



# The Shroud of Turin Research Project 1978 Scientific Examination of the Shroud

Presented by

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Shroud of Turin Website

[www.shroud.com](http://www.shroud.com)

President, STERA, Inc.

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## INTRODUCTION

The Shroud of Turin Research Project (STURP) was not the first group of scientists to examine the Shroud. There is a long legacy of important Shroud scholars and dedicated Sindonologists that came before them.

Without doubt, the first photograph of the cloth made by **Secondo Pia** in 1898 ushered in the scientific era of the Shroud's history and prompted illustrious scholars like **Paul Vignon, Pierre Barbet, Msgr. Giulio Ricci, Don Luigi Fossatti** and so many others to take up its serious study in the first 75 years of the 20<sup>th</sup> century. We truly owe a huge debt of gratitude to these individual pioneers of Shroud research who paved the way for modern scientific studies of the cloth.

Of course, as a professional photographer myself, I was truly honored to follow in the footsteps of Secondo Pia and **Giuseppe Enrie**, whose iconic and beautiful 1931 photographs of the Shroud are famous worldwide and **Giovanni Judica Cordiglia**, who made the first color photographs of the cloth in 1969.

## INTRODUCTION

STURP had the distinction of being the first **team** of researchers that, working together, performed the first ever **in-depth, multidisciplinary** scientific examination of the cloth in its history. Their work forms the primary database of credible scientific information about the Shroud published in the peer-reviewed scientific literature and has become an essential resource for the ongoing research done by every serious Shroud scholar in the world today. It is also the perfect starting point for every new student investigating the science of this enigmatic cloth.

In this presentation, I will share with you with my personal perspective on the STURP team and its history and will do so by using some of the more than 2500 photographs of the event I made in my formal capacity as the Official Documenting Photographer for the project.

So this is not really a scholarly presentation (like most of the others at this conference), but more accurately, a visual look behind the scenes of an important moment in the history of this unique relic.

## THE BEGINNING

On February 19, 1976, physicist **John Jackson** met with **William Mottern**, a radiographic expert and researcher working at Sandia Laboratories in New Mexico. Bill was using a device known as a **VP-8 Image Analyzer** for analyzing x-rays in his own research. However, the VP-8 was an image processing tool that allowed any image to be input via video camera.

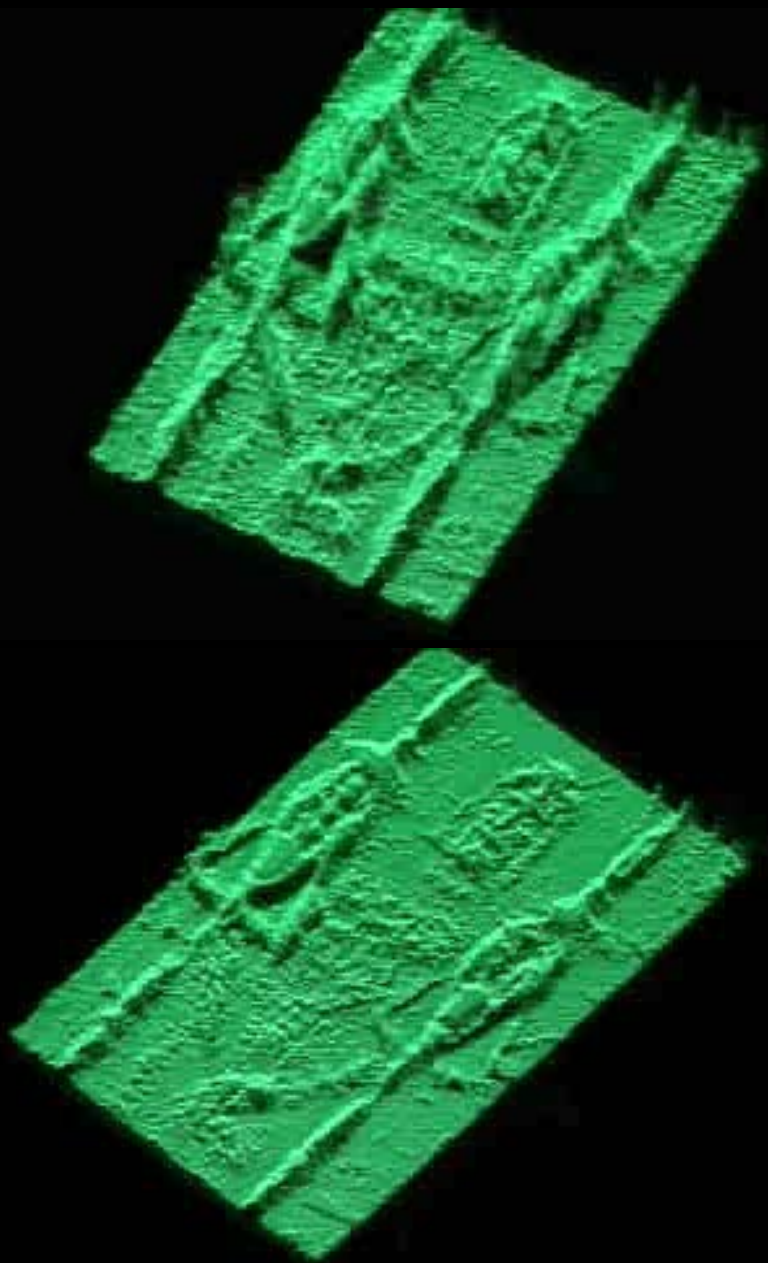
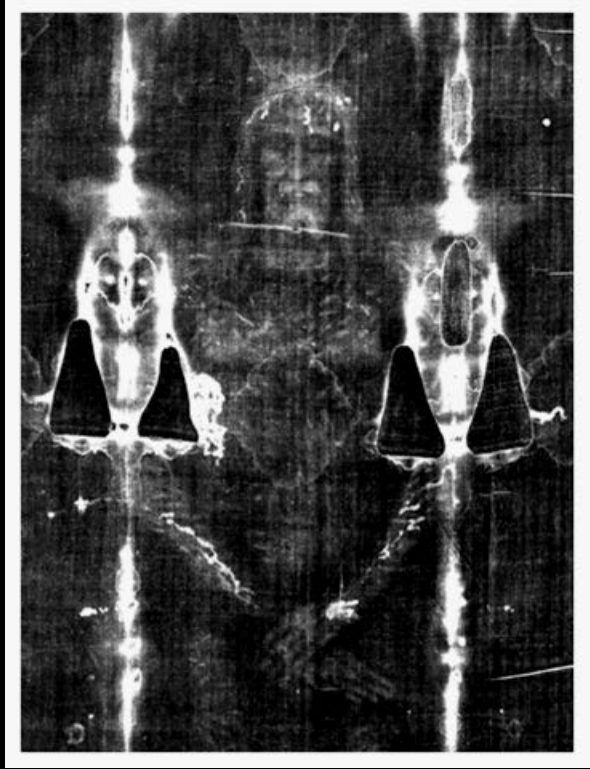
So the researchers input a 1931 Enrie photograph of the Shroud and, using the device's ability to convert image density to vertical relief, saw the natural relief of a human form on the VP-8's green screen display. Although earlier researchers had predicted that spatial or topographic data was encoded into the Shroud's image, this was the first time this property was verified using a scientific instrument.

Among the researchers working with Jackson at this same time were physicist **Eric Jumper**, professor **Kenneth Stevenson** and Santa Barbara imaging specialist **Don Devan**. After sharing the VP-8 results with them, they quickly decided that this warranted further study. At this same time, **Prof. Giovanni Tamburelli** and **Nello Ballosino** in Turin were using a computer program to perform a similar analysis of the Shroud image.



# THE VP-8 IMAGE ANALYZER





## THE STURP TEAM GROWS

Thus, the VP-8 Image Analyzer became the catalyst for the formation of the STURP team. Jackson's purpose was very clear: Assemble a team of multidisciplinary experts, design a series of non-destructive experiments within the framework of a comprehensive test plan and seek permission to physically examine the Shroud itself to try and determine how the image was formed.

Eric Jumper quickly joined Jackson as co-founder and they began to recruit experts qualified to conduct scientific experiments that would try and determine the image formation mechanism of the Shroud. We were not trying to prove that the Shroud was "authentic" nor were we trying to prove that the image on the cloth was that of Jesus.

Over the next year and a half, the team grew as members were added on an as-needed basis. We worked in small regional groups around the U.S. and communicated by telephone and postal mail. We met for the first time as an entire team only one month before departing for Turin.

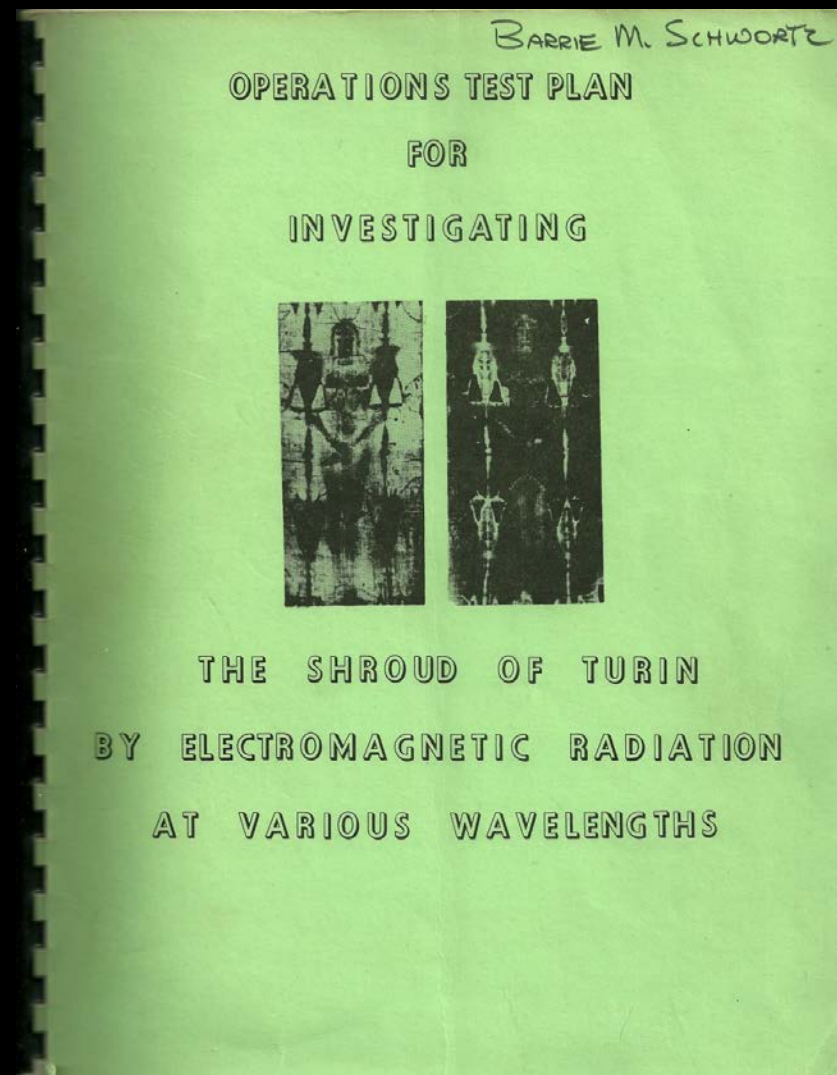
**Joseph S. Accetta**, Lockheed Corporation\*  
**Steven Baumgart**, U.S. Air Force Weapons Laboratories\*  
**John D. German**, U.S. Air Force Weapons Laboratories\*  
**Ernest H. Brooks II**, Brooks Institute of Photography\*  
**Mark Evans**, Brooks Institute of Photography\*  
**Vernon D. Miller**, Brooks Institute of Photography\*  
**Robert Bucklin**, Harris County, Texas, Medical Examiner's Office  
**Donald Devan**, Oceanographic Services Inc.\*  
**Rudolph J. Dichtl**, University of Colorado\*  
**Robert Dinegar**, Los Alamos National Scientific Laboratories\*  
**Donald & Joan Janney**, Los Alamos National Scientific Laboratories\*  
**J. Ronald London**, Los Alamos National Scientific Laboratories\*  
**Roger A. Morris**, Los Alamos National Scientific Laboratories\*  
**Ray Rogers**, Los Alamos National Scientific Laboratories\*  
**Larry Schwalbe**, Los Alamos National Scientific Laboratories  
**Diane Soran**, Los Alamos National Scientific Laboratories  
**Kenneth E. Stevenson**, IBM\*  
**Al Adler**, Western Connecticut State University  
**Thomas F. D'Muhala**, Nuclear Technology Corporation\*  
**Jim Drusik**, Los Angeles County Museum  
**Joseph Gambescia**, St. Agnes Medical Center  
**Roger & Marty Gilbert**, Oriel Corporation\*  
**Thomas Haverty**, Rocky Mountain Thermograph\*  
**John Heller**, New England Institute  
**John P. Jackson**, U.S. Air Force Academy\*  
**Eric J. Jumper**, U.S. Air Force Academy\*  
**Jean Lorre**, Jet Propulsion Laboratory\*  
**Donald J. Lynn**, Jet Propulsion Laboratory\*  
**Robert W. Mottern**, Sandia Laboratories\*  
**Samuel Pellicori**, Santa Barbara Research Center\*  
**Barrie M. Schwartz**, Barrie Schwartz Studios\*

Note: The researchers marked with an \* participated directly in the 1978 Examination in Turin. All others are STURP research members who worked with the data or samples after the team returned to the United States.

