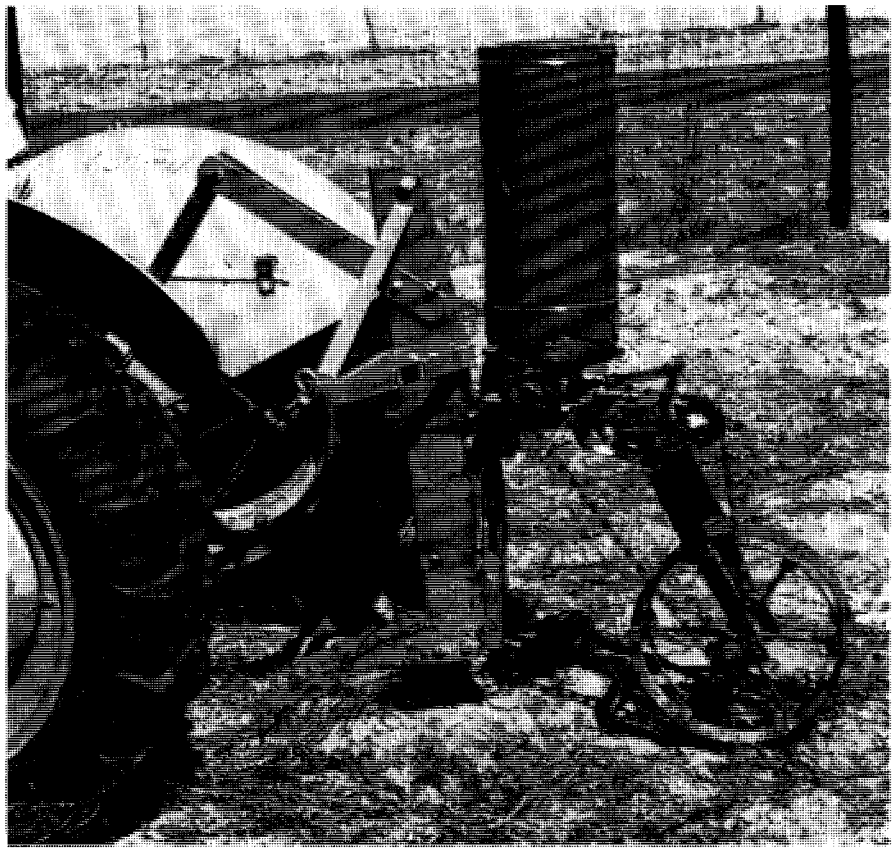

Florida experiment station workers have developed this unit for simultaneously plowing the subsoil and applying fertilizer at depths as low as 14 inches

workers, for instance, report doing no work at the present time and indicate they believe fertilizer placement is not likely to have too much influence on Idaho practices in the near future. In addition, relatively little research is under way in Oregon comparing different methods of placement, but one college department head believes placement will be given more attention in Oregon's fertilizer research in the future.

In California, the California Fertilizer Association and others in the fertilizer industry have been devoting a great deal of time and money to finding out how placement can give better results. This year, for instance, University of California workers, using an association grant found that a combination of nitrogen and P_2O_5 drilled to a depth of four inches materially increased rice yields. In the past, fertilizer has been broadcast on rice, and because the phosphorus was near the surface it was not available to the plant root system. (For some time Arkansas recommendations for rice have been preplant application of anhydrous ammonia followed by phosphate drilled in at seeding time. In Louisiana ammonium nitrate and urea applied by planes have been paying well in commercial operation as top dressings for rice.)

Application equipment seems to be keeping pace with new needs generally, although at least two experiment station groups express some dissatisfaction. In North Carolina, side placement has been recommended for years in the region, but many farmers have not been able to procure satisfactory side placement equipment. Therefore, more and more attention is being directed to broadcast methods as contrasted to concentrating fertilizer in rows.

On the opposite side of the country, Washington farmers are interested in nitrogen fertilizer applicators which can be used to apply nitrogen materials in the spring to wheat sown the previous fall and which place the nitrogen four to six inches deep without tearing up too much of the wheat. Such an applicator they feel will enable them to apply nitrogen to make maximum use of the soil moisture. At present, they have two alternatives: estimate winter rainfall and apply the correspondingly estimated proper amount of nitrogen in the fall, or reduce nitrogen application in the fall and then try to give spring surface applications which are considerably less efficient.

Meanwhile, trend to multiple placement equipment appears to be most significant in the Pacific Northwest. Multiple placement—putting part of the fertilizer with the seed and the rest in a band deeper in the soil—will favor use of liquid materials, since their application will require less complicated machinery, workers there believe. Improvements needed in application equipment are: reduced power requirements; less narrower openers (disturbing to seed beds); and more accurate metering of fertilizer.

Too Many Grades?

Could Louisiana farmers use four grades of mixed fertilizers instead of 25?

