

sulted in nitrate concentrations in the bed 10 to 20 times greater than that in the furrow or in any of the sprinkled area.

Nutrient Levels

Thirty recently mature cotton leaves were obtained randomly from each plot prior to each irrigation, and were combined into one composite sample for leaf and petiole analyses. At no time did any of the plants exhibit any nutrient deficiency. The only differences evident in the petiole analyses between irrigation methods occurred in the nitrate analysis after the first irrigation. Subsequent irrigations apparently erased this difference. Leaf analyses showed the same results—that the method of irrigation did not affect nutrient uptake at any time during the season. Sprinkler application rate did not appreciably influence nutrient uptake at any time.

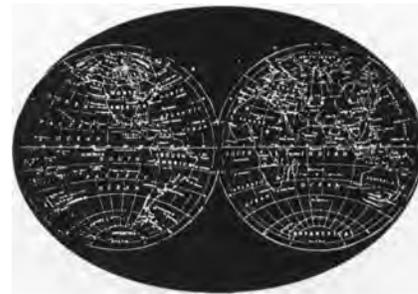
Soil Moisture

Soil moisture determinations throughout the growing seasons were made with electrical resistance blocks at 18- and 36-inch soil depths. In no case were there appreciable differences as a result of the irrigation method. Soil moisture tension at the three-foot depth did not exceed one atmosphere until after the last irrigation; however, at the 18-inch depth, soil moisture tension approached 10 atmospheres prior to the second and third irrigation. In all cases soil moisture tensions were never high enough to adversely affect cotton yield.

Cotton Yields

Measurements of seed cotton yields in four replicated plots confirm the conclusion that yields are not affected by irrigation methods. Furrow irrigated plots yielded an average of 1,780 pounds per acre and the sprinkler irrigated plots yielded 1,831 and 1,810 pounds per acre for the 0.20 and 0.10 inch per hour application rates, respectively. These differences are not significant, however, and it may be concluded that the irrigation method resulted in no differences in cotton yields. Additional field studies at the same location are planned to evaluate the continued effects of these irrigation methods on soils and crop yields.

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The Proposed Trade Expansion Act of 1962 and California Agriculture

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The proposed Trade Expansion Act of 1962, with its focus on the European Common Market, presents special problems for agriculture in general and California agriculture in particular. The status quo in foreign trade cannot be expected to prevail. The need is to take advantage of prospective changes. If the Trade Expansion Act is considered unsatisfactory, constructive alternatives need to be proposed. If the Act is approved and becomes effective, the State's agricultural industries—particularly fruits, vegetables and tree nuts—will need to pursue closer-than-ever working relationships with those who negotiate for the United States.

THE U. S. CONGRESS is now debating the President's Trade Expansion Act of 1962. It is being discussed along with the development of the European Common Market. The proposed act is intended to improve our position in negotiating tariff adjustments and other features of trade agreements with the Common Market and other countries. Our foreign policy and patterns of international relations are also involved. The proponents believe the act will strengthen our trade position and our foreign policy posture. The opponents believe that segments of our agriculture and industry could be harmed.

A previous article (California Agriculture, May, 1962) summarized the main aspects of the European Economic Community and some problems facing the U. S. The development of the Common Market has reached the point where the member nations have announced the ini-

tial outline of a common agricultural policy. If not striving for self-sufficiency in farm products, the Common Market policy is to foster agricultural development—even if that means restriction of agricultural imports. It is with the maintenance of our European markets that California is concerned in the "give and take" of these new trade agreement negotiations.

This involves the additional burden of facing up to increased imports of certain agricultural products which may be competitive with those produced in California. These problems may become more acute as new members join the Common Market, particularly the United Kingdom, an important importer of U. S. agricultural products, or Spain, a major exporter of citrus. Certain California agricultural industries, particularly fruits, vegetables, and tree nuts, are concerned with possible restriction of export markets

as the European Economic Community gains momentum.

In this setting, the Trade Expansion Act of 1962 takes on added significance. It is an initial phase in the reformulation of American trade policy. Although the Act and the Common Market must realistically be considered together, they are not fully interlocked. Even without the Common Market, our current Reciprocal Trade Agreements Program would likely have been reconsidered before its expiration this June. Both the proponents and opponents of the past and current programs have become dissatisfied with the situation.

The basic new developments in the international trade position of the U. S. are:

Rapid economic growth in Western Europe; the need to accelerate our own economic growth; the recent deficits in our international balance of payments; and the Communist bloc's economic offensive in the less-developed areas. Although the Trade Expansion Act, according to its proponents, is designed to meet all these requirements, we confine our comments to only a part of the total picture—that of concern to agriculture in general and California agriculture in particular.