## THE STURP TEST PLAN

The STURP team spent a year and a half designing a comprehensive battery of non-destructive tests that could be performed in a brief but efficient period of time. They developed the protocols for each experiment, scheduled the tests within the confines of a 96 hour test period and compiled everything into a detailed, 65 page spiral bound notebook that would not only guide us during our examination, but would first be submitted to Turin for final approval.

Permission to examine the Shroud was granted to STURP by **King Umberto II, Duke of Savoy**, the owner of the Shroud in 1978. To assist us in our liaison with the Church and the Turin Custodians, we also worked closely with the **Holy Shroud Guild** in Esopus, New York.





## STURP PREPARES FOR TURIN – THE “DRY RUN”



**In September 1978, less than one month before leaving for Turin, the entire team met together for the first time in Amston, Connecticut, at what was simply referred to as the “Dry Run.”**

**This allowed all the team members from the different groups to finally meet in person and more importantly, set up and test their various instruments (many of them custom designed and fabricated specifically for the project) and rehearse the procedures they would ultimately be using on the Shroud.**





**STURP Co-Founder John Jackson**

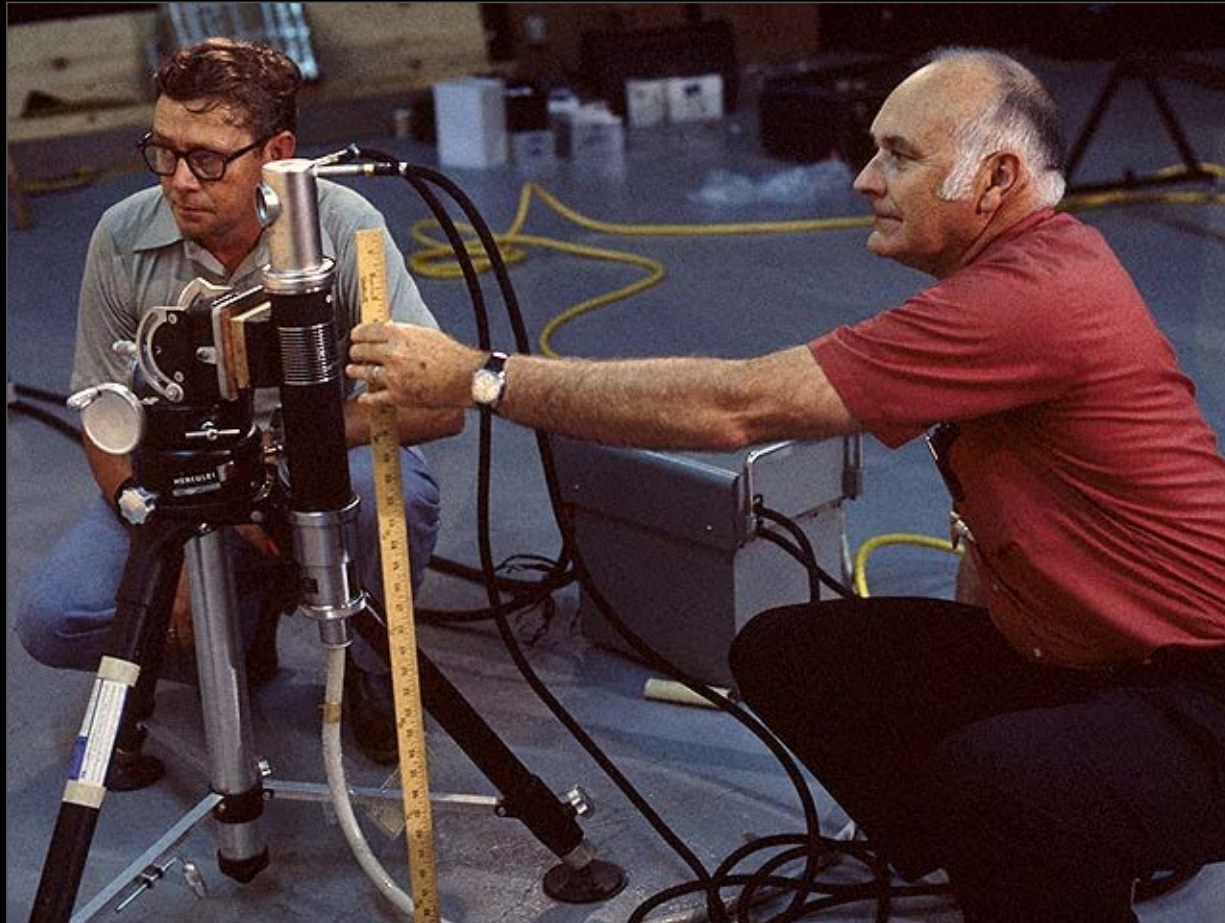


**STURP chemist Ray Rogers and Fr. Adam Otterbein, Holy Shroud Guild**



**Fr. Francis Filas, Holy Shroud Guild**





**Ronald London and William Mottern with their x-ray equipment**



**Steve Baumgart (1<sup>st</sup> slide) and Tom Haverly add liquid nitrogen to their thermographic instruments**



**Joe Accetta and Steve Baumgart set up their thermographic instruments**

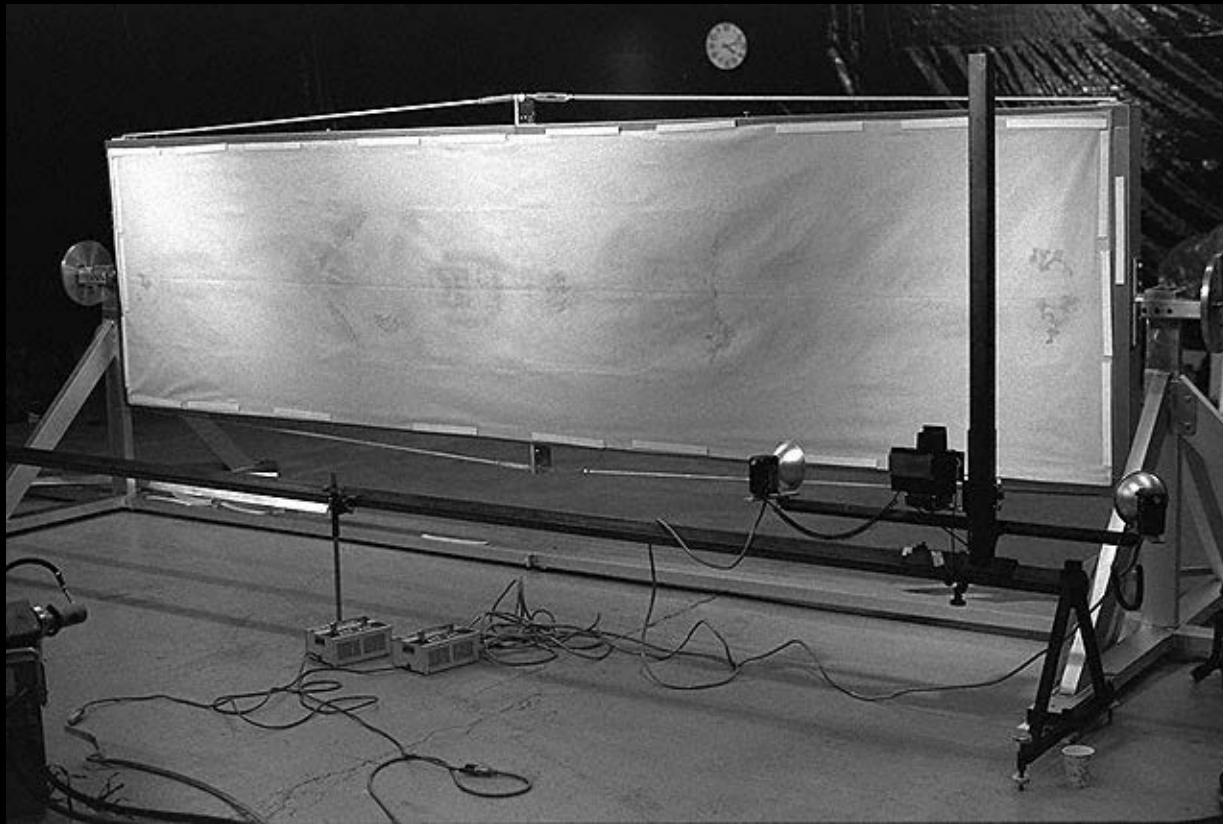




**Don Devan with the Shroud Examination Table (1<sup>st</sup> slide)  
and the Replica Shroud used by the team at the “Dry Run”**



**STURP team members John Jackson, Don Lynn, Ernest Brooks (l to r) and Don Devan (far left) place the replica on the Shroud Examination Table**



**The Shroud Replica, held in place with magnets at its periphery, is rotated to a vertical position on the stainless steel Examination Table. You can also see the camera rail system set up in front of the Shroud.**



**Barrie Schwartz with motorized Hasselblad camera on rail system**





**Roger Morris, Eric Jumper, Don Janney, Don Lynn,  
Roger Gilbert, John Jackson and Ray Rogers (l to r)**



**Don Devan and Don Lynn**





**Vern Miller, Don Devan, Don Lynn and Jean Lorre**

## A LAST MINUTE CRISIS

The team was scheduled to depart for Turin on September 29, 1978 and the 80 crates filled with our equipment and instruments were shipped to Italy in advance. The plan was to arrive a full week before the end of the public exhibition to allow us ample time to carefully unpack our equipment and set up and calibrate our scientific instruments.

However, late in the evening of September 28<sup>th</sup>, the night before we were to leave, the sad news was announced that Pope John Paul I had died suddenly in Rome. We were all shocked and frankly, were very concerned that permission to examine the Shroud might now be withheld. But after many late night phone calls amongst team members, it was decided that we would proceed as planned and hope for the best. We left the next morning.



**Informal group portrait of the STURP team at Kennedy International Airport - Sept. 29, 1978**





**STURP arrives in Milan, Italy**

## ANOTHER CRISIS

Almost immediately upon our arrival in Turin we were informed that all of our equipment and instruments had been seized by Italian Customs officials and were being held in quarantine. Apparently, fixed to the outside of the crate that housed the x-ray equipment was a radiation warning sticker. This caused the officials such concern that they simply seized everything and refused to release it!

Needless to say, this caused great concern for the STURP team as well. Over the next five days we waited while the team leaders and the Italian authorities tried to find a solution. During that time our days were filled with countless, tedious meetings and we all were feeling the stress of the situation since we were losing valuable time.

Even with the endless daily meetings, we were left with some free time on our hands as the public exhibition was still ongoing, so I still had a little time to go out and do what I do best: make some photographs!



**Public Exhibition in Turin  
27 August to 8 October 1978**









Comparing Technologies at the Sindone Museo (Pia's Camera vs. Nikon)





**Inside the Royal Palace**



**Fresco in the “Equipment Maintenance” Room**





**Fresco in the Shroud Examination Room**

## ANOTHER CRISIS AVERTED

### (Turin Style)

Finally, on the fifth day and with no relief in sight, **Fr. Peter Rinaldi** of the Holy Shroud Guild (who himself was originally from Turin), solved the problem of our seized equipment by visiting the customs office and asking for the name of the man in charge. He told the official that an international incident would soon occur and he wanted to give him credit for causing it! He then slipped him 100K Lira and the equipment was immediately released (and loaded onto a dump truck)! Evidently, Fr. Rinaldi knew exactly how to deal with the local bureaucracy!

On a more serious note, it was later rumored that Archbishop Ballestrero provided the deed to the Cathedral as collateral for release of the equipment, although I have never been able to confirm that myself.





