HEADLINES
ARCHIVE
ENVIRONMENT
REAL X-FILES
SCIENCE
ABOUT US
CONTACT US
CONTRIBUTORS
EARTHFILES SHOP
SEARCH IN DEPTH
SUBSCRIPTION
LOGIN
LOGOUT
HELP
Printer Friendly Page

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Part 2 - Textiles Expert Examines the Corguinho, Brazil Bed Sheet and Pillowcase

Prof. Herbert J. Barndt, Director, Grundy Testing Laboratory, School of Textiles and Materials Technology, Philadelphia University, Philadelphia, Pennsylvania, examines the Corguinho, Brazil bed sheet and pillowcase in his laboratory on April 22, 2003. Photograph © 2003 by Linda Moulton Howe.

June 6, 2003 Philadelphia, Pennsylvania - On April 22, 2003, I showed Prof. Herbert J. Barndt, Director of the Grundy Testing Laboratory, School of Textiles and Materials Technology, Philadelphia, University, Philadelphia, Pennsylvania, photomicrographs by biophysicist Levengood and the entire bed sheet and pillowcase. Prof. Barndt has been working in textiles research for 35 years. He collected a control sample from the Corguinho bed sheet to test with the goal of trying to duplicate the melted polyester threads neatly cross woven with the unaffected cotton threads.

Prof. Herbert Barndt cutting a sample from a corner of the bed sheet where the material was normal for his experiments to try to reproduce the blue "halo" juxtaposed with scorch as seen in the body pattern. Photograph © 2003 by Linda Moulton Howe.

Three weeks later on May 13, 2003, I returned to Prof. Barndt's lab with audiotape and a videographer to see one of the experiments he did with a small blow torch and to interview him.

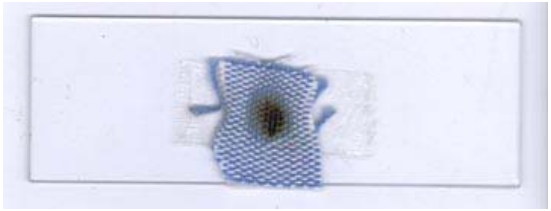
Given Urandir Oliveira's statement that he had taken a shower just before he laid down on the bed, Prof. Barndt added water to the control sample he cut from the Corguinho bed sheet and applied a small blow torch that emitted about 1500 degrees Fahrenheit. On a very small scale, he was able to simulate the blue halo around a dark burned scorch after a brief 2 to 4 second exposure of the heat to the bed sheet sample. But the resulting scorch was darker than most of the body print on the bed sheet. On May 13, 2003, I talked with him about his torch experiment, analytical chemist Phyllis Budinger's report and his overall impressions of the Corguinho bed sheet and pillowcase.

Interview:

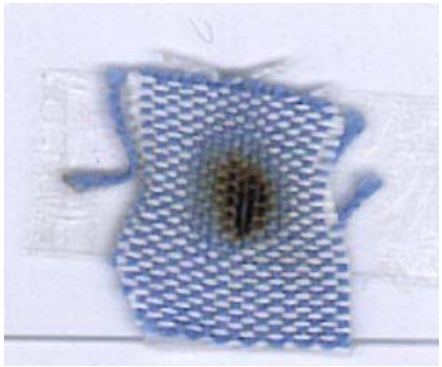
Prof. Herbert J. Barndt, Director, Grundy Testing Laboratory, School of Textiles and Materials Technology, Philadelphia University, Philadelphia, Pennsylvania: "I took a small square of the fabric which you left with me and I wet it to simulate the conditions that were described.

PERSPIRATION.

And moisture from the shower. I used a small heat source, a (small blow) torch. I heated the center of the fabric. You can see it started to char in the middle. But the (blue) ring around the charred area is darker in color, similar to some of the (blue halo) areas on the fabric and that's because of the polyester shrinking away from the heat.



Slight enlargement of the glass slide Prof. Herbert Barndt prepared to examine the Corguinho cloth sample that he exposed to the 1500 degrees F. blow torch for 2 to 4 seconds.
There is a blue "halo" around the very dark center, darker than most of the body pattern on the
Urandir Oliveira bed sheet. Photograph by Linda Moulton Howe.



Blow-up of Prof. Barndt's blow torch test.

SO, THE HALO IS CREATED BY THE POLYESTER MELTING AND...?

And shrinking and exposing more of the cotton.

CAN YOU DEMONSTRATE?

(Prof. Barndt turns on the blow torch). You can hear it. Want to feel it? Trust me, it's warm.

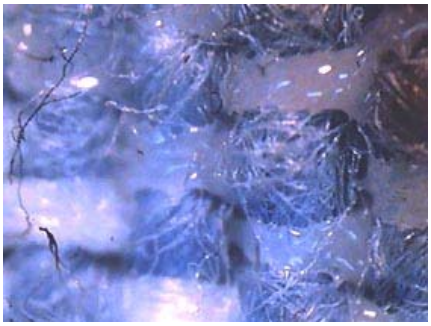
YEAH, IT SURE IS. AND THE TEMPERATURE THAT'S PUTTING OUT IS ABOUT WHAT?

