-, and 75-ppm of 2,4,5-T. Moderate to severe damage to foliage has resulted from all applications that contained 75-ppm of this substance. A mild ripening response has resulted from spray application of 5-ppm concentration on the varieties Erly-Red-Fre and Golden Jubilee.

The use of 2,4,5-T as a fruit ripening agent is not recommended at present for commercial practice or large scale tests, since there is considerable danger of immediate or permanent fruit tree injury. Results thus far, however, show promise that warrants further careful study.

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Partogrid, Proportional Divider for Use in Paper Chromatography (Partography)[1]

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The authors' Partogrid,[3] shown in Fig. 1, was prepared as follows. Double-thickness lines (2.5-cm intervals) and triple-thickness lines (5-cm intervals) were drawn as accurately as possible with India ink on a sheet (50 cm × 50 cm) of Eugene Dietzgen's "perfect" cross section millimeter paper. Scale readings in increments of 0.1 R_f units were placed as shown on each short side of the scale. The drawing was mounted parallel to a camera lens (corrected for spherical aberration) and photographed (5 in. × 7 in. negative). Prints of three sizes (5½-, 7-, and 10-in. hypotenuses) were prepared. The Partogrid, swabbed with a solution of 25% alcoholic Carbowax 400[4]

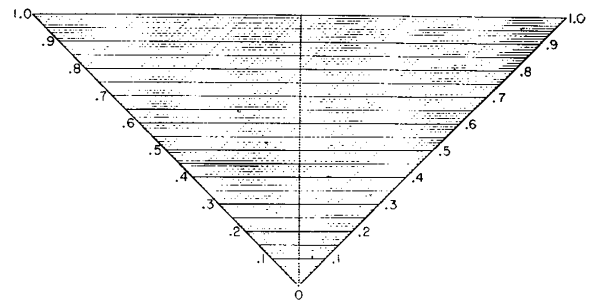

FIG. 1. Partogrid.

to increase the transparency, was mounted on an etched glass window lighted by a 100-w bulb cooled with a small fan.

A pin is inserted through the center of the initial spot (amino acid or other solute) on a filter paper strip (*4*) and the zero point of the Partogrid. The paper strip is rotated until the solvent boundary line intersects the 1.0 horizontal line on the Partogrid and the R_f values of the solute spots are read from the scale. Reliability of estimated R_f values may be increased by using both scales.

The word *chromatography* has been employed to describe the separation of substances by partition (*2*) as well as by adsorption processes. In order that these procedures may be differentiated, the word *partography* is suggested to denote the partition of colored and colorless solutes between solvents one of which may be a stationary phase. Dent (*1*) has proposed recently that filter paper partition chromatography be designated as *papyrography*. Related terms which have been suggested include *evography* (*5*) and *papergram* (*6*).

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[3] Phillips (*3*) has described a device for the rapid measurement of R_f values but it is subject to deterioration.

[4] A polythelene glycol polymer obtained from the Carbide and Chemical Company, New York City.