**The equipment arrives at the Royal Palace on a dump truck!**





**“You unload!”**







**Of course, this left STURP with only 1½ days to unpack their equipment and prepare everything for their experiments. The pressure was on!**





**Prof. Luigi Gonella helps unload STURP equipment**



**Ernest Brooks and Vernon Miller**





**Joan and Rudy Dichtl**



**The “Equipment Maintenance” Room**





**The Shroud Examination Room**



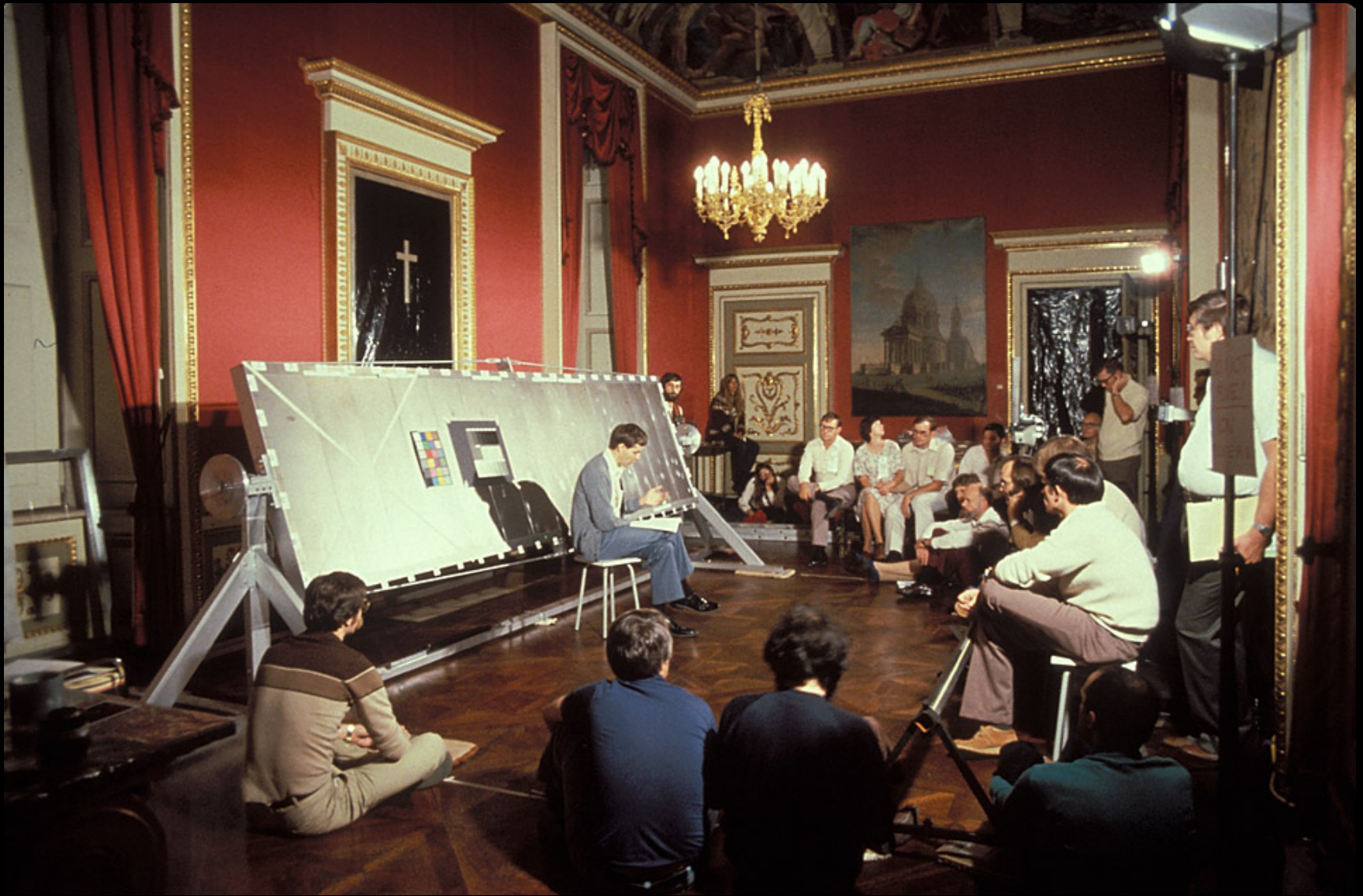


**Windows are covered with foil for the infrared experiments**



**Vern Miller, Sam Pellicori and Don Devan calibrating camera rail system**





**The Team meets in the Shroud Examination Room**





**“Here comes the Shroud!”**











**Our first look at the Shroud**











**Msgr. Jose Cottino and Prof. Vallauri removing the thumb tacks!**



**Prof. Giovanni Riggi and Eric Jumper**





**Eric Jumper, Msgr. Jose Cottino and Msgr. Sergio Baldi move the Shroud to the STURP Examination Table while (l to r in background) Professors Gonella, Baima-Bollone and Riggi observe.**





**Tom D'Muhula, John Jackson and Don Devan moving the Shroud to the STURP Examination Table**



**Eric Jumper moving the Shroud to the STURP Examination Table**



**The Scientific Examination  
of the Shroud of Turin  
October 8-13, 1978**







**Max Frei was given the privilege of starting the examination and began by taking sticky tape samples from the Shroud, as Ray Rogers, leader of STURP's chemistry group, observes.**



**Max Frei applied commercial sticky tape to the Shroud using his thumb to control application pressure. Alan Adler observed years later that the tape definitely left a gum residue on the cloth wherever it was applied.**





**Frei's method of tape application and removal also caused considerable strain on the cloth itself. Then, at one point in his testing, Frei reached over to place his tape on the Shroud face.**





**John Jackson strongly protested to Prof. Luigi Gonella and ultimately, no tape was placed on the Shroud face by anyone**



**Next to examine the Shroud was Prof. Giovanni Riggi, who here observes as a small portion of the Shroud is unstitched from the Holland Cloth, allowing him to insert his vacuum and endoscopic camera systems between the two cloths. 63**





**As the cloths were unstitched, I realized we were about to see the back side of the Shroud of Turin for the first time in nearly 450 years!**



**Ray Rogers, John Jackson and Prof. Giovanni Riggi**





**Prof. Pierluigi Baima-Bollone**









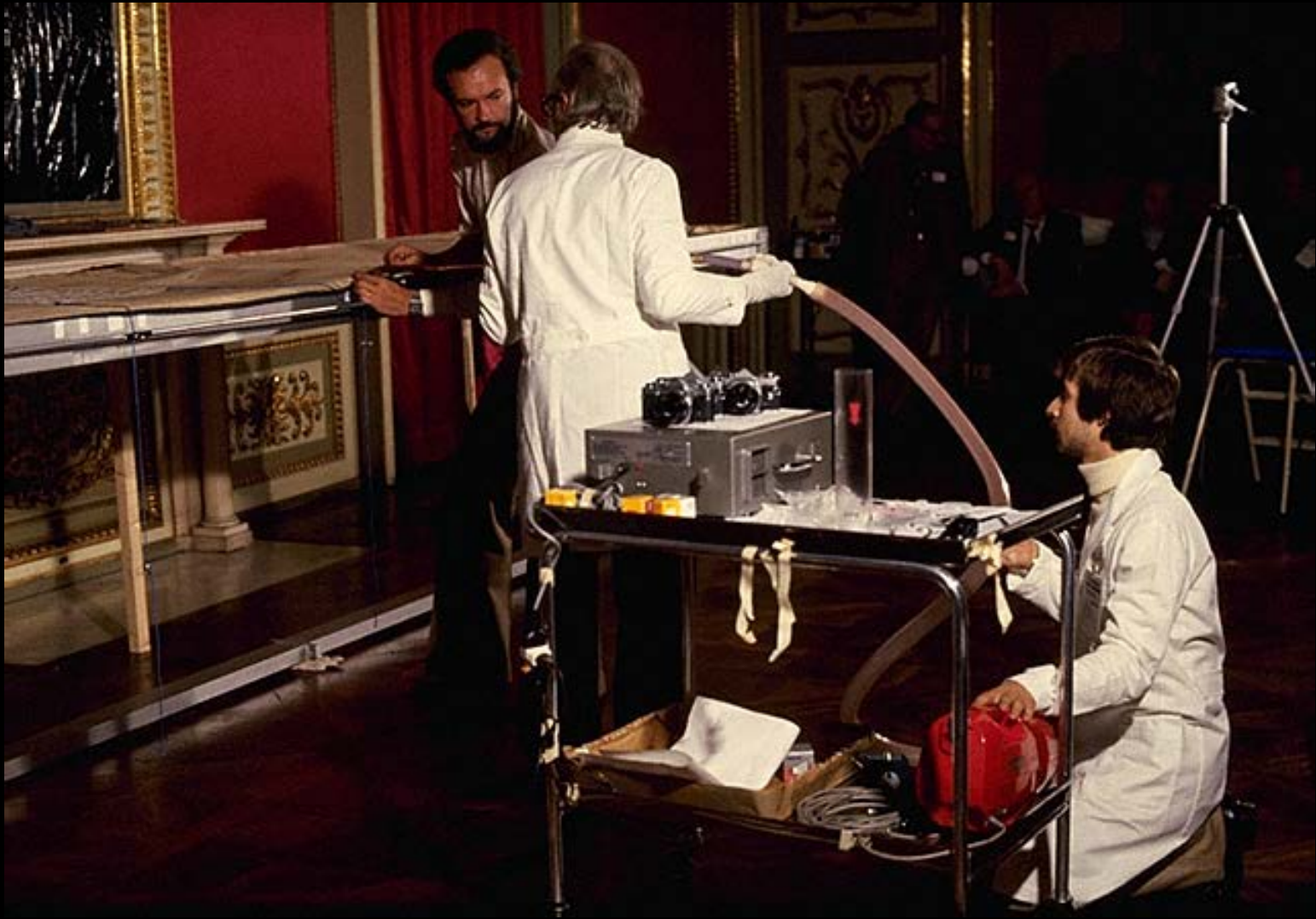


**Prof. Giovanni Riggi & Gabriele Porrati prepare the vacuum and endoscopic tests**





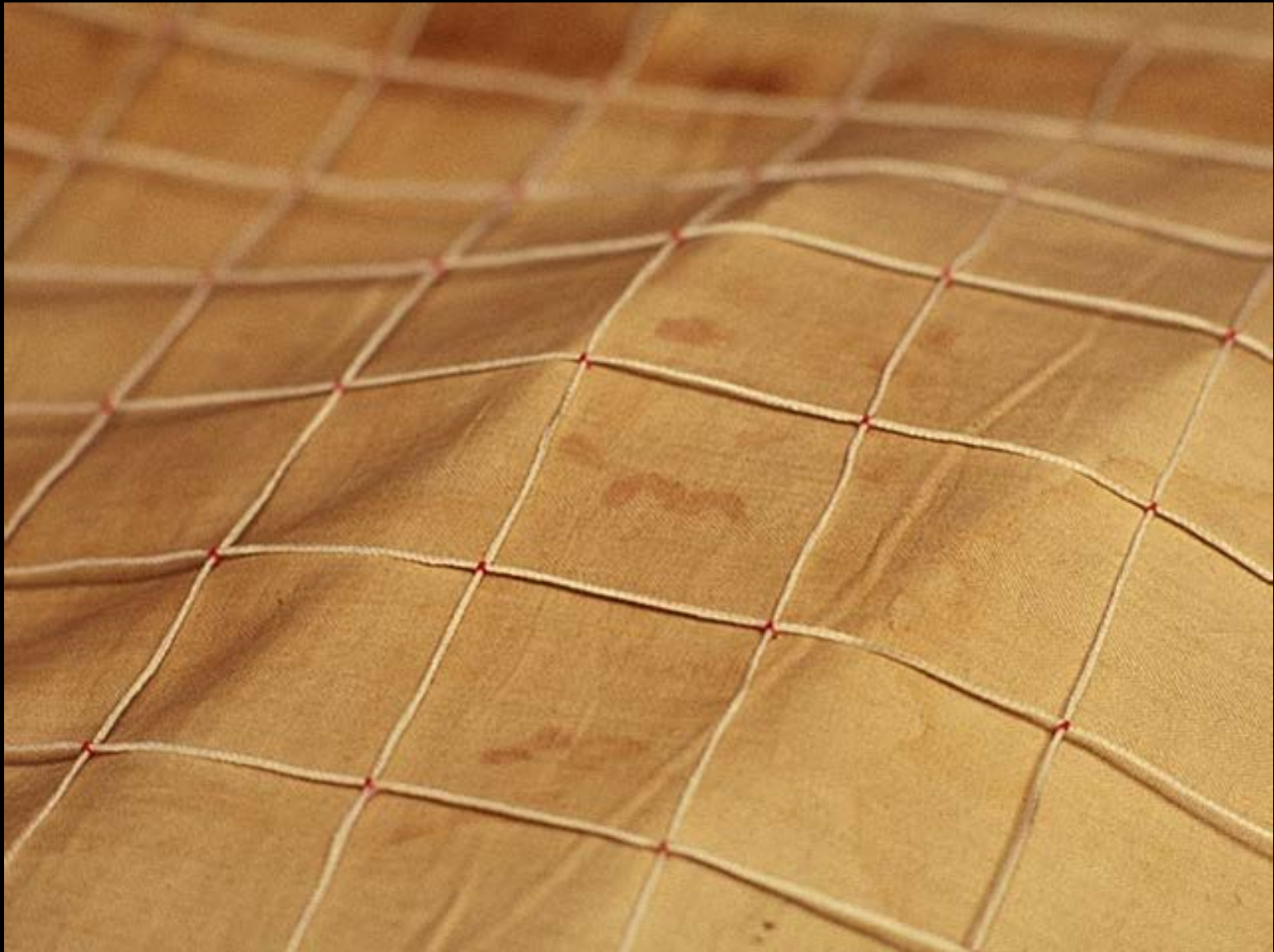
**Prof. Riggi uses a custom made 'bridge' to hold the Shroud and Holland Cloth apart so the vacuum & endoscopic camera systems could be inserted between**



**Prof. Giovanni Riggi and his team performing the vacuum experiment**







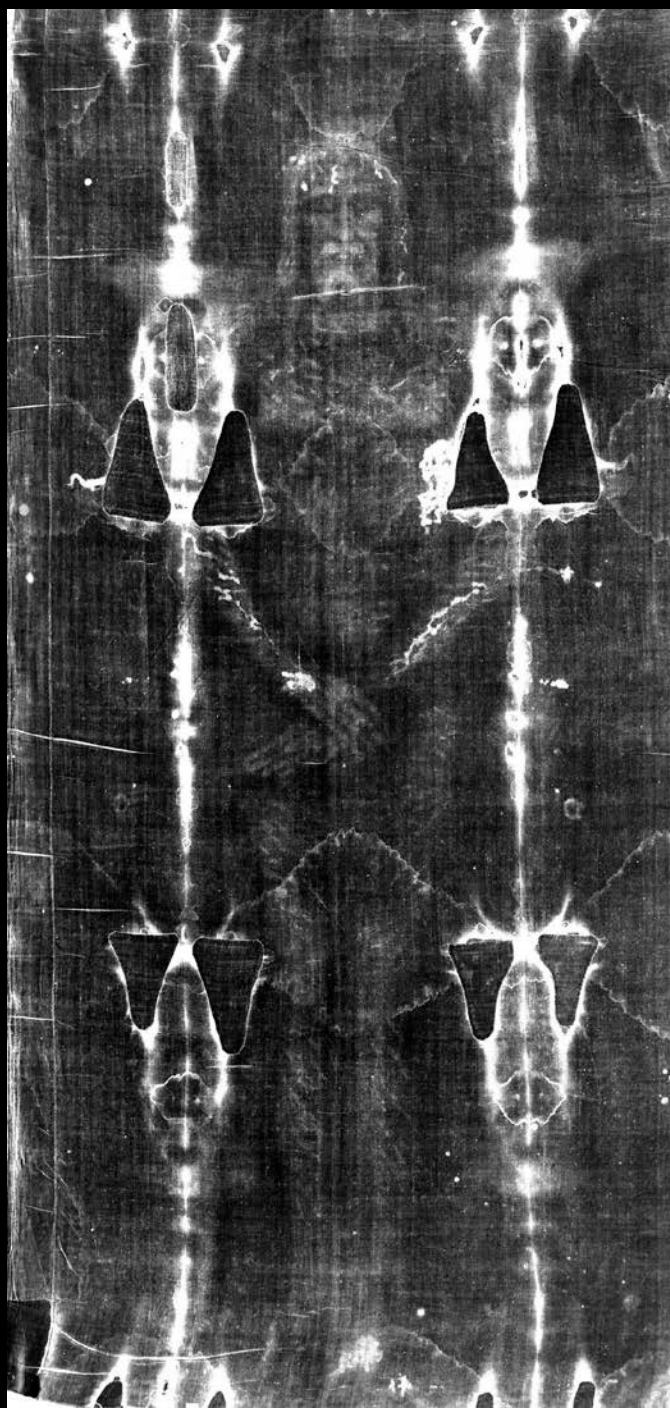
**Prof. Giovanni Riggi's Endoscopic Camera Grid (10cm<sup>2</sup>)**



**Prof. Giovanni Riggi's endoscopic camera focusing light transilluminates the #3 bloodstain on the forehead, revealing higher density in blood areas**



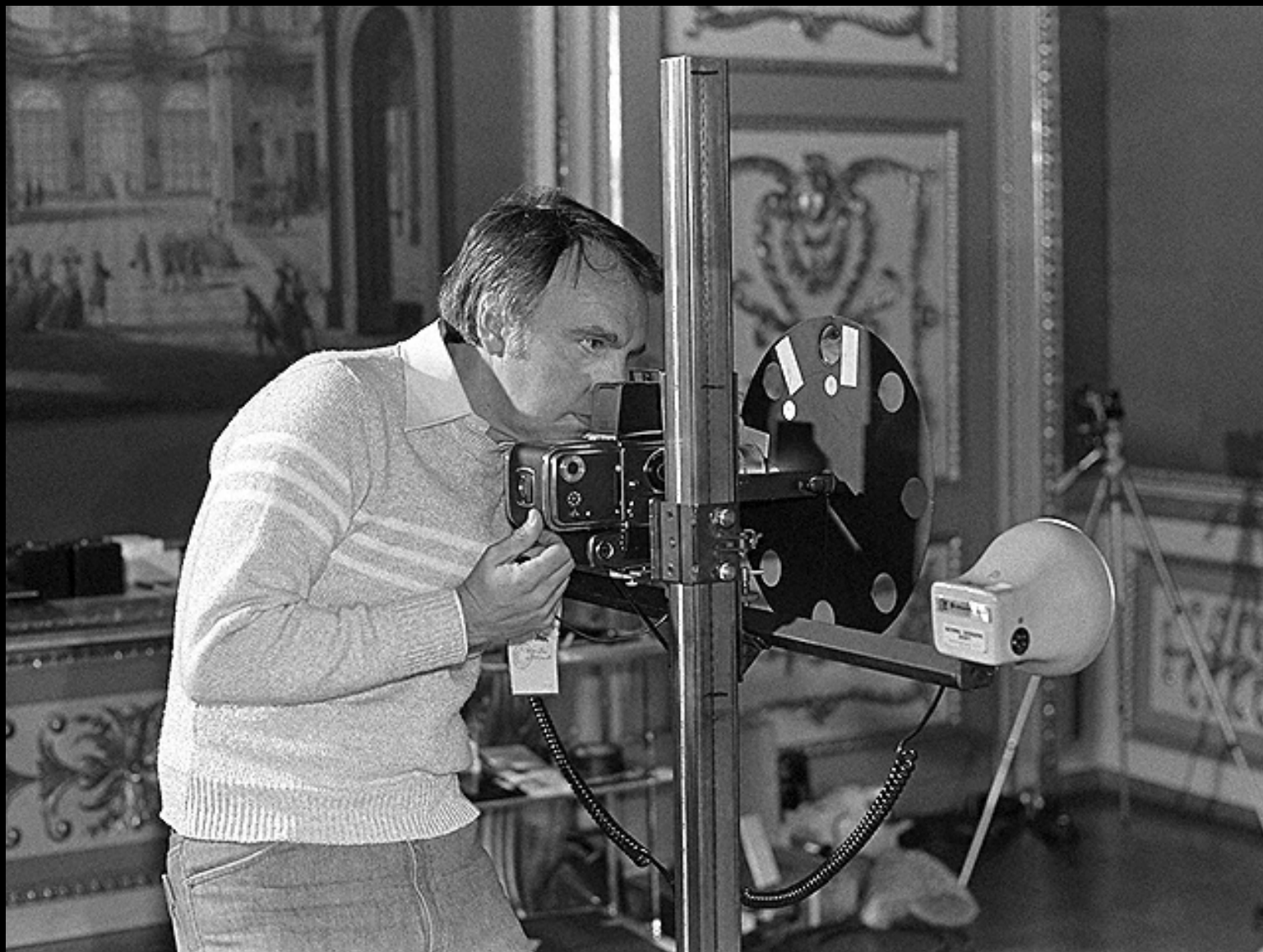




## STURP Begins with Photography

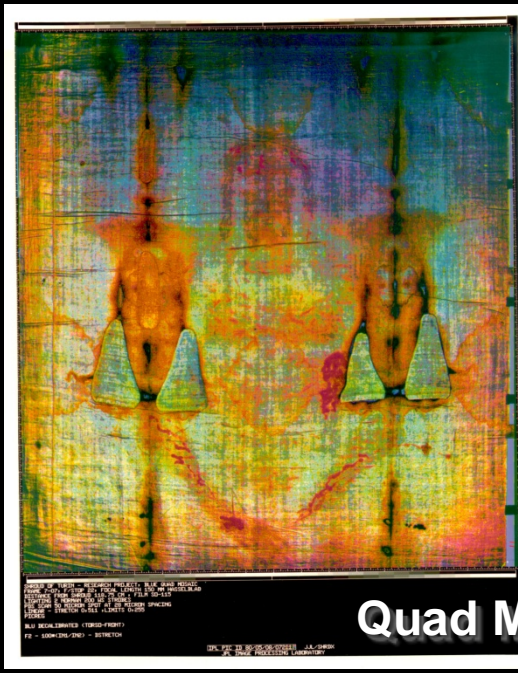
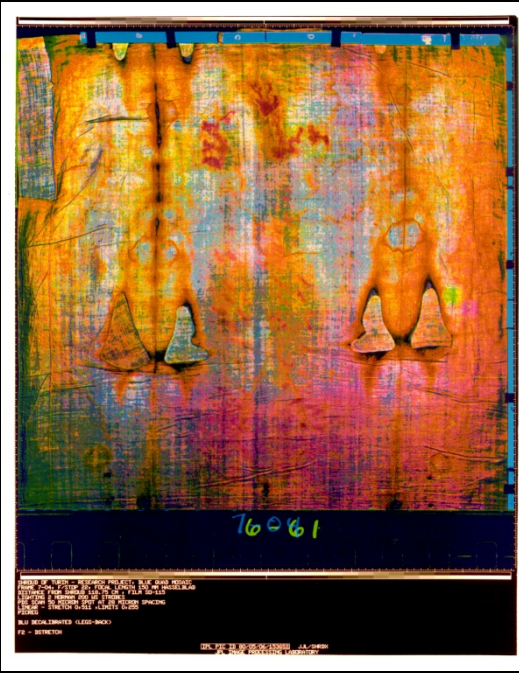


**Vern Miller, Chief Scientific Photographer and Don Devan, Imaging Specialist 78**

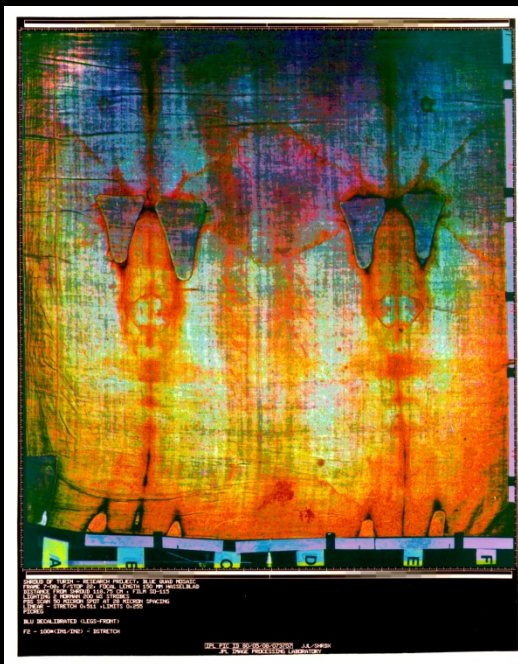
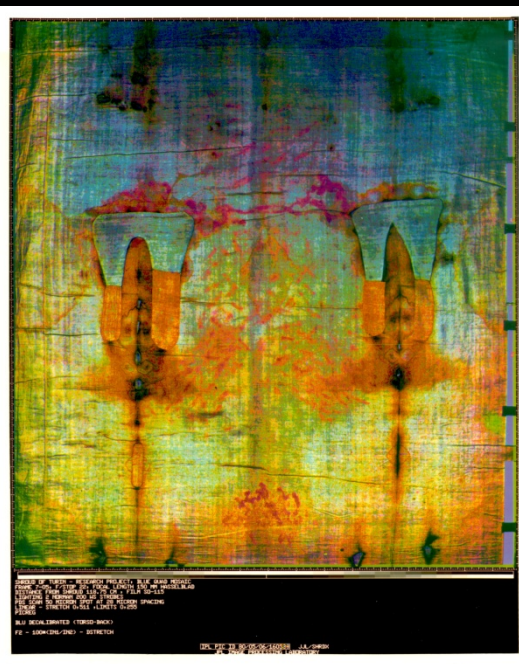


**Vernon Miller using Hasselblad camera mounted on Camera Support Rail with rotating wheel mounted in front of the lens housing the B/G/R filters**

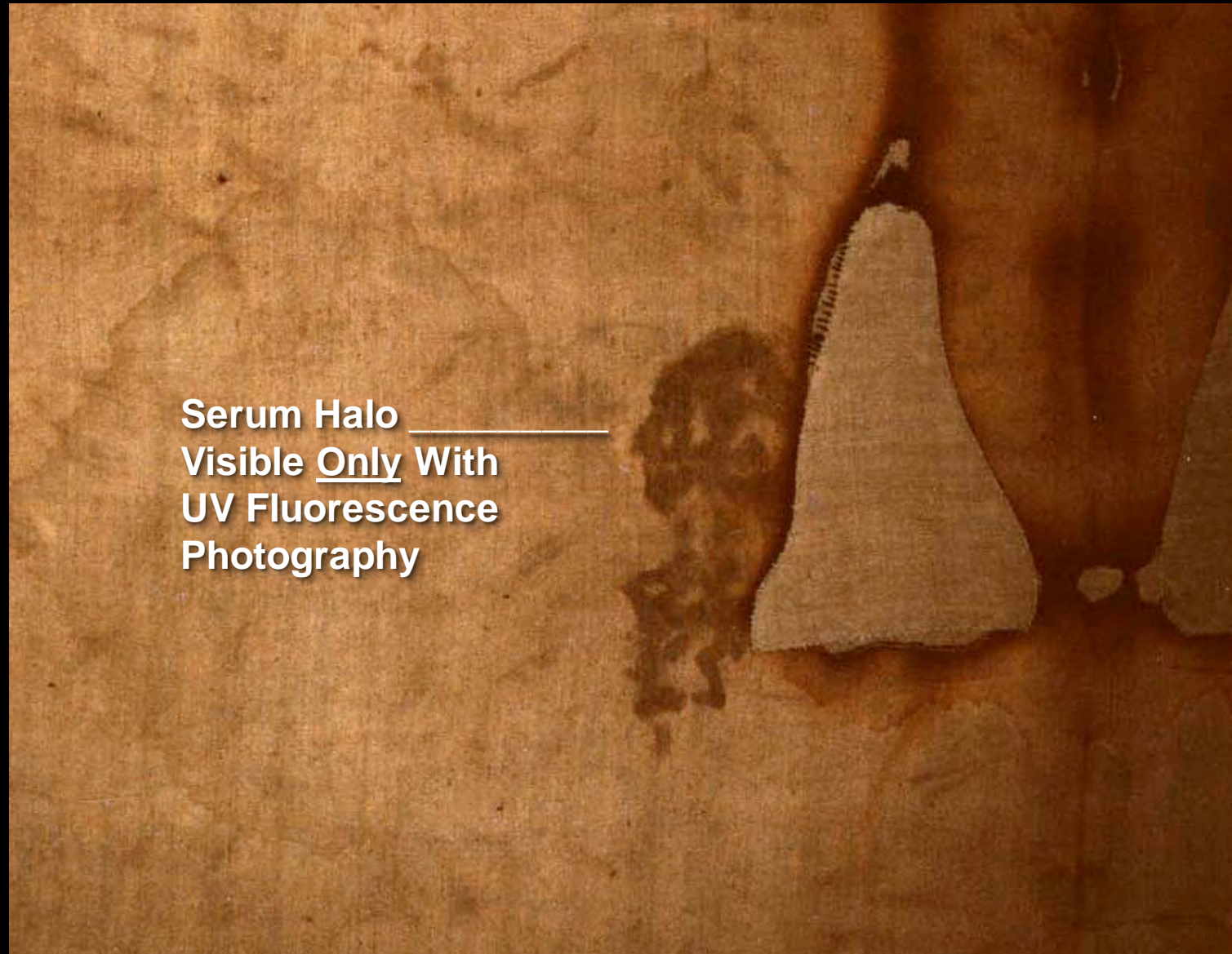




Quad Mosaic Images



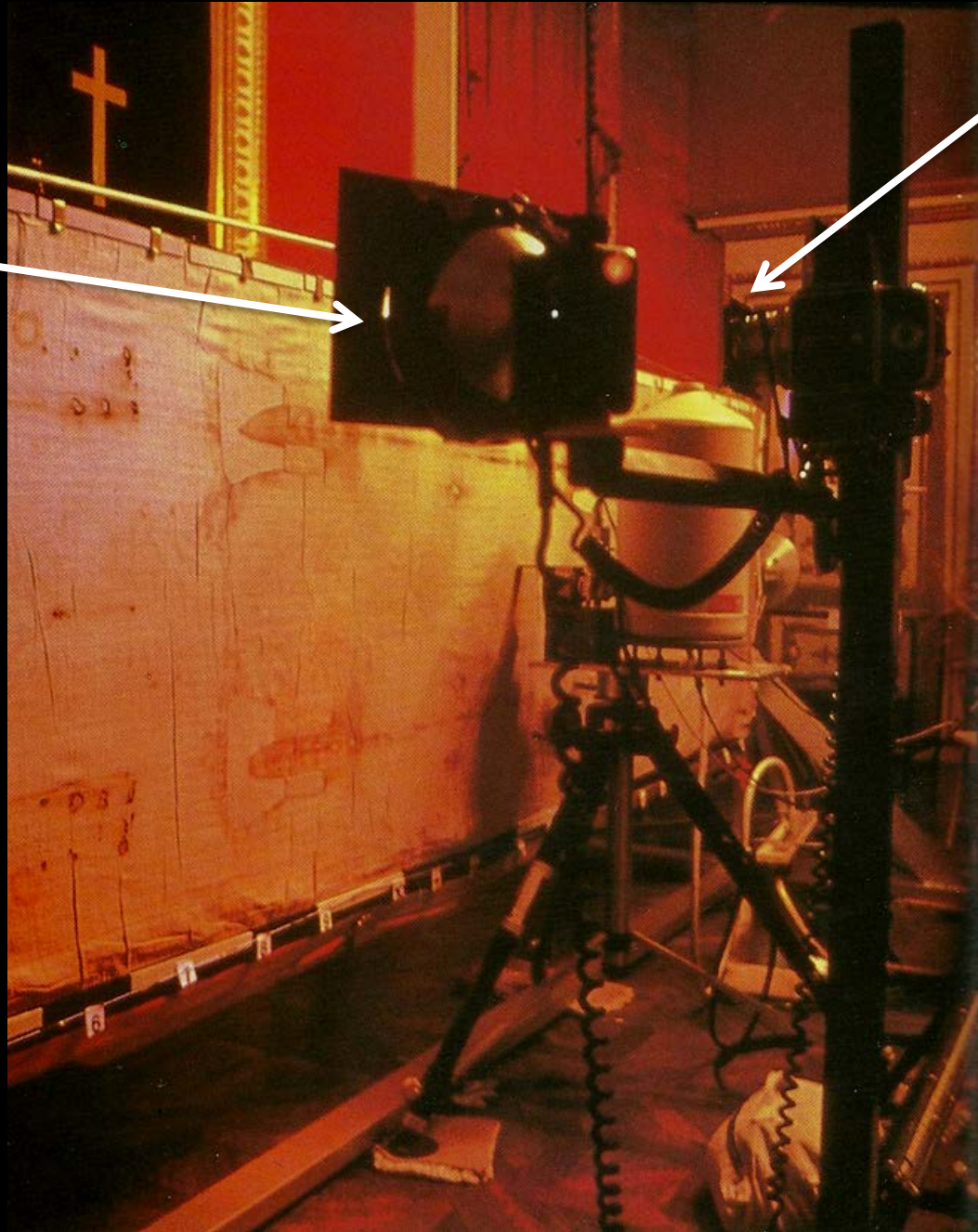
## UV Fluorescence Photograph of Spear Wound Bloodstain



Serum Halo \_\_\_\_\_  
Visible Only With  
UV Fluorescence  
Photography



Liquid UV Filters  
Over Light  
Sources



UV Filter Over  
Camera Lens





**Photomicroscopy**



**64x Photomicrograph of the Shroud of Turin showing Image at tip of nose**  
Courtesy Mark Evans Collection, STERA, Inc.

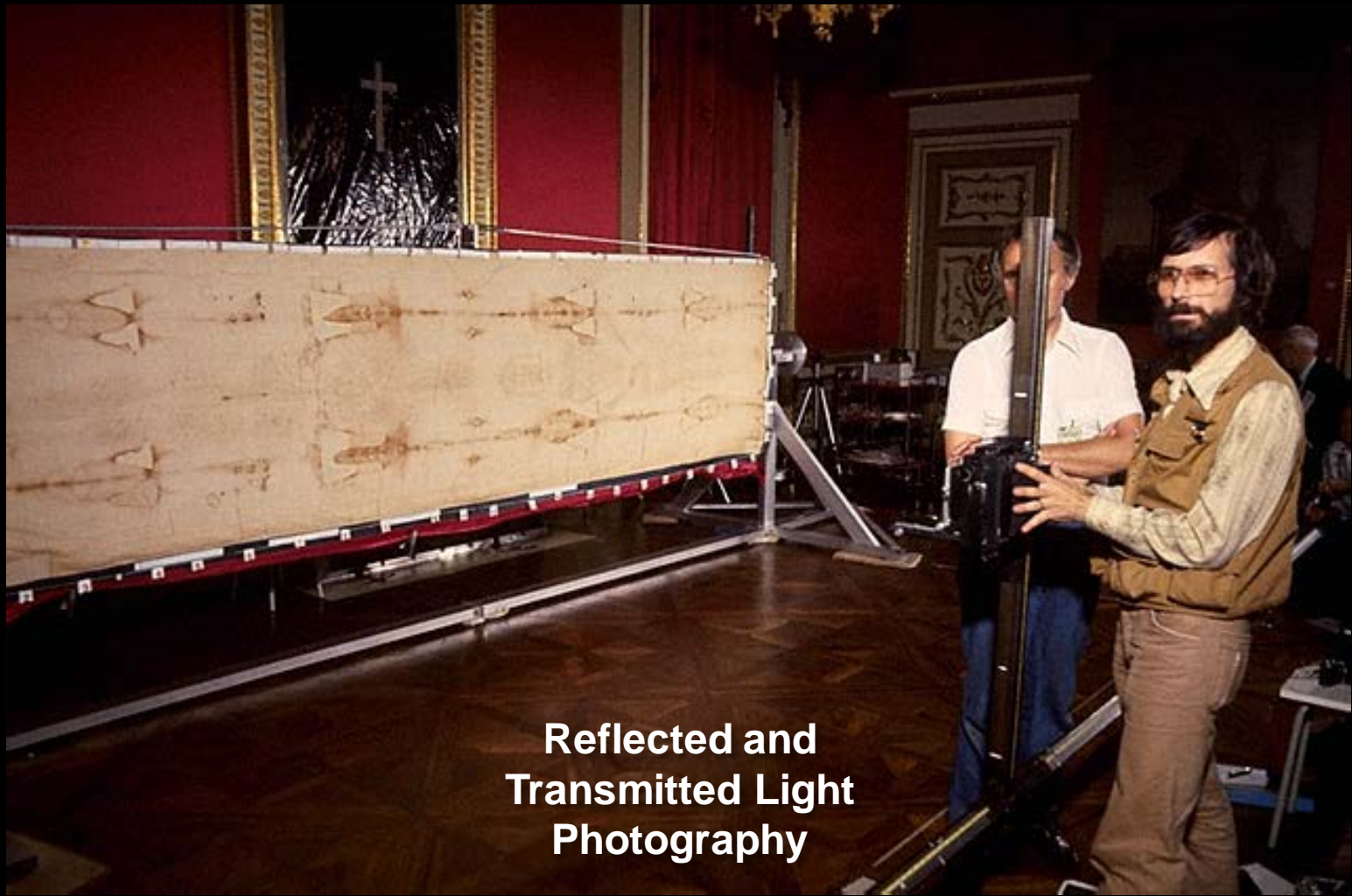




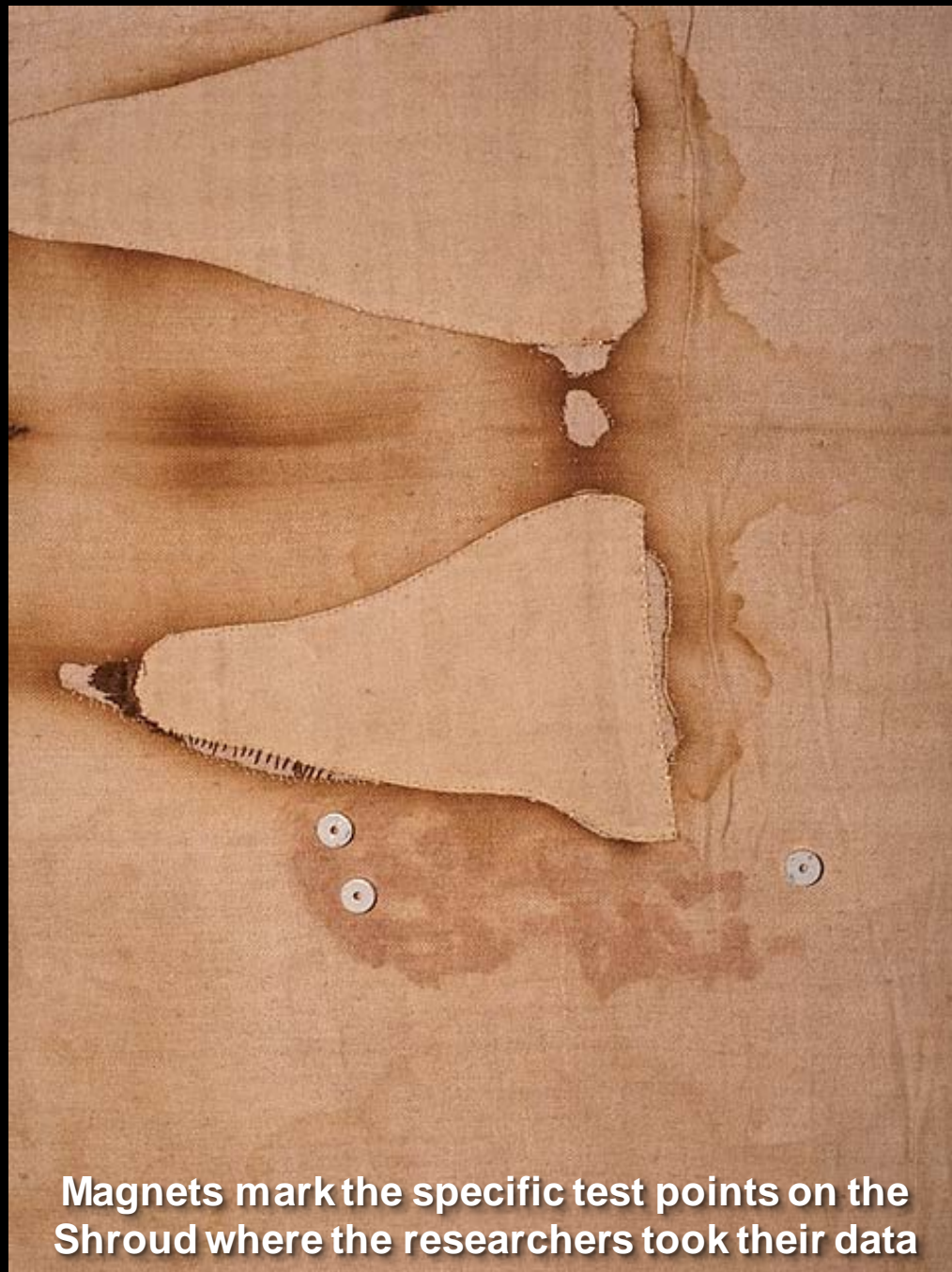
**32X Photomicrograph of the Shroud showing dense blood at the small of the back**

Courtesy Mark Evans Collection, STERA, Inc.

