

GENERAL SCIENCE

Russian Declassification

the main body and lignin is the bond that holds the cellulose together. Without lignin, wood is a loose bundle of fibers. Without cellulose, it is a porous sponge of lignin.

Paper is composed of cellulose. If you tear a piece of paper in half and hold it up to the light, you will see a tiny fuzz along the torn edge. Occasional hair-like strands will project separately. These are cellulose fibers.

Cellulose is used as a base for 70% of the better plastics on the market today. Celluloid, the first of all plastics, was named after cellulose.

High-grade wood pulp is the source of cellulose acetate, nitrate and ester plastics. It is also the source of rayon.

Besides material for plastics, trees yield chemicals important in a variety of products from cosmetics to soil restorers, which is where lignin enters.

Lignin in Many Products

Lignin is an ingredient in some hand lotions and scalp tonics. It is used in several bactericides, in fire extinguishers and as a road binder. A mixture of lignin and concrete is sometimes used as a base for building materials. Synthetic flavoring for some vanilla ice cream is made from lignin also.

Lignin has a big future in conservation. The chemical can be used to restore soil for farming in heavily forested areas. Combined with elemental phosphorus and nitrogen, lignin encourages the formation of topsoil.

A pilot plant has recently been established by Crown-Zellerbach Corporation in Camas, Wash., for producing dimetal sulfide from lignin.

In most pulp mills, however, lignin is still regarded primarily as a waste product. Scientists have not found a way of putting to use large amounts of the chemical. Unfortunately, industrial pulping seriously degrades lignin, a fact that has not encouraged research.

Search for Lignin Plastic

Uses for lignin and methods of extracting it constitute the frontier of the least explored, least known and least understood country in the wide realm of timber.

If it were completely understood, there is reason to believe the entire future of the wood and plastics industries would be altered. A lignin plastic, in which lignin resins would form 50% by weight of the final product, could so drastically increase the world's plastic output that there would not be a market for all of it.

No large-scale processing of lignin exists at the present time because its uses are so limited. Chemists specializing in this branch of research say, however, they are on the threshold of finding a general use to which lignin can economically be put.

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Sheep turned into a corn field prior to harvest may result in faster, more economical corn picking; they clear away lower corn leaves, weeds and grass.

► THE RUSSIANS are now declassifying atomic information faster than the United States, for the first time.

The disclosures about the Soviet experiments on controlled thermonuclear reactions made by Dr. Ivan Kurchatov at Harwell were definitely of a kind that would not have been let loose under U.S. security regulations, despite their non-military nature.

Heretofore, the United States has beat Russia in announcing atomic progress. At the Geneva Atoms-for-Peace conference, the Soviet scientists consistently lagged in producing hitherto secret information.

The Soviet scientists have told more of what they know than U.S. scientists have been allowed to. This does not mean they are ahead of the U.S. in thermonuclear research. They probably are not, although this is not known for sure.

The U.S. has a full-blown research on the peaceful H-reaction, centered at five large laboratories. The official word is that we are 20 years from possible useful thermonuclear power, but there might be a breakthrough faster.

There are tremendous technical difficul-

ties. It is necessary to have temperatures of several million degrees to fuse the heavy hydrogen (deuterium) or perhaps lithium and beryllium atoms, converting their matter into energy. Nothing like a metal vessel can confine such temperatures. The reaction would have to take place in gaseous discharge, self-contained in what the physicists call a "hot plasma." Magnetic and electrical means would be used to create the temperatures. The discharge would not be steady.

Once the fusion reaction got underway, the temperatures would rise further and the trick would be to take out the energy released and use it. Neutrons would be produced, indicating fusion. The Russians are reported to have thought they were producing neutrons, but these were evidently not from actual fusion.

American physicists are convinced, many of them, that if the AEC got its controlled thermonuclear research information out in the open in a modern Smyth report there would be faster progress, without detriment to the defense effort. A few fringe research reports have been released.

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