The saving which is thus effected is clear from the following figures:

Assuming 2 lbs. of injected open steam in the still per lb. of dynamite glycerol produced, a plant producing 800 lbs. of glycerol per hr. would inject 11,420,000 lbs. of steam per year, or 38,000 lbs. of steam would be injected in the still per working day. On a yearly basis, this amounts to 335,000 b. h. p. At a rate of 2 cents per b. h. p., the cost of evaporating the sweetwater obtained in one year's operation would amount to \$6700. As all of the steam openly injected in the still must be transferred and finally evaporated to sweetwater crude which is again distilled, the amount of \$6700 represents the saving of a modern plant compared with older types, considering only the feature of sweetwater evaporation.

The controlling of glycerol passing to the sweetwater condenser by means of water-cooled condensers in place of air condensers and the including of evaporator and concentrator equipment as part of the glycerol distilling set under the same vacuum system rather than operating them as separate units, represents another essential difference between modern and old type plants. Present practice permits the recovery of more than 90 per cent of the glycerol in the crude in the form of dynamite, against about 75 per cent in former methods, or about 20 per cent more glycerol is obtained in the form of dynamite grade by means of modern equipment. On a plant of 800 lbs. per hr. capacity, this amounts to an additional saving of \$11,520 per year, assuming the refining cost at only 1 cent per pound.

SUMMARY

Modern glycerol distillation equipment:

- 1—Enables marked economies in steam and power consumption.
- 2—Gives highest glycerol yields by eliminating loss of glycerol through handling and evaporating large quantities of sweetwater.
- 3—Gives maximum recovery of glycerol in the form of high gravity dynamite or C. P. glycerol in a single distillation.
- 4—Greatly economizes floor space, by including the evaporator and concentrator units as part of the distillation system and under the same vacuum system.

Wood Turpentine

[ABSTRACT]

By C. A. Lambert

HERCULES POWDER CO., HATTIESBURG, MISSISSIPPI

WOOD turpentine is made from stumps, down wood, and sawmill slabs, by destructive distillation or by steam distillation, while spirits of turpentine is the volatile part of the oleoresin exudate from the scarified living tree.

In the manufacture of steam distilled turpentine, 14-ton lots of finely shredded material are distilled with steam at approximately atmospheric pressure. The average recovery from each charge is 112 gal. of crude turpentine, or 8 gal. per ton of wood.

The physical characteristics of the crude product are:

Specific gravity, 15° C.....	0.877
Distillation range:	
5 per cent over at 162° C.	
48 per cent over at 170° C.	
95 per cent over at 212° C.	
Unpolymerized, per cent.....	0.8

The crude turpentine consists largely of α -pinene, dipentene, and α -terpineol. There have also been isolated β -pinene, camphene, *d*- and *l*-limonene, cineol, fenchyl alcohol, and other terpene derivatives and hydrocarbons.

Spirits of turpentine is largely a mixture of α - and β -pinene, and the problem of the wood turpentine manufacturer is to distil his crude oil in such a way as to secure a product as nearly as possible like the best grade of spirits. Technical control has improved the product to a point where practical tests cannot distinguish the distilled product from the spirits.

The crude product is distilled over soda-ash from a refining still provided with a Hempel or Barbet plate column. About 60 per cent of the crude turpentine is made into so-called pure wood turpentine and 40 per cent into pine oil.

The physical properties of the pure wood turpentine are as follows:

Specific gravity, 15° C.....	0.863
Refractive index, 20° C.....	1.468
Unpolymerizable, per cent.....	1.4
Refractive index, residue, 20° C.....	1.490
Initial boiling point, ° C.....	153
Distillation range:	
91 per cent below 170° C.	
Color.....	Standard or better
Acidity.....	Trace
Water.....	Trace

A large sample of pure wood turpentine distilled through a Hempel column gives the following fractions:

	Identified as:
Approximately 2 per cent below 150° C.	α -Pinene
Approximately 70 per cent below 160° C.	β -Pinene
Approximately 3 per cent below 168° C.	Dipentene and
Approximately 15 per cent below 190° C.	terpineol
Approximately 7 per cent below 350° C.	Terpineol, heavier
	terpene derivatives
	and polymers

From the heavy ends of the crude turpentine, steam distilled pine oil is obtained by fractionation. It is a mixture of dipentene, terpineol, and other terpene derivatives, with the following physical properties:

Specific gravity, 15° C.....	0.930 to 0.938
Unpolymerizable, per cent.....	3 to 3.5
Refractive index, 20° C.....	1.479
Color.....	Very light straw
Odor.....	Pine oil
Water, maximum per cent.....	1.6
Boiling range:	
Per cent	° C.
5	189
10	198
20	204
30	206
40	208
50	210
60	212
70	213
80	214
90	217
95	222

Physical characteristics can be varied considerably to meet demands for flotation oils, paints, disinfectants, and pharmaceuticals.

Benzene Purification

[ABSTRACT]

By S. S. Heide

1922 AVE. G, ENSLEY, ALABAMA

CRUDE light oil is recovered from by-product coke oven gas by absorption in paraffin oil. It varies in color from light straw to dark amber, according to its contamination with the wash oil used in its recovery. Its composition is as follows:

	Per cent
Finished fore runnings	1.00
C. P. benzene	62.00
C. P. toluene	15.00
Refined light solvent	3.00
Crude heavy solvent	4.50
Naphthalene	2.50
Finishing still residue	4.00
Wash oil	5.00
Acid washing loss	3.00

The first step in the purification of benzene is distillation of the crude light oil in a column with indirect steam. The cuts are as follows: