

# Silk Stockings From Pine Chips—Wonder of Western Forests

*Great Industry Rises As Science Discovers Ways To Make Silk From Wood*

By Rockwell Evans

CALIFORNIA has its yellow gold. Texas has its black gold from the oil fields. But Washington has its green gold—green gold in the form of forests that cover the mountain sides.

From great trees, about which countless songs and poems have been written, comes nine-tenths of the artificial silk produced in the world. From chips in the forest come filmy stockings to cover ladies' legs. Artificial silk is rayon, and rayon today is used not only in stockings, but in women's underwear, nightgowns, rayon-satin evening dresses, covers for cushions and for chairs and davenport.

It is entertaining to reflect that the pile of chips you passed when driving through the woods the other day has undergone chemical process and today adorns the lovely young lady sitting a couple of tables away in a night club.

We are getting so clever we can make everything out of everything else, says Professor Henry K. Benson, head of the chemical engineering department at the University of Washington, Seattle.

Chemistry, he points out, once a mystery to the vast majority of people, today is fast becoming a matter of common knowledge; its language is translated by great numbers of interpreters from crowded classes in high schools and colleges.

THANKS to chemistry, we get cellulose from wood. And from cellulose we get lacquer to put on your car, safety glass for the windshield and waterproof fabrics; two-thirds of your wife's clothing and, if you are given to silk pants, your own underclothing. In your home such unsuspected things as telephones and toothbrushes, to say nothing of cellophane, come from cellulose, as do photographic films and smokeless rifle powder.

Add to this the paper on which this is printed and you have a few of the products which originate in the green forests.

It used to be, and probably still is, a standing joke among the kids to refer to the breakfast food they were served as "sawdust" or wood. But, to tell the truth, you eat considerable wood for dinner. Cellulose is not digestible for man, but all hoofed animals eat it. Therefore your leg of mutton, or your beefsteak, really contains a certain amount of wood.

Furthermore, Germany has now perfected a process in which sugar is obtained from sawdust. It is rapidly being placed on a commercial basis in that country to compete with the cane and beet product. It has, say scientists, all the food qualities of the sugar you now have on your table.

IT IS not a new process. The DuPonts have a plant at Georgetown, N. C., to extract sugar from sawdust and then convert it into alcohol. And as early



Milady dons a pair of sheer rayon hose—and little thinks that they were made from the massive pines that grace the Western mountains! But that, explains Professor Henry K. Benson, upper left, is exactly what has happened since the rise of chemistry in the lumber business. Even the silk gown adorning lovely Jeanne Meyers, of Seattle, in the lower left photo had its beginning in a tree trunk. United States rayon mills manufacture 30 per cent of the world's supply, says Professor Benson, head of the University of Washington's chemical engineering department.



as 1911 a plant was started at Port Hadlock, north of Seattle. A French chemist by the name of Schindler was in charge, but the plant failed due to lack of proper facilities for handling the sawdust.

Cellulose, explains Professor Benson, is a chemical substance closely allied to starch and is a carbohydrate. Unglazed paper, which is nearly pure cellulose, is converted by the action of strong sulphuric acid into parchment paper. By the action of a mixture of strong nitric and sulphuric acids, it is converted into nitrates, the higher one of which is known commercially as gun-cotton.

Celluloid, for instance, is composed of the lower nitrates of cellulose and is extensively used as a

substitute for ivory, bone, hard rubber, coral and similar products.

But rayon is probably the outstanding by-product of wood. A substitute for silk had been sought for many years and in 1859 a French scientist produced a cellulose yarn that had many of the qualities of real silk.

HIS process was improved upon and developed until it has become the rayon of today, manufactured in more than 100 factories throughout the world.

"The basic material," says Professor Benson, "is wood pulp. Any pinaceous trees will do for pulp

*Modern Chemists Create Amazing Number of Uses For By-Products of Trees*

making, the important thing being uniform material. The wood is pulped by the sulphite process and converted into nitro cellulose, or gun-cotton.

"This is dissolved in a mixture of alcohol and ether and the solution is filtered and then aged. When in proper condition, the pulp is forced through extremely fine holes in a 'spinnerette' and becomes thread. By winding several threads together, yarn is produced. It then may be dyed either in the yarn or after weaving."