That's about 1500 degrees F. It's very hot.

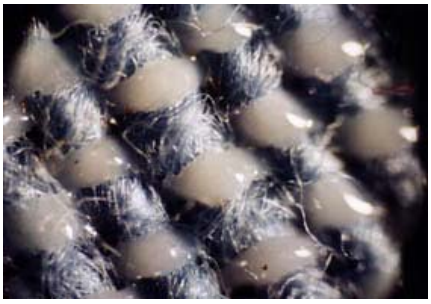
SO YOU COULD ONLY THEN EXPOSE THAT (FABRIC) FOR LIKE ONE SECOND? TWO SECONDS?

It was two to four seconds, something in that range. As soon as it started to char, I withdrew the heat. But as you can see, we did accomplish some melting around that area.

THE SHAPE OF YOUR MELTED POLYESTER, IT'S NOT QUITE IDENTICAL TO THE BRAZIL. THIS IS THAT 40X PHOTOMICROGRAPH THAT BIOPHYSICIST W. C. LEVENGOOD DID.



Prof. Barndt's photomicrograph of the Corguinho bed sheet
sample he subjected to the 1500 degrees F. blow torch for 2 to 4 seconds.
Photomicrograph by Prof. Herbert J. Barndt.



40X photomicrograph by biophysicist W. C. Levengood in early March
2003 of Corguinho bed sheet Sample 1 cut from lower right leg of body pattern.

WHEN YOU TAKE THE EXPERIMENT THAT PHYLLIS BUDINGER DID WITH AN IRON AND YOU PUT IT DOWN THE 3 SECONDS, 4 SECONDS AND 10 SECONDS OF THE IRON ON SOME OF THE CONTROL FROM THIS BED SHEET, IT SEEMED TO BE KIND OF FLATTENED.

It's flattened because when polyester is heated under pressure, it spreads and makes it look flat on top. In fact, it is flat on top. You can do that at home when you iron something if you want to.

ALSO, WE KNOW NOW THAT AN IRON LIKE AN IRON ON AN IRONING BOARD COULD NOT MAKE THIS PATTERN BECAUSE IT WOULD SQUASH THE POLYESTER THREADS.

Flatten. It would flatten them.

AND WE KNOW FROM THE PHOTOGRAPHS UNDER THE MICROSCOPE, YOUR EXPERIMENT AND THE ORIGINAL PHOTOGRAPHS FROM THE BIOPHYSICIST THAT IT (POLYESTER THREADS IN BED SHEET) HAS A VERY NEAT, PRECISE, TOTAL CURVE TO IT, SO IT IS NOT FLATTENED.

Right.

SO, WE HAVE ELIMINATED THE IRON AS A POSSIBILITY.

Yes. Could someone have taken a torch and created this? Improbable. They would have to have understood an awful lot about what they were doing.

WHAT ABOUT A SOLDERING IRON?

No, anything that has to put pressure against the fabric is not going to produce what you see in this bed sheet.

HOW WOULD YOU DO IT IF YOU WERE GOING TO TRY TO REPRODUCE EVERYTHING THAT YOU ARE SEEING HERE?

I don't know exactly what I would do, but I can tell you we'd probably need a lot of bedspreads before we got it right. It wouldn't happen the first time, at least not what I see happening here.

SO, THIS IS EXTRAORDINARY?

I think so. It's very unusual. As I said, if you were going to try to duplicate this in a laboratory, you'd probably go through quite a few bedspreads. And why didn't it just ignite and burn up? Probably because of the presence of moisture or something else we can't explain.

BECAUSE AN EXPOSURE TO 500 DEGREES F. FOR LET'S SAY 5 MINUTES...?

It would be a mess.

IT WOULD BE A CONGEALED MESS.

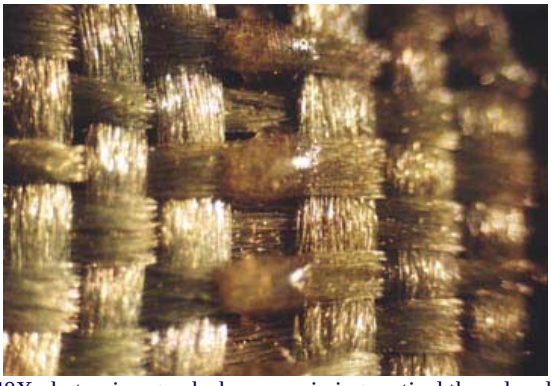
Well, possibly, it would be worse than that. The cotton would burn for that length of time, definitely. The fabric would have dried out, the cotton would have burned, the polyester would have melted. Yeah, it would be a puddle.

THERE REALLY ISN'T MUCH CARBONIZATION ANYWHERE ON THIS.

Yes.

AGAIN SUPPORTING, IT SEEMS, THE HYPOTHESIS THAT THIS HAPPENED QUICKLY.