The Act has two main parts: (1) granting to the President new authority to reduce tariffs; and (2) ways to deal with possible domestic injuries through adjustment assistance to firms and industries harmed by increased imports.

The President requests authority to reduce tariffs 50 per cent below the level existing on July 1, 1962. In addition to possible new reductions, there would be provision for similar reduction of duties where negotiations have been completed but not made effective by that date. The new authority would be for a five-year period, extending through June, 1967. The general authority to reduce tariffs by 50 per cent, under certain conditions, is carried over from the present trade agreement legislation.

Tariff authority

The special, and new provisions, for dealing with the Common Market are designed to provide the President with the authority to grant additional reductions in tariffs in certain product categories. In negotiating with the Common Market, the President could exceed the 50 per cent limitation and reduce tariffs to zero, under certain specified conditions—in cases where the U. S. and the EEC together account for 80 per cent or more

RAPIDLY VARIED FLOW IN OPEN CHANNELS

CONTROL STRUCTURES in canals and other watercourses, governing the relation between water depth and rate of flow, have been built and operated by hydraulic engineers for hundreds of years. Design and service conditions were arrived at by trial and from experience with other structures. As human, property, and water values increased, greater accuracy of prediction was required. The past century has seen extensive, systematic laboratory investigation of the flows associated with weirs, spillways, gates, and other structures whose operation depends upon a rapid constriction of the flow passage and generation of backwater. The existence of numerous formulas, currently in use and derived from these tests, describing identical flow situations with non-uniform results testifies to the difficulty of extrapolating model data to prototype structures.

The fluid properties that are of prime importance in determining the flow pattern are mass density and specific weight. Were these the only effective agents, the results of tests on any convenient size model could be applied to full-scale structures directly. Unfortunately, ever-present fluid viscosity and surface tension, affect-

ing the flow pattern to an unknown degree, are most prominent at the small, model scales.

A mathematical method, based on complex variable theory, has been developed for predicting the flow pattern in the neighborhood of simple structures like vertical, sharp-crested weirs, or vertical sluice gates. The integral equations derived, expressing the solutions for weirs of various heights, have been resolved numerically with the aid of a highspeed digital computer. This technique, which neglects the effects of viscosity and surface tension entirely, is directly applicable, with small error, to the flow over high weirs. For smaller structures, the mathematical results can be compared with existing experimental data to obtain an evaluation of the effects of the secondary influences.

The present technique, while restricted to flows that are essentially two-dimensional, is being extended to encompass more complex boundary forms.—*Theodore S. Strelkoff is Acting Assistant Professor of Irrigation and Acting Assistant Irrigation Engineer in the Department of Irrigation, University of California, Davis.*

of the world export value of specified product-categories. Also, the President would be given additional authority to reduce or eliminate tariffs on "any agricultural commodity or product thereof" which did not meet the 80 per cent rule if it were determined that "such agreement will assure the maintenance and expansion of U. S. exports of such commodity or products thereof."

Further, the President would be authorized to reduce or eliminate tariffs and duties on any tropical agricultural or forestry commodities or their primary products if the European Economic Community takes similar action on a nondiscriminatory basis and if such product is "not produced in significant quantities in the United States."

The tariff reductions resulting from implementation of the Act, as it concerns negotiations between the U. S. and the Common Market, would be extended by the U. S. to other countries. This is in accord with our traditional tariff policy of most-favored-nation-treatment which is carried over from the proposed legisla-

The U. S. Tariff Commission is to advise the President, before negotiations commence, on the economic effect of reduction or elimination of tariffs on U. S. workers and firms in the industry. The bill provides for public notice of intention to enter into trade agreements and opportunity is given for presentation of public views. The President is required to present negotiated trade agreements to Congress, including the advice received from the Tariff Commission and reasons for entering into any agreement.

Adjustment assistance

It is in the area of "adjustment assistance" that the Act breaks new ground. Difficulties due to increased imports of like or directly competitive articles as a result of tariff concessions would entitle those determined to have been injured, to various forms of adjustment assistance. These include: assistance to private firms including technical assistance, some financial assistance, and tax relief by special "carryback of losses" procedures; assistance to workers including readjustment allowances, retraining for other em-

ployment, and relocation allowance; and assistance to industries in extraordinary cases, authorizing increase of duty or import restrictions.

Specific provisions are made in the bill for eligibility for such adjustment assistance for firms and workers, with final authority for establishment of injury resting with the President on advice of the Tariff Commission. Three standards are set for the determination of eligibility: (1) Tariff concessions granted by the U. S. must have forced or threatened significant idling of production facilities of the firm; (2) prolonged and persistent inability of the firm to operate at a profit; and (3) unemployment or underemployment of a significant number of workers of the firm. Workers may apply for assistance based entirely on the third standard, while industries may apply for extraordinary relief only if all three standards are met.

