

The total time, therefore, being seven hours instead of six hours. In neither instance was there any marked differences in yield, quality, or colour from the pulp obtained from cook 3271-I. Sample sheets of these pulps were not run.

In order to obtain a lighter-coloured pulp and lower screenings, cook No. 3276-I was made, following the type of curve shown in Plate 7, fig. i. The pulp obtained showed a decided improvement in colour over any produced previously, and the strength qualities were superior to any of the other tawa pulps. Unfortunately, the yield of this pulp had to be estimated, due to the loss of some pulp upon blowing the cook. However, repeat cooks Nos. 3297-I and 3282-I were made, duplicating all conditions and verifying all points indicated by cook No. 3276-I.

The samples of tawa pulp produced exhibited a rather specky and dirty appearance, which is characteristic of hardwood sulphite pulps, such as are yielded by aspen, maple, and birch. Comparative cooking-strength data on these same species have been included in Tables 11 and 12.

Tawa - Insignis Pine Mixture.

In a papermaking experiment described in another section of this report successful use was made of a mixture of tawa and insignis-pine sulphite pulps in the proportion of 78 and 22 per cent. respectively. Cook No. 3277-I was made on such a mixture to determine the practicability of pulping the two species together. The result was quite successful. The curve illustrated by Plate 7, fig. i, was employed. A yield of 49.4 per cent. resulted, and by comparison of the strength data of this pulp with those from cooks 3279-I or 3282-I it will be noted that the mixed-species pulp is high in all respects.

European Larch.

Only one test (cook 3278-I) was made on European larch. The yield of pulp obtained was low, and the percentage of screenings high. The colour was dark, and the pulp rather "shivey," eliminating this species as a source of newsprint sulphite pulp. The data obtained on pulping western larch by the sulphite process have been included in Table 11 for comparison.

ADAPTATION OF LABORATORY RESULTS TO MILL-SCALE OPERATION.

In case the co-operator desires to translate the foregoing laboratory results into mill practice, cognizance should be taken of certain factors involved, and allowance made therefor. At present most mills have no means of ascertaining the weight of chips charged into the cookers, the measure being by cords. Yields, too, are rather hard to determine, most mills getting at this value by using the over-all mill-production figures and crediting each cook with its proportionate share, regardless of other factors involved. Besides lack of information regarding the actual weight of wood being pulped, there are also doubtful elements of moisture content and general physical condition of the wood, variations in chip-size, in acid composition, in accuracy of temperature measurements, steam available for cooking at a given time, &c. All of these items can be minimized by careful supervision, but never completely eliminated. Cooking-conditions should, therefore, be so arranged as to cover as many contingencies as possible, and should, above all, be flexible and designed to take care of the poorest operating-conditions which are likely to be met. With this in mind, tentative schedules for mill-scale operation have been drawn up for the production of newsprint grades of pulp from immature insignis pine and from immature tawa. In cooking mature wood from both species better results will probably be secured by increasing the penetration periods recommended for the immature wood.

Newsprint Sulphite Pulp from Immature Insignis Pine.

Acid composition : 5 to 5.5 per cent. total SO_2 ; 1.3 to 1.5 per cent. combined SO_2 .

Temperature and pressure schedule : Two to two and a half hours to 110°C ; a uniform rate of temperature-increase of 5° to 6°C . per hour from 110° to 148°C . A uniform pressure of 75 lb. should be maintained throughout the cook, with a half-hour gassing-down period at the end of the cook.

The time that will be consumed in raising the temperature from 110°C . to 148°C . will vary from seven to eight hours. The type of newsprint pulp desired will determine whether or not the digester should be blown upon reaching maximum temperature. If a hard stock is desired, no further cooking is necessary. If a softer stock is wanted, having a slightly better colour, the temperature should be maintained at the maximum for at least half an hour, and preferably one hour.

Another type of curve that could be used is that shown in Plate 8, fig. vi. This type of cooking schedule is somewhat harder to control under mill conditions :—

Acid-composition : Same as before.

Temperature and pressure schedule : Two to two and a half hours to 110°C ; 110° to 117°C . in two hours ; 117° to 126°C . in two hours ; 126° to 139°C . in two hours ; 139° to 148°C . in one hour. One to two hours at the maximum temperature. A uniform pressure of 75 lb. throughout the cook, with a half-hour to one-hour gassing-down period.

Newsprint Sulphite Pulp from Immature Tawa.

Acid-composition : 5.5 to 6 per cent. total SO_2 ; 1.2 to 1.4 per cent. combined SO_2 .

Temperature and pressure schedule : Two and a half to three hours to 110°C ; a uniform rate of temperature-increase of 5° to 6°C . per hour from 110° to 148° or 150°C . (seven to eight hours) 75 lb. pressure.

If a book stock is desired the temperature should be maintained at the maximum from one to two hours.