MANY AN AGRONOMIST thinks we have far more fertilizer grades than can be justified on the basis of soil types and kinds of crops in any given region. Frank E. Boyd, Virginia-Carolina Chemical Corp., for example, says Louisiana farmers could probably do away with 21 grades, and hardly feel the difference. But does the same reasoning apply to other states? According to Mr. Boyd it does, and here are the reasons why.

In the early days fertilizer manufacturers often pulled the grade of their choice out of a hat—without regard to any research findings with soils and crops. The form and grade of fertilizer materials available, type of mixing equipment, economic conditions, and farm practices greatly influenced manufacturing procedures. Manufacturers and users of fertilizers in the early days took

Can Louisiana Farmers Throw 21 Grades Out the Window?

Louisiana Grades	Ratio	Tonnage	Number Grades	Average Grade	Suggested Grade
Equal N-P-K	1–1–1	47,380	4	9–9–9	12–12–12
Varying N but equal P-K	1–3–3	50,306	7	4–12–12	4–12–12
Varying N, Low P-High K	1–2–3	1,140	2	6–8–13	4–8–12
Varying N, High P-Low K	1–3–2	29,660	12	5–14–6	4–12–8

the path of least resistance; they made or used upward of a hundred different grades.

Six to Twelve Will Do

In Tennessee there is no legal limit on the number of grades. During 1938–39, some 85 different mixed goods were offered for registration and sale! (Most of the tonnage, however, moved in a relatively few grades.) The College of Agriculture now recommends only 12, but, as in the past, the bulk of the complete (NPK) tonnage movement is with six grades.

Georgia also permits unlimited registration and sale of fertilizer grades. But the College of Agriculture and the Georgia Plant Food Educational Society only make recommendations from a list of 12. Even with unlimited registration, a mere handful of grades supplies practically all of the tonnage.

Alabama's State Department of Agriculture very definitely restricts registration of mixed fertilizers to a specific number—12 for 1955. The College of Agriculture recommends ratios or grades to the State Board of Agriculture which, after a hearing with industry representatives, issues the approved list.

From his experience in analyzing soil samples, the Director of the Alabama Soil Testing Laboratory recently stated that in his judgment Alabama needs only four complete (NPK) ratios or grades for practical coverage of all the state's soils and crops. In the early days there were as many as 50 grades sold annually in Alabama, but in 1954–55 only 12 grades are on the approved list. For the future, it looks like four NPK and three OPK grades will meet all requirements.

North Carolina and Mississippi, along with several other states, have strict legal requirements governing the number of permissible grades. In these states the College of Agriculture and the State Department of Agriculture are working and cooperating with industry in arriving at the suitable number.

But Why Not Four?

Louisiana takes a different road. Each year certain "experimental" grades are added to the "approved" list on a trial basis, and "specialty" grades are permitted. This may look sound, but in practice it has led to abuses—which multiply the problems of research, industry, and education in maintaining a reasonable list.

In the seven year period 1944–51, Louisiana had an average of 19 NPK grades, but six grades represented 94% of the tonnage. This would indicate that Louisiana's situation is getting worse, while in most other states the trend is toward approved lists of fewer grades.

Fewer grades lead to less storage space in factories, less price spread between low and high grades, and less cost per pound of plant food in higher analysis goods. Manufacturers can reduce their assembling and handling problems at the plant's loading platform; they save money on registration, tag and bag printing costs, keeping of records, and chemical control procedures. Fewer grades encourage farmers to follow recommendations and create more confidence on the part of the customer.

Since the soil tester does not attempt to pinpoint his figures, why should farmers try to add accuracy that doesn't exist? The soil test simply indicates whether the essential plant food elements are in low, medium, or high supply—low, medium, and high have different meanings for different soils.

The problem is to match a low phosphorus soil with a high phosphorus fertilizer to give the plant or crop a balanced phosphorus ration. And the same is true for potash, calcium, sulfur, magnesium, and the trace elements. With the guaranteed mineral elements (PK) in a complete (NPK) grade, the ratio is either high-low, low-high, or equal. Agronomists have spent days trying to figure out other combinations for Louisiana, but the suggested arrangement seems to be the answer—it especially satisfies the requirements for cotton, corn, grain, pastures, and other crops.

Manufacturers of fertilizer could reduce their assembling and handling problems, save money on tag and bag printing costs, reduce record keeping, simplify chemical control procedures, according to many observers, if the number of fertilizer grades available to farmers were to be reduced

Isotopes in Russia

Radioactive isotopes being employed extensively in U.S.S.R. to solve laws of plant life

USE OF RADIOACTIVE ISOTOPES as a tool leading to advancement in biology and agriculture has been described widely in many countries. Less known are investigations that have been made in U.S.S.R. At the recent United Nations' "Atoms for Peace" Conference in Geneva, Russian scientists told of research in their country which has led to clearer understanding of effective applications of granulated fertilizers, non-root nutrition, and more effective utilization of fertilizers for feeding plants. Some of the developments were described as "new." Others were said to parallel coincidentally research and findings in other countries. All pointed in an emphatic manner to the fact that development and improvement of practical farming methods in U.S.S.R. have resulted from research of biologists, chemists, and agronomists employing marked