The adjustment assistance is to be administered through existing agencies and programs of the Executive Branch of the government. An interagency Adjustment Assistance Advisory Board, chaired by the Secretary of Commerce (and including the Secretary of Agriculture) is proposed to coordinate the necessary development of specific programs.

The issues

Achievement of important foreign policy objectives and a strengthened U. S. economy are goals agreed upon by those debating the Trade Expansion Act. The expansion of world trade, which is certainly desirable, is also not at issue. The significance of foreign trade to American agriculture is widely recognized. But the Trade Expansion Act and its focus on the Common Market present special problems to agriculture in general and California agriculture in particular.

California's agriculture has great diversity, represented by many commercial crops. The leading cash crop, cotton, accounts for 11 per cent of the state's farm income; the other 89 per cent is spread over close to 200 crops, with none of them being dominant. Because of its national position, cotton may be viewed as a "politically sensitive" crop; its interests can be expected to be taken care of. The same very probably applies to rice. But fruits, vegetables, and tree nuts—important in the aggregate in California agriculture—may be vulnerable in terms of tariff negotiations. These specialty crops do not loom large on the national scene when negotiations are under way. The negotiators cannot be expected to

have close familiarity with our specialty crops, nor be appreciative of their position in the economy of California. This is a matter of concern for the California fruit and vegetable industries.

Diversity effects

Because of diversity in California farm production, each one of a large number of farm products may seem relatively small in terms of production and percentage export value. Yet in the aggregate these commodities constitute a significant proportion of the state's agriculture. There are those in California agriculture who are apprehensive about the erosion of the economic position of a considerable number of these farm products and the adverse effect this might have on a particular sector of agriculture and the status of California agriculture as a whole.

Another issue raised by the provisions of the Trade Expansion Act, as proposed, concerns the "80 per cent" category matter. As defined in the Act, a "category" is not fully meaningful for fruit and vegetable growers and exporters. Although the President may negotiate "within" a category, he is not obligated to do so. Indiscriminate application of the "80 per cent" rule could injure some of the products within the category, particularly if the negotiators are not adequately informed.

It is not clear how the "adjustment assistance" features of the Act would or could be applied to California fruits, vegetables and tree crops. Adjustment assistance for farmers and farm workers may well involve different problems than those confronting manufacturers and industrial workers. One may interpret the Act's adjustment assistance features as being oriented in the main to nonagricultural workers, firms, and industries. This also is an issue of concern to many in California agriculture.

The prospects

At this writing, the outcome in Congress of the Trade Expansion Act is not known. Various industries and groups are presenting their views at congressional hearings and formulating their position for public discussion. A mixture of interests prevails in the state, reflecting our diversity. Yet the essence of the Act is to provide the President with increased authority and a greater range for negotiation. Without such an added grant of power, compared with the present negotiating authority, it is questionable whether our bargaining representatives

could succeed in opening the doors or widening our access to the European Economic Community markets which are expanding and promise further growth.

To that end, without causing undue hardship, our negotiators need be fully informed of the nature, situation, and unique circumstances of our agriculture, particularly for fruits, vegetables, and tree nuts. Our negotiators need the close counsel and assistance of agricultural production and trade people—those intimately familiar with the industries and their problems. Otherwise the special needs and unique problems of the fruit and vegetable industries may not be fully appreciated or may even be unintentionally neglected.

The potential over-all benefits of the Trade Expansion Act are of interest to California agriculture. It can be viewed as an instrument allowing us to bear equitably the burdens and adjustments to attain the over-all benefits. But California agriculture, including the fruit and vegetable industries particularly concerned, should not be put in a position where it might have to bear more than a reasonably proportionate share of the burdens and adjustments. The benefits and gains along with the burdens and losses need to be equitably distributed among the various participants.

The *status quo* cannot be expected to prevail. Significant changes may be anticipated, in the light of the Common Market developments and prospects. The challenge exists and the need is to take advantage of prospective changes. If the Trade Expansion Act is considered unsatisfactory, constructive alternatives need to be proposed.

If the Trade Expansion bill is enacted and becomes effective, the state's agricultural industries—particularly fruits, vegetables, and tree nuts—will need to pursue closer-than-ever working relationships with those who negotiate for the United States. This is desirable, even necessary, under present trade agreement legislation. It will be even more necessary in any dealings with Common Market officials, in view of their agricultural policy—and essential if the Trade Expansion Act governs future negotiations.

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