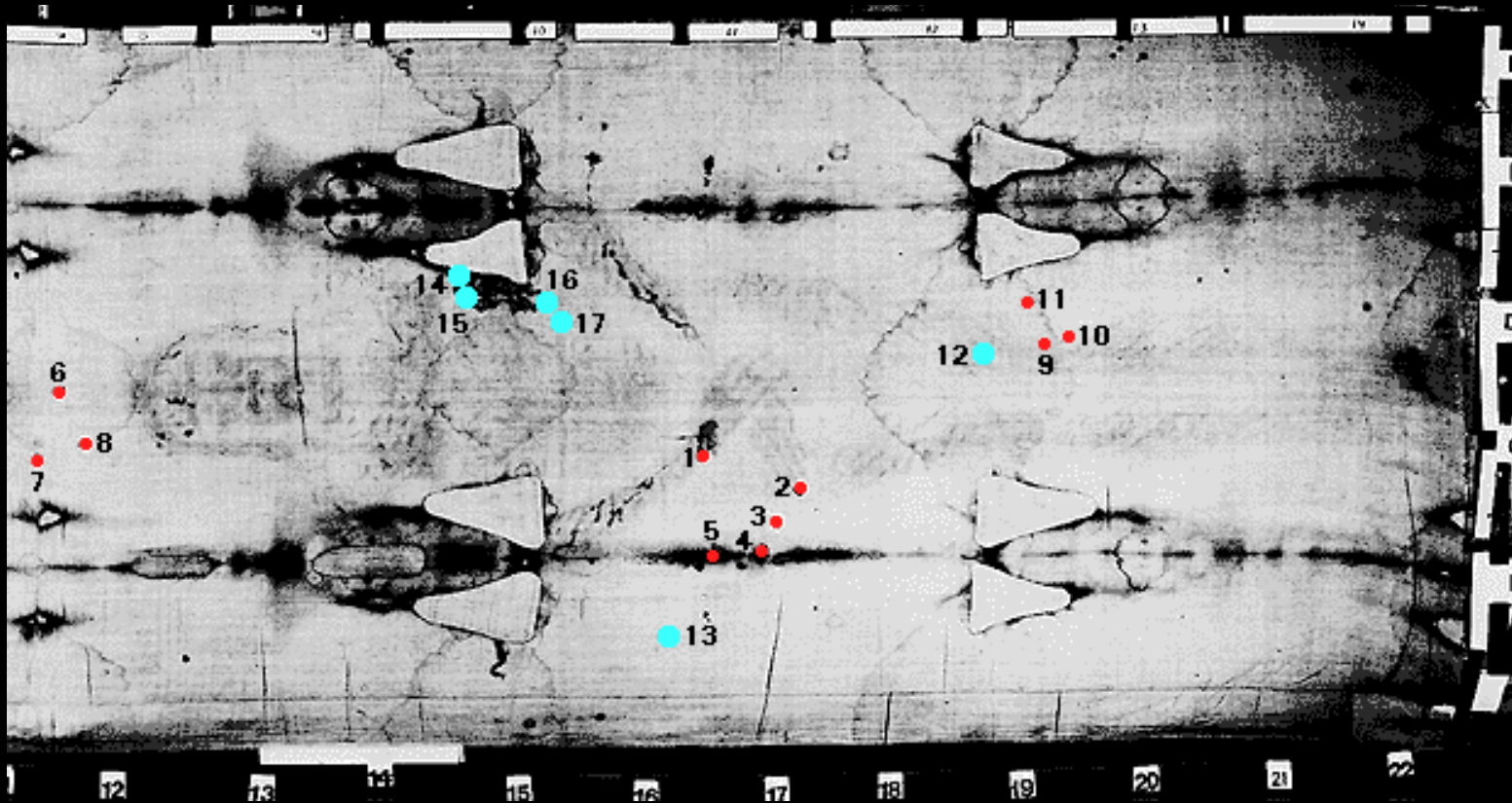




**Reflected and  
Transmitted Light  
Photography**

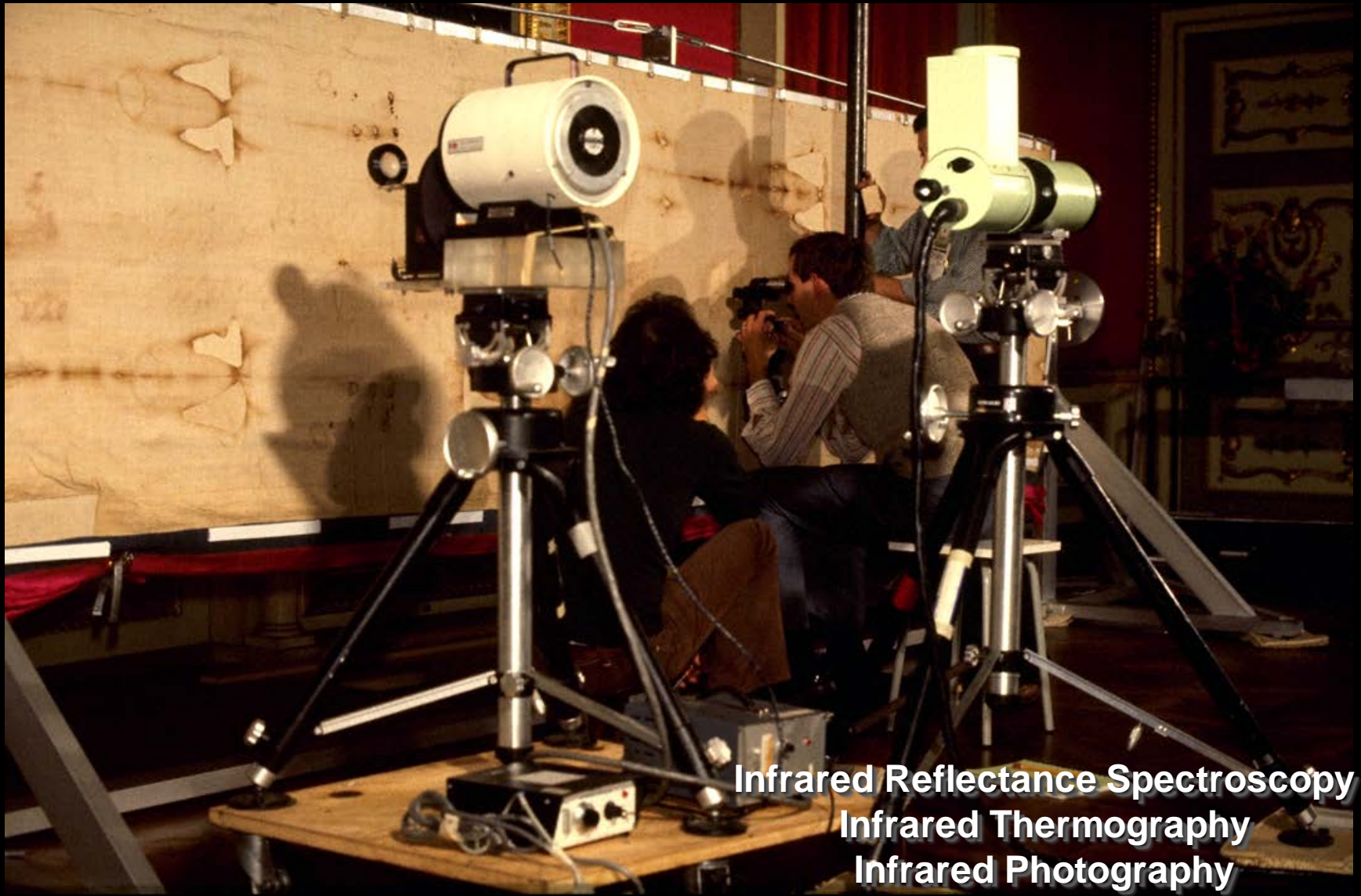


**Magnets mark the specific test points on the Shroud where the researchers took their data**

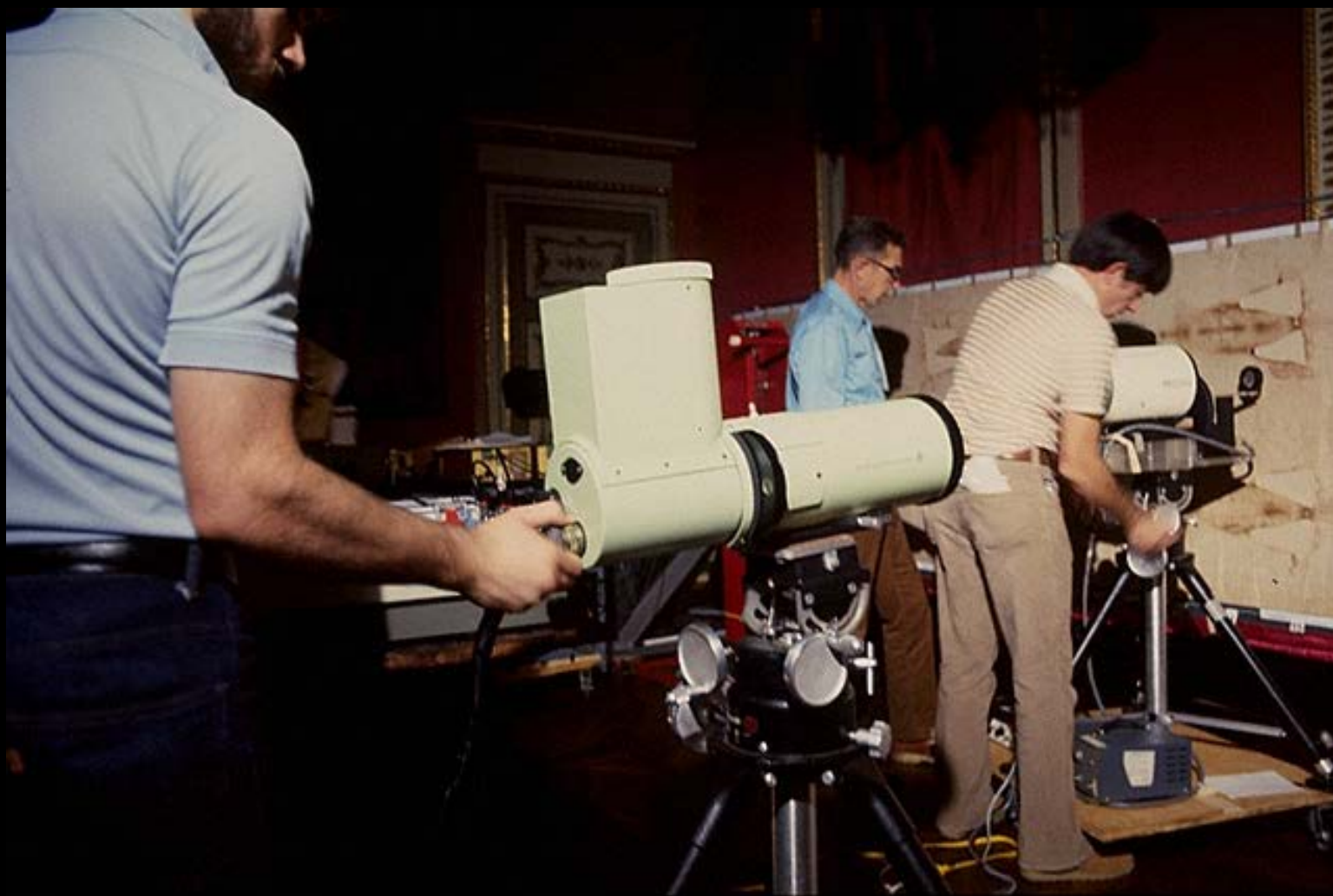


**Photographic maps were produced for each experiment. These were created from the magnetic markers put in place by the researchers at every point they tested on the Shroud.**