The United States today has 20 rayon factories turning out 30 per cent of the world production. In a single year the United States factories will produce approximately 65,000,000 pounds of rayon, a product which has the appearance and luster of silk, but is not so strong.

Rayon is used extensively with cotton, also, for production of moderate priced garments.

And so, while we may not actually make a silk purse from a sow's ear, chemistry produces other wonders even farther removed.

"As another example," says Professor Benson, "chemistry has shown men in the logging industry how to make tannin from the bark of trees and use it to tan hides from China and South America."

"Or the debris of the forest may be reduced to chips, treated with steam under pressure, exploded, the fibers reassembled and made into strong, durable panels for radios and the decoration of our homes."

"Liquid waste from pulp mills has been used in the athletic stadium of the University of Washington to make a running track that is dustless in summer and mudless in winter."

"Thanks to chemistry, the conversion of electrical energy into commodities is no longer a mystery, but an accomplished art. From the rushing waters of the Nisqually River we have for years made a nitrogen product from water, air and electricity, combined it with ordinary washing soda and sent it East in barrels for making dyestuffs."

"With electric energy and ordinary sand we can make phosphorus from the country's greatest deposit of phosphate rock in Idaho, combine it with ammonia made from air, water and electricity, and ship cargoes of fertilizer to the ends of the earth."

"Nitrogen today is being removed from the atmosphere at the rate of thousands of tons a day and, besides its primary use as a fertilizer, it plays a leading role in the manufacture of nitro cellulose—or gun-cotton—and there we are right back to the production of rayon again."

All very clever. Eve started out by wearing a fig leaf taken from a tree. Today the girls wear silk undies taken from the trees. We're making progress.

And if the metamorphosis from the raw material to the finished product is a bit confusing, just consider that the "miracle" is the basis from which an ordered and marvelous future will arise!

## Setbacks, Not Medals, Develop Men, Says Reno "Sky-Pilot" Story of Young Singer Who Got the "Gong" Proves Value of Being Able To Fight Back

FOR a quarter of a century, Brewster Adams, Reno's beloved Baptist pastor, has come to contact with city folk and old-time desert dwellers. He knows at first hand stories of staunch courage and fortitude in the face of hardship... which prove to him that men and women who have lost the accumulation and ease of yesterday are carving out new frontiers for themselves. He knows modern pioneers with hearts "that can begin anew" and recalls personal experiences. Brewster Adams' articles are a regular feature.—Editor.

By BREWSTER ADAMS  
For 25 Years Reno's Baptist Preacher

"GEE! I thought I would be bringing back a lot of medals, but all I got was the gong."

He was an honest-eyed, clean-featured lad—one any parents would be proud to have throw his shirt on the floor, leave his muddy shoes in the parlor and let the family dog sleep under the covers.

"You see, I won the audition trials for this state, and then for the Western area. I thought I was pretty good and went back East for the final tryout."

"I was sure I was coming back with a lot of ribbons, but when I sang, all they gave me was the bell."

Feel sorry for him? Surely. But that old gong has ding-donged so many times on me that I don't pay any more attention to it than to the family alarm clock.

"Son, take it straight from me, it's the best thing that could ever happen—if you can take it."

He looked at me with surprise, if not disappointment.

"Everybody else feels sorry for me."

"Sure! And you feel sorry for yourself, and instead of fighting your way back, you are trying to get there by crying. You don't get any medals for weeping."

were good. Nobody could have taught you, and probably nobody would have wanted to hear you."

IT wasn't easy for him to take. Frankly, I liked the lad so much, I was trying to get him mad. There's a lot of people you can help most by slapping ears rather than shedding tears.

I told him about a lad who got all the awards. He was an Eagle Scout in my troop. I got him a job in a garage. The foreman said to me one day,

with apparent regret, "I can't use that boy. Nobody can tell him anything. He's got a swell head. I guess the kid's got too many medals."

One reason I get so much joy out of watching the big games is that they so often fumble the ball. It makes me feel so much easier when I miff them—the opportunities which come my way.

At the last East-West game they awarded an all-American certificate to Gomez Jones! Gong! He

passed the ball where nobody ain't or wasn't.