Yeah, that sounds reasonable.



This 40X photomicrograph shows a missing vertical thread and three vitreous spots where horizontal fibers cross the missing thread space in the mattress cover. Each thread is .4 millimeters wide. None of the other polyester fibers appear to be affected. Photomicrograph by biophysicist W. C. Levengood.

WHAT ABOUT SOME OF THESE DETAILS THAT THE BIOPHYSICIST FOUND UNDER THE MICROSCOPE SUCH AS THAT ONE .4 MILLIMETER THREAD (THAT'S MISSING AMONG OTHER UNTOUCHED ONES.)

How about I have no idea why that could have happened. You have polyester here and here and all along here. You have this one that is obviously missing. Why? You'd almost have to have a very, a pinpoint heat source like a laser to do something like that.

IF YOU HAD A PINPOINT THAT COULD GO DOWN TO .4MM, COULD A .4MM LASER MAKE THIS COMPLICATED PATTERN?

No. No. I don't really know what kind of energy source would do that. That's a mystery as far as I'm concerned.

Thermal Conductivity of Polyester Versus Cotton

In the report that you have, if you'll flip back several pages, she talks about thermal conductivity. If you look here, the numbers she has given you indicate that polyester is 10 times more conductive than cotton. And if that is the case, then of course, the polyester could absorb the heat more rapidly than the cotton.

FROM YOUR KNOWLEDGE AS BEING A TESTING LABORATORY IN TEXTILES, YOU WOULD AGREE WITH THE TEN TIMES NUMBER THAT POLYESTER HAS A HEAT TRANSFER THAT IS TEN TIMES FASTER THAN COTTON?

No. No, I wouldn't.

TELL ME WHAT YOU KNOW.

What I know is from several different texts that they generally suggest that cotton is more conductive than polyester, which is why polyester is used as an insulating material in winter clothing and other things. You don't fill a ski jacket with cotton. You fill it with polyester because polyester is a better insulator than cotton. When we talk about thermal conductivity in the sense of what we do in this laboratory, it is measuring the conductivity of fabrics, not the conductivity of a sample polymer.

OK, SO AN INDIVIDUAL THREAD...

Or fiber.

OR FIBER CAN GIVE ONE RESULT THAT MIGHT BE COMPLETELY DIFFERENT IF IT IS WOVEN THOUSANDS OF THREADS INTO A WHOLE PIECE OF FABRIC.

Yes. And it's also the measurement technique. We use a technique when we measure conductivity of a fabric that simulates skin temperature because we're talking about comfort of the wearer. If you test it at a different temperature level, you might get a different set of results.

Reproducing Such A Complex Body Pattern

SO, AS YOU LOOK AT IT NOW CLOSE UP WITH ALL OF YOUR YEARS OF EXPERIENCE WITH FABRIC, WHAT IS KIND OF YOUR BOTTOM LINE RESIDUE ABOUT THIS?

Oh, I can't explain it. The only thing I can tell you about it is there are obvious heat damage to the fabric. Surprisingly, the polyester has melted and the cotton has burned in some areas, but not all of them. It has the general shape, as you say, of a body. I would be at a loss to explain how a body could have been present in the amount of heat that was required to do the damage that you see here and not suffer serious burns. So, from a scientific standpoint, that's pretty much what I can tell you. I don't know exactly how this was done.

IT SEEMS TO ME THAT THE MORE STUDIES PEOPLE HAVE DONE ON THIS, THAT WHAT EVER HAPPENED, IT HAD TO HAPPEN IN SECONDS,

NOT MINUTES.

Yeah, the exposure of a particular area of the fabric has to occur very quickly. Can someone with a heat source start down here and spend twenty minutes doing this? Perhaps, but the point is if you have a heat source that is intense enough to melt the polyester and still not cause intense damage to the cotton, or at least not to some of the cotton, it has to move fairly quickly along this pattern. It either happens, the whole thing, all at once. Or it has to be very carefully guided to get this effect without actually starting a fire of some kind.

BECAUSE REALLY AT 500 DEGREES FAHRENHEIT AND WE HAVE TO BE SOMEWHERE IN THAT RANGE THAT KIND OF EXPOSURE TO THIS POLYESTER AND COTTON BLEND FOR MORE THAN SAY LIKE 2 OR 3 MINUTES, YOU WOULD END UP WITH BLACK, CHARRED, PROBABLY TARRY...

Oh, that kind of exposure, that kind of heat on this fabric, you're talking about no more than ten seconds in any one area, probably. Otherwise, you would ignite it.

YOU WOULD IGNITE IT INTO FIRE.

Yes.

WHY ISN'T IT ALL BROWN OR ALL HALO-LIKE BLUE?

Excellent question. I don't know. Why is this area which is presumably between the shoulders of the individual, why is it essentially undamaged?

RIGHT, THAT'S A GOOD QUESTION.

Was it some kind of an energy that did this that we don't know anything about? I don't know the answer to that. I guess it's possible."

Continued in **Part 3.**

Credits