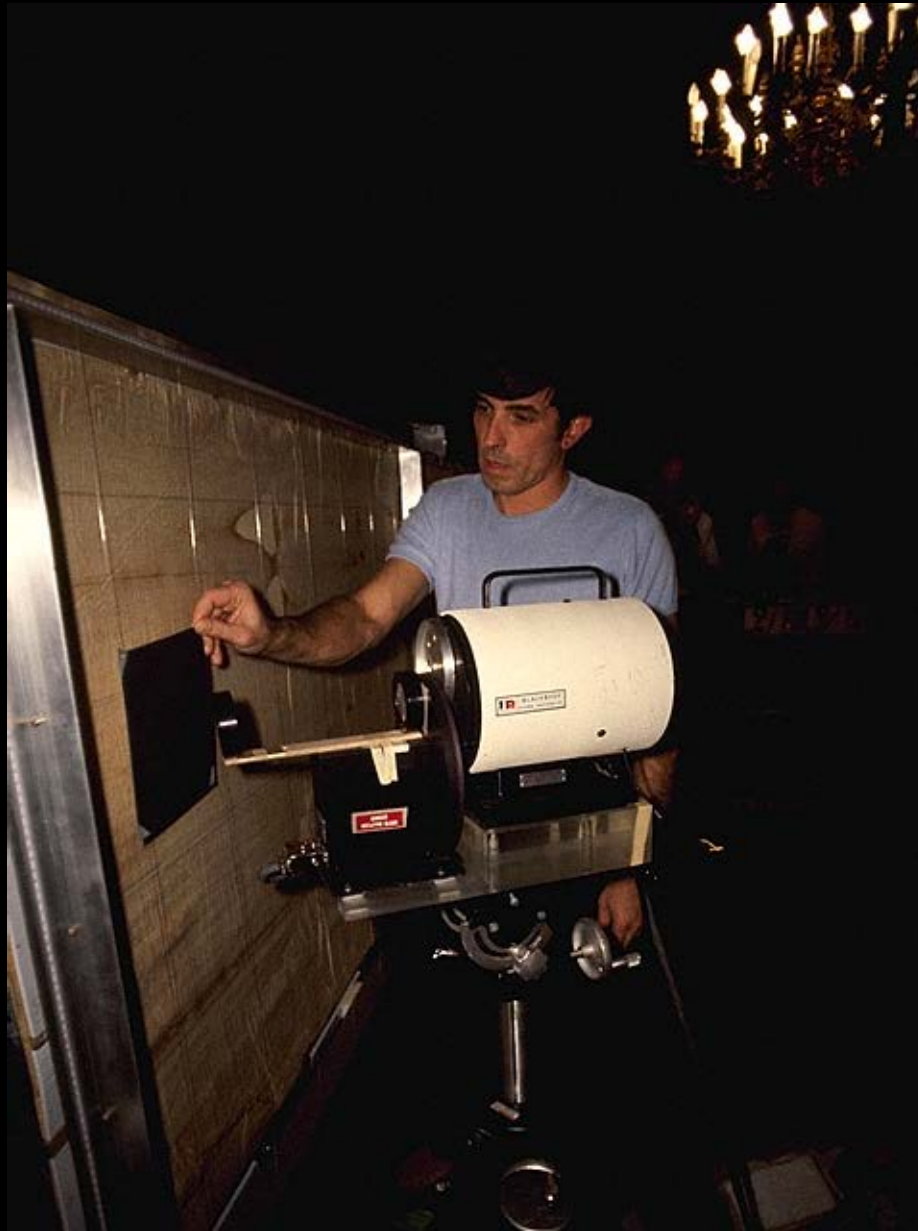




**Infrared Reflectance Spectroscopy**  
**Infrared Thermography**  
**Infrared Photography**



**Steve Baumgart, Robert Dinegar and Joseph Accetta set up Infrared instruments**

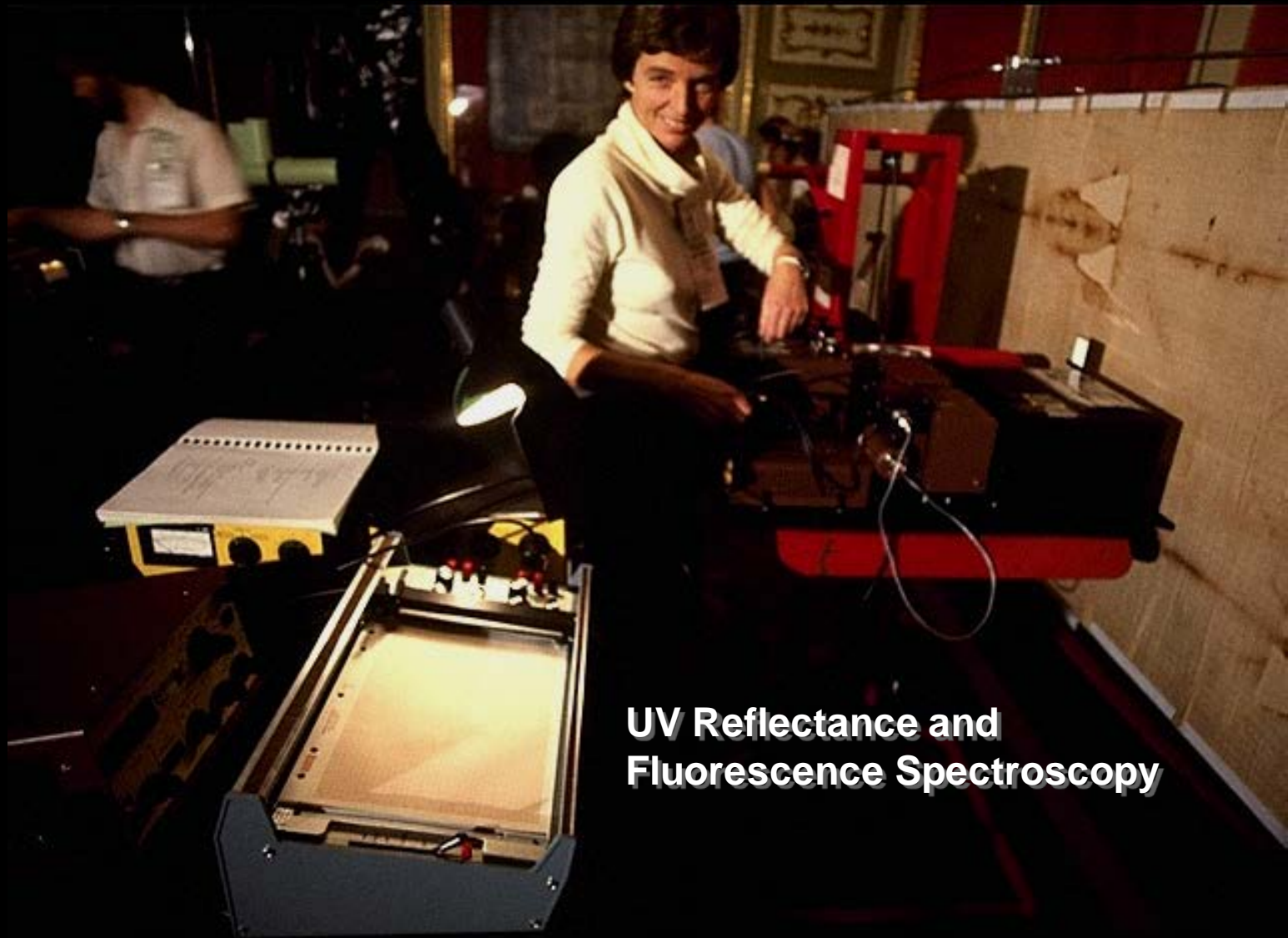


**Joseph Accetta calibrates blackbody radiation source**





**Infrared camera test image of STURP team member on large CRT**

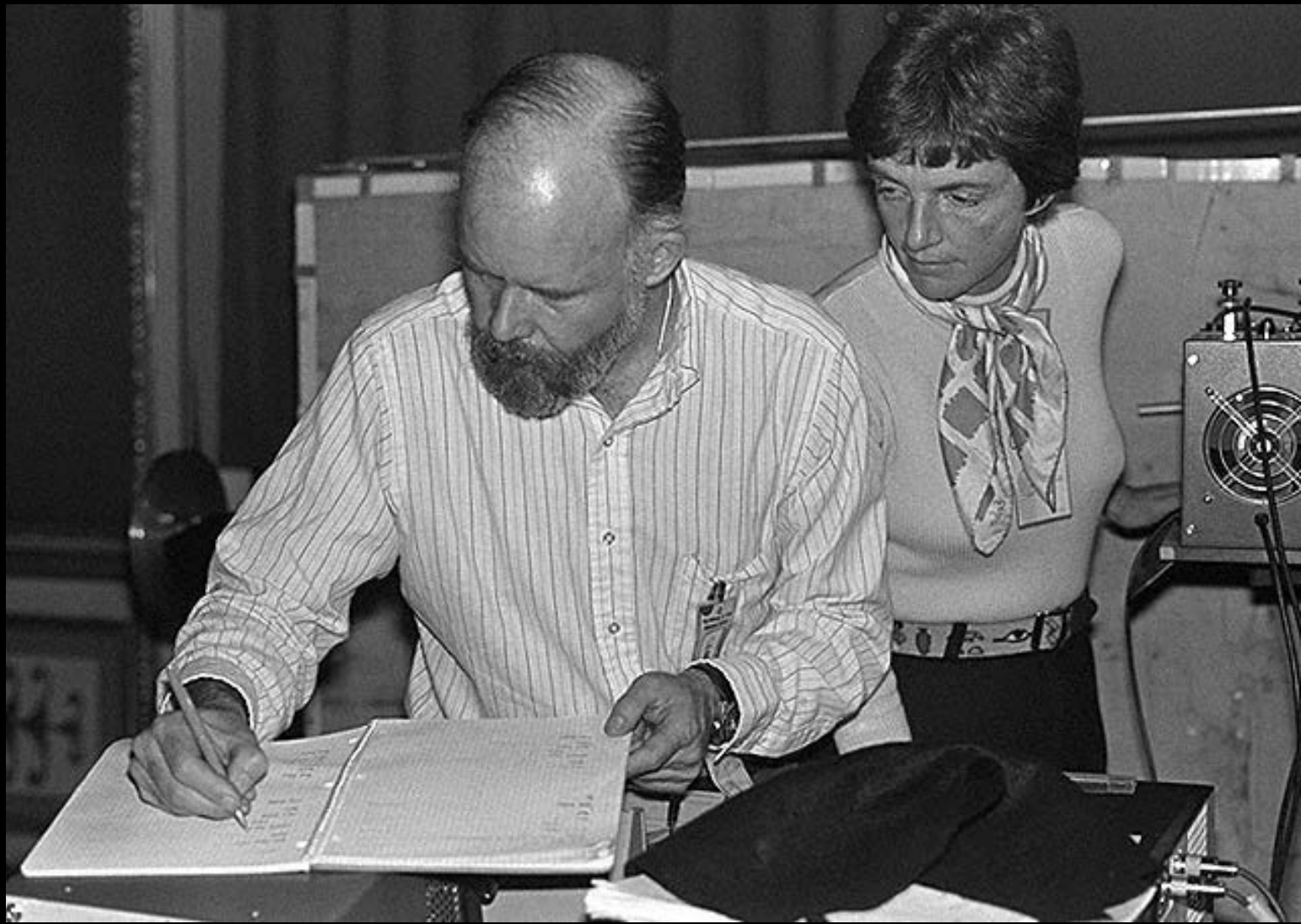


**UV Reflectance and  
Fluorescence Spectroscopy**



**Marty and Roger Gilbert (Robert Dinegar in background)**





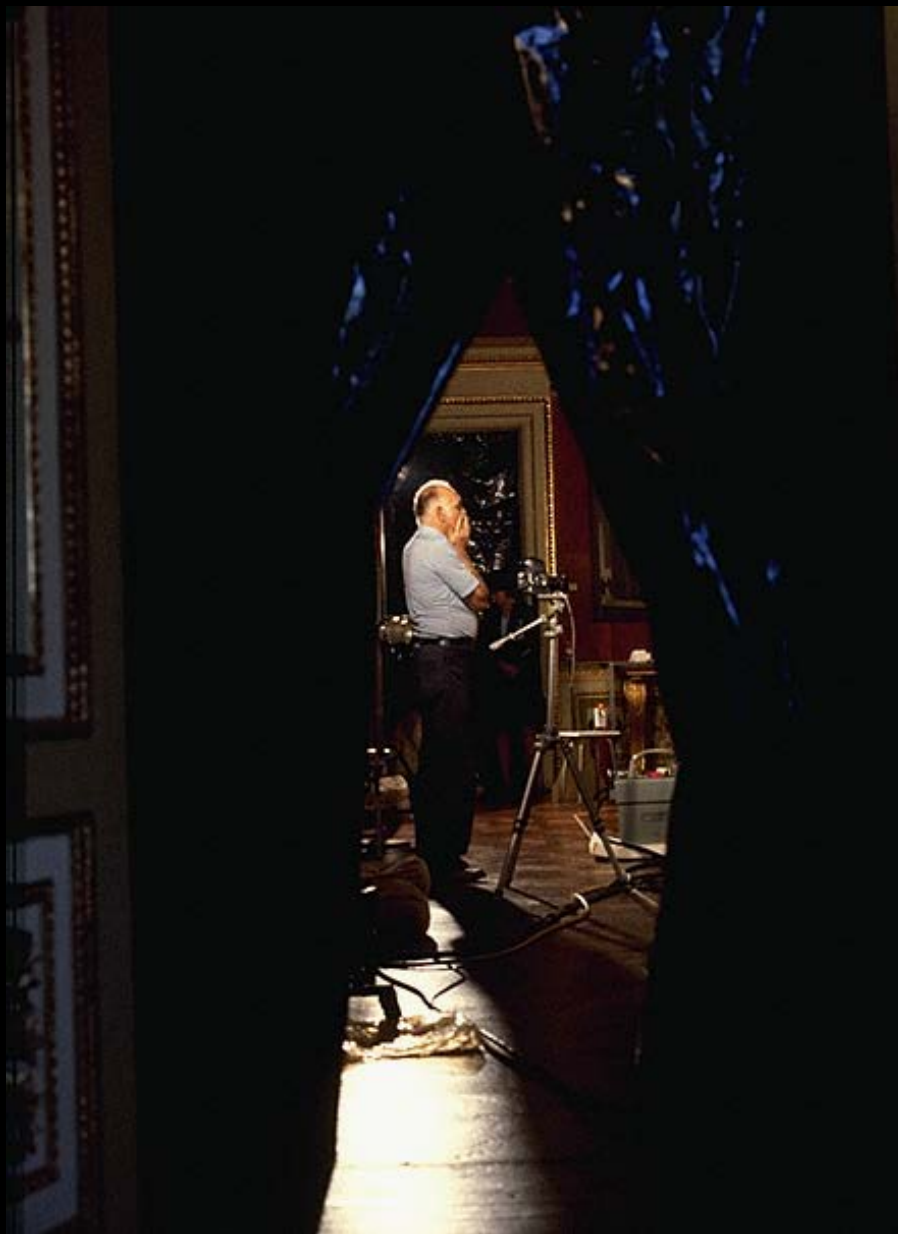
**Roger and Marty Gilbert**



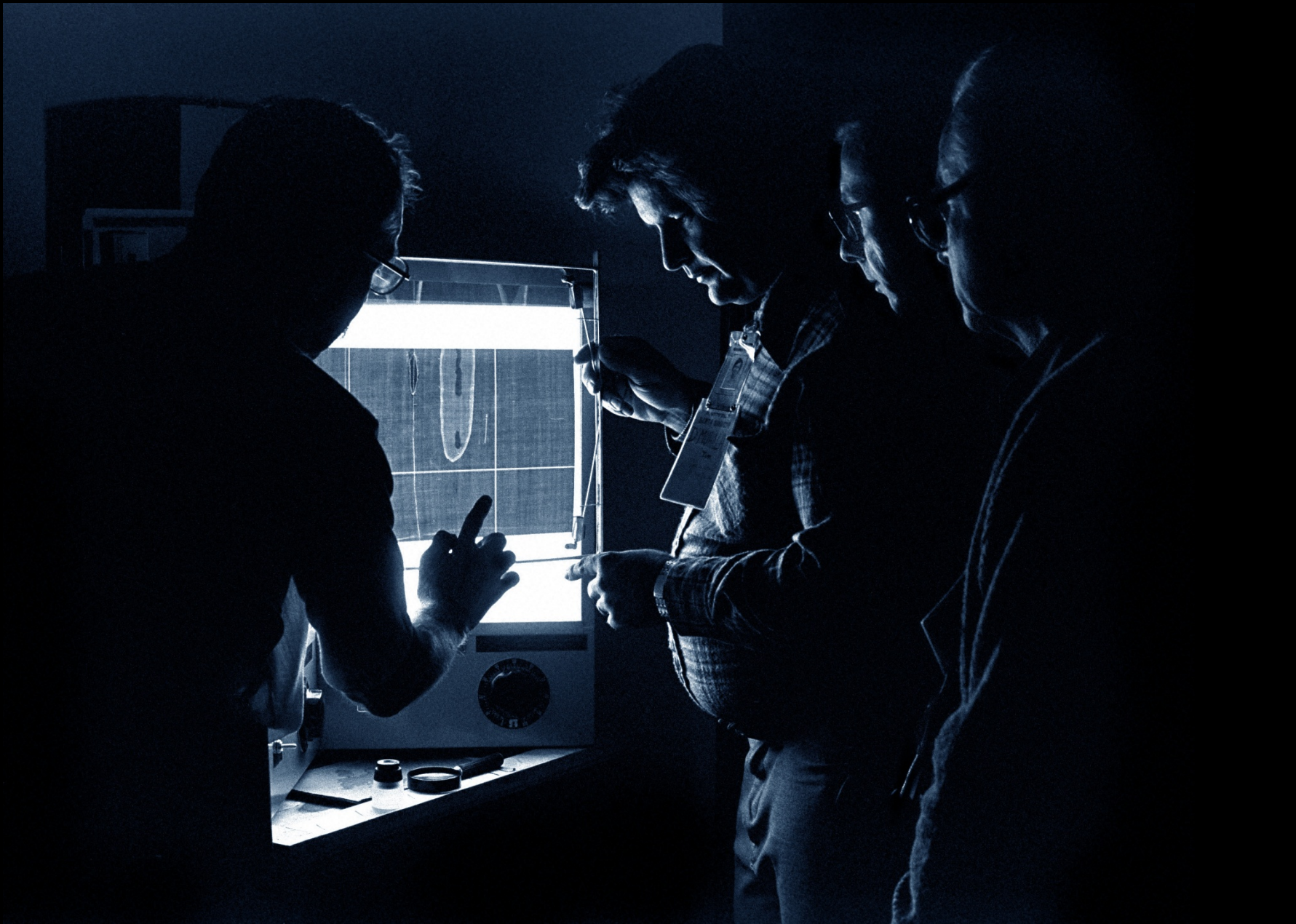


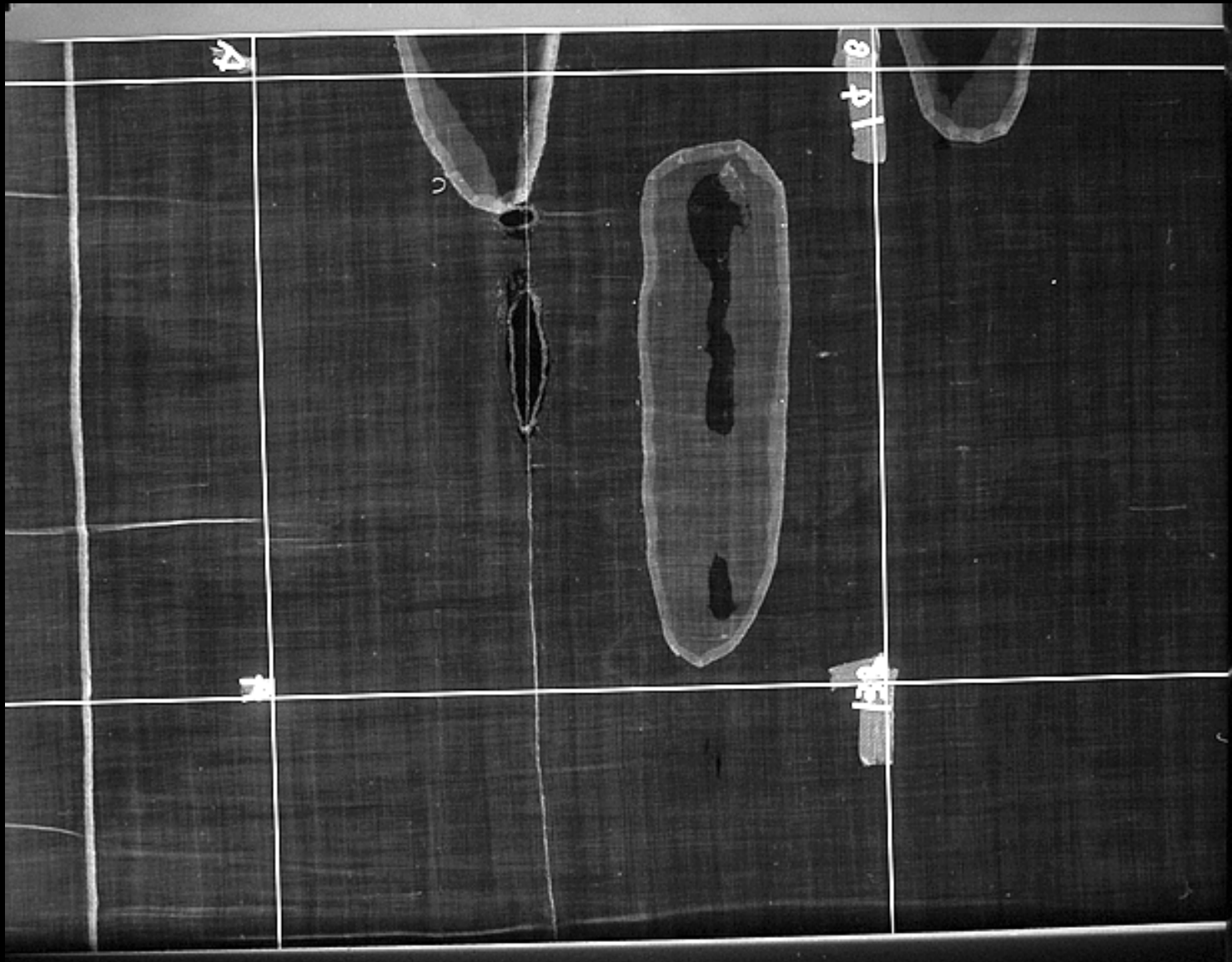
**William Mottern and Ronald London remove the steel panels via the rear of the Shroud Examination Table to allow for x-rays to be taken of the cloth**





**William Mottern waits patiently (without moving his feet) during one of the 20 minute low power x-ray exposures**





X-ray courtesy William Mottern Collection, STERA, Inc.





The "Darkroom"



**Ray Rogers examines the Shroud with a binocular ophthalmic microscope**

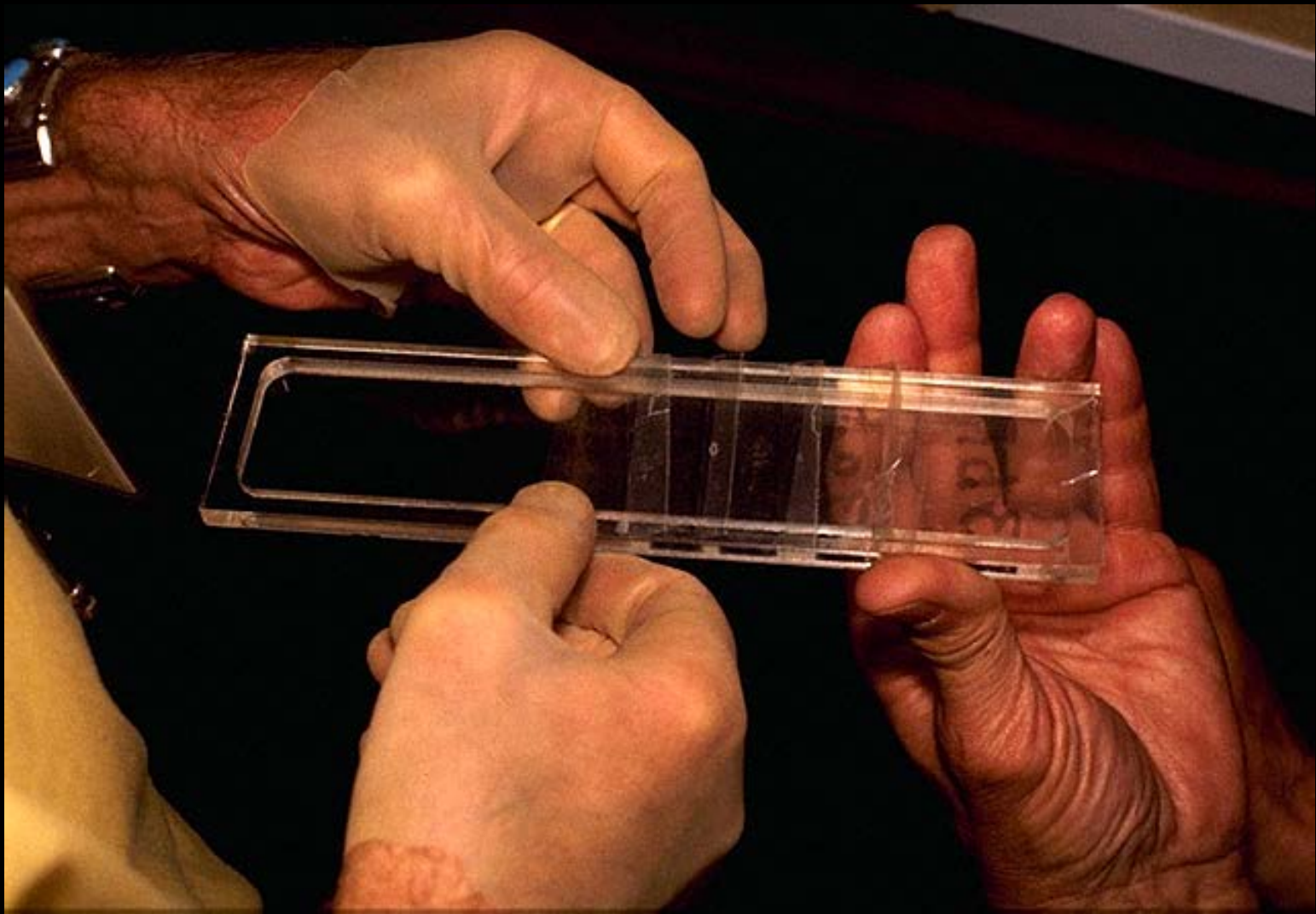


**Ray Rogers and Robert Dinegar used a custom fabricated torque applicator to evenly apply sticky tape to the Shroud using a known pressure. This allowed the removal of surface debris for later chemical and microscopic analysis without risk to the cloth itself. The tape was specifically created for STURP by 3M to leave no gum residue on the cloth. The Mylar base of the tape was specifically formulated to allow polarized light microscopy to be performed directly on the tapes.**





**Ray Rogers removes one of his tape samples from the Shroud. Note the magnetic markers he put in place at each sample site.**



**Custom well slides were fabricated to secure the tape samples by the edges and prevent any lifted debris from being embedded in the gum**



**STURP actually brought a computer with them, but it never worked!