ROGER PECKINPAUGH was awarded the prize for being the most valuable player in the American League. He took the award and tipped his hat. Gong! He made five errors that game.

McNeilly was given a great hand—a promising youngster from Sacramento. Gong! He overran an easy pop fly and let in two runs.

"Doc," said my old friend, the prospector, "I've got a wonderful showing. Looks like a glory-hole. We're going to blow it. Want to see us bring in the richest mine in Nevada?"

His holes were drilled and he set a half dozen sticks of mud, as he called his powder. He shot them. We rushed to the "glory-hole." Gong! The hole was there but the glory had faded. The vein had pinched out.

But no complaint nor wailing from the old-timer. He had heard the gong too many times.

"Hell! Excuse me, Reverend. But you've got to admit that it was a good shot I gave her!"

He will dig another hole and shoot again. The gong is the beginning of another round, not the end of the last, to the man who is a fighter. The whistle blows when a player is forced out of bounds. But the play is not over. Over the door of Boss Ketterling's laboratory, out of which have come so many modern devices, are these words: "When you strike an obstacle you are on the verge of a new discovery."

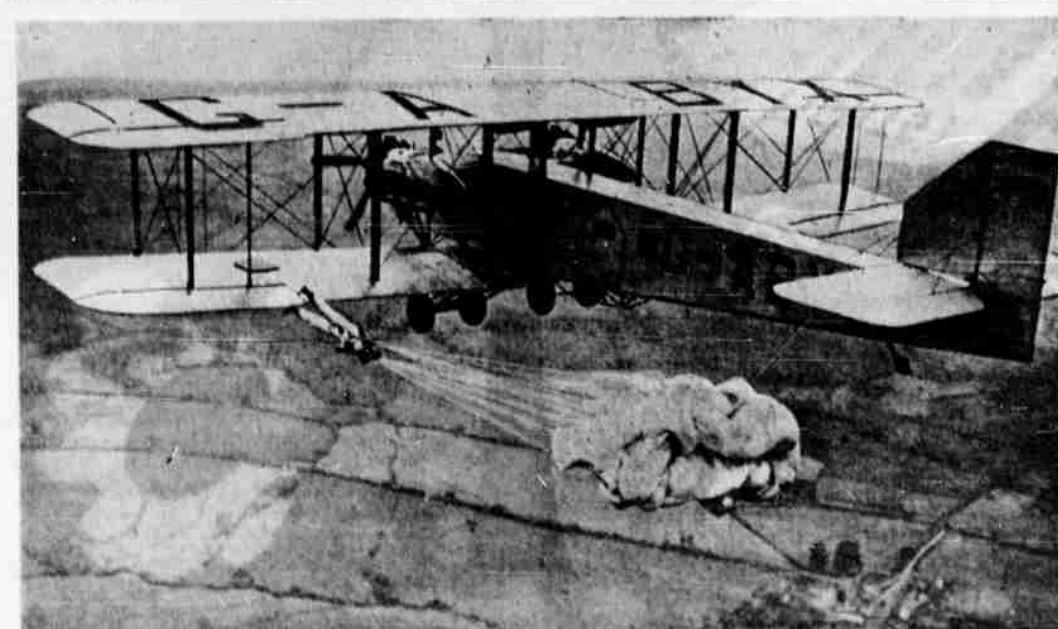
THE other day the boy singer was back. He was carrying a little sample case. With considerable embarrassment he explained that with the sale of so many subscriptions he could take a thorough course in voice culture.

"They rang the gong on me. But I'm going back when I get this training. This is quite a come-down for me. I thought I was a star and now I'm only a salesman," he apologized.

"Quite a come-back. I would rather say. You're going back to beat the gong."

I hope I may hear him some day. I feel sure that when he sings there will be a peculiar little bell-like tone drifting out of his heart, that will touch the hearts of many, also, who have heard the gong.

★ ★ ★ ★ ★ And the Camera Caught It! ★ ★ ★ ★ ★  
One of a Series of the World's Most Unusual News Photographs



This unusual photo of the beginning of a "pull off" parachute jump was taken June, 1934, during an aerial meet at Bristol, England. The camera caught the jumper just as he was pulled from the wing of the plane.