THE DE-INKING OF NEWSPAPERS

Although the de-inking and re-use of old magazines has been practiced for a long time, it has never been possible to apply the process to the recovery of old newspapers, because the strong alkaline solutions used in the process and the subsequent bleaching operation discolor any pulp containing groundwood. These solutions might be reduced in strength and temperature so as not to discolor the pulp and still serve to dissolve the varnish from the ink and free the carbon black. But the carbon particles would then collect in masses which would not pass through the washing screen, or would remain enmeshed with the paper fibers. It is therefore necessary to provide some finely-divided colloidal carrying agent in the wash water which will help gather up the carbon and carry it off. Clays and talcs are used for this purpose, but ordinarily they are so coarse that they need to be peptized, or broken up, by strong alkalies at high temperatures before they are effective. It is this requirement that has made it necessary to use solutions in the de-inking process of such strength that they would discolor the groundwood pulp of which newspaper is made.

Experiments have been conducted by the Forest Products Laboratory of the U. S. Forest Service, Madison, Wisconsin, using bentonite, a very fine cream-colored clay found in Wyoming, as a de-inking agent. Bentonite occurs in finer particles than any other natural mineral substance, and will go into colloidal suspension in water without the aid of strong alkalies. In preliminary de-inking runs made on old newspapers at the Forest Products Laboratory, bentonite was used with an alkali solution just strong enough to loosen the ink without discoloring the paper. It was found that the bentonite
particles were so small that they could gather up the freed carbon and still pass through the ordinary washing screen. In the experimental runs, paper fiber matted on the screen and tended to prevent thorough washing; but even with this difficulty a sheet almost equal in quality to the original was obtained.

De-inking trials made later at a Minnesota paper mill, using ordinary paper-making equipment except for a special washing screen, show that the process can be carried out on a commercial scale to produce a sheet which can compete in the open market with standard news.

One ton (2000 pounds) of pulp can be recovered from 2500 pounds of old newspapers by this de-inking process. In Chicago alone, it is estimated, 325 tons of waste newspapers might be economically collected daily and converted into approximately 260 tons of de-inked pulp. This would mean a daily saving of about 300 cords of wood and the annual saving would be equivalent to the cut on about 4000 acres of 100-year old spruce-fir forest.

**COST OF DE-INKED PULP**

The itemized cost figures given below are based on a mill operating at the rate of 40 tons of de-inked newspaper stock per day. The labor, repair, and maintenance figures are estimated on the use of modern types of disintegrators and washers. The cost of power and equipment for beating the old papers is not included since it would be the same where purchased pulp was used.

<table>
<thead>
<tr>
<th>Labor and expense</th>
<th>Cost per ton</th>
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</thead>
<tbody>
<tr>
<td>Labor</td>
<td>$1.00</td>
</tr>
<tr>
<td>Labor (general and repair)</td>
<td>0.30</td>
</tr>
<tr>
<td>Fuel</td>
<td>0.10</td>
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<tr>
<td>Power</td>
<td>0.40</td>
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<tr>
<td>Repairs</td>
<td>0.25</td>
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</tbody>
</table>

$2.05
Carried forward..........................$ 2.05

Materials

Cost
per ton

Old newspapers, 2500 lb.
at $0.75 per 100 lb.............................$18.75

Lime, 25 lb. at $0.80 per 100 lb............... 0.20

Soda ash, 40 lb. at $1.32 per 100 lb........... 0.53

Bentonite, 200 lb. at $1.52 per 100 lb........ 3.04

Water, 13,000 gal. at $0.08 per 1000 gal.... 1.04

$23.56

Miscellaneous charges

Royalty, taxes, interest on investment in washer equipment, etc. Would not exceed........ 2.00

Total cost........................................$27.61

COST OF FURNISH OF NEWSPRINT

Using ground-wood pulp

Cost
per ton

0.84 ton ground-wood pulp at $30.........................$25.20

0.21 ton sulphite pulp at $60......................... 12.60

Cost of pulp (allowing for a 5 per cent loss in conversion of pulp into paper)... 37.80

Labor handling ground-wood laps...................... 0.50

$38.30

Using reclaimed newspapers

0.94 ton de-inked pulp at $27.61....................$26.00

0.11 ton sulphite pulp at $60....................... 6.60

Cost of pulp (allowing for a 5 per cent loss in conversion of pulp into paper)........ $32.60
To make the most out of the de-inking process, it is absolutely necessary that the mill be independent of the periodical manipulating of the waste-paper market. For mills situated near the larger cities such a course is very simple. In fact, a large part of a mill's supply might be collected by its own force from the neighboring territory, thereby cutting out the profits of at least three middlemen.

In stabilizing the supply of waste papers the publishers can be of enormous assistance, since the supply is directly dependent upon the amount of paper saved by the average householder. With proper newspaper campaigns the supply of waste newspapers could be doubled without much effort; and if the demand were stabilized, with proper warehouse facilities the supply would continue.