**



**STURP returned to the U.S. and spent the next 3 years reducing and evaluating their data, writing their results into formal scientific papers and submitting them to the finest journals of the day.**

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## **CONCLUSIONS OF THE STURP TEAM**

...The answer to the question of how the image was produced or what produced the image remains, now, as it has in the past, a mystery.

We can conclude for now that the Shroud image is that of a real human form of a scourged, crucified man. It is not the product of an artist. The blood stains are composed of hemoglobin and also give a positive test for serum albumin. The image is an ongoing mystery and until further chemical studies are made, perhaps by this group of scientists, or perhaps by some scientists in the future, the problem remains unsolved.



**So in the end, what exactly were STURP's contributions and achievements?**

**1. In an unprecedented series of tests, they performed the first-ever direct, in-depth scientific examination of the Shroud of Turin using a comprehensive collection of then state-of-the-art non-destructive technologies.**

**2. They documented and characterized the chemistry and physics of the image and published more than 24 multi-disciplinary papers in credible scientific journals.**



**3. It is 41 years later and their collective work still constitutes a major portion of the scientific database of published Shroud science and remains the basis for much of Shroud research to this day.**

**4. STURP demonstrated that modern science could investigate an emotionally charged, enigmatic and highly controversial relic and do so in a totally professional, respectful and unbiased manner. Most importantly, STURP set the example and formed the solid foundation upon which future Shroud science will be based.**

