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# Book Reviews: Technical Books Section

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A JOY TO READ

Blood Dynamics 1st Edition *by* Anita Y. Wonder
Academic Press, Harcourt Place, 32 Jamestown Road, London NW1 7BY, UK; viii + 168 Pages: ISBN 0-12-762457-0: Hardback edition, September 2001: Price $69.95

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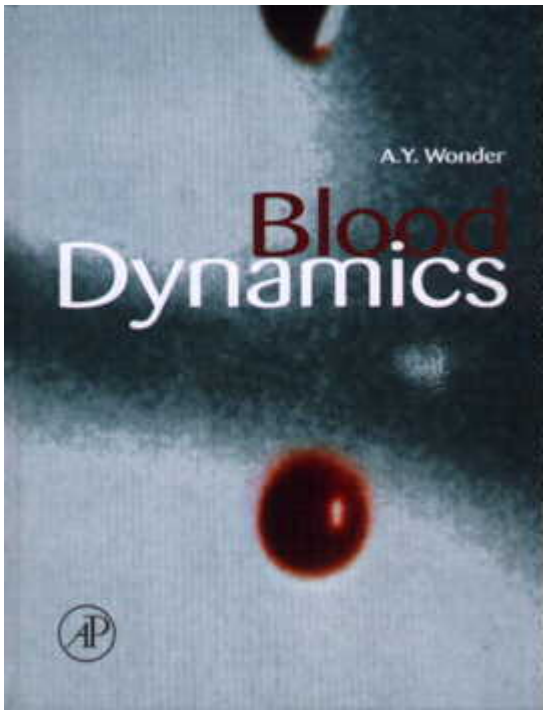



"I am in blood
Stepp'd in so far, that
I should wade no more,
Returning were as tedious as go o'er.
*-Macbeth, Act iii, Scene 4, Line 136, Shakespeare*

The above quotation from Shakespeare appears on page 118 of Anita Wonder's book on Blood Dynamics. Clearly, even in the late 16$^{th}$ century blood was associated with crime and guilt. Forensic Historians will no doubt have their own starting point of their interpretation of the history of blood spatter interpretation. There are several Biblical references to spilling of blood and other blood related activities in the Old Testament. Able, brother of Cain was the first to have his blood spilt and which incidentally was the first homicide, or rather fratricide.

View this book on Amazon

Individual Forensic Pathologists and Crime Scene Investigators will have their own; mostly personal, starting points as well as memorable cases that made them study blood spatter patterns.

This reviewer's own introduction to the science of bloodstain pattern interpretation was the work of Herbert Leon MacDonell. In the middle Eighties having reproduced all of MacDonell's original work I set upon improving them. The next step was of course to teach others and more importantly apply my knowledge to actual crime scenes. From a personal point of view therefore it was a delight to be asked to review this readable and enjoyable book.

Paul Leland Kirk (1902 - 70)

**Paul Leland Kirk**



The author has been so influenced by Paul Kirk that she has preferred to name her book *Blood Dynamics*, a term preferred by him. The official title however for the discipline (which studies blood spatters) is *Bloodstain Pattern Analysis*, adopted by the *International Association of Bloodstain Pattern Analysts* (IABPA) on November 18,1983.

Kirk was born on May 9, 1902 in Colorado Springs, Colorado. He earned his masters degree from the University of Pittsburgh in 1925 and his Ph.D. in biochemistry from the University of California in 1927[1].

Kirk worked on the Manhattan Project (which developed the first atomic bomb), became a full professor of biochemistry in 1945, and helped establish the School of Criminology at the University of California, Berkeley in 1950.

One of the most famous cases, in which Kirk opined was *State of Ohio v. Samuel H. Sheppard*. Dr. Samuel Sheppard - a brilliant neurosurgeon - was accused of killing his pregnant wife Marilyn by bludgeoning in 1954. He was sentenced and jailed. But in a sensational retrial occurring after 12 years, Dr. Kirk relying on just the photographs of the blood spatter patterns opined that the killer must be *left handed*. Dr. Sheppard was right handed! Sheppard was released mainly on Dr. Kirk's evidence.

Dr. Kirk retired in 1967. His original writings are preserved in Bancroft Library, Berkeley, San Francisco, California. In her *acknowledgements*, Dr. Wonder recommends reviewing his papers. They are contained in seven boxes, and she recommends a couple of days at the library. Readers must be prepared to read an extremely illegible writing - so much so, that there is a rumor that Kirk wrote in code!

REFERENCES:

1. Phillips Charles, Axelrod Alan. Cops, Crooks and Criminologists: An International Biographical Dictionary of Law Enforcement (Updated Edition), 2000, Checkmark Books (An imprint of Facts on File, Inc., New York), page 151

Blood spatter analysis is now commonplace in violent death scene investigation and any scene involving spilling of blood. Indeed, it should be applied to scenes of violence even if the victim survives. Although such analysis can provide a wealth of information to the investigator there still remains considerable confusion, ambiguity, disagreement, misrepresentation and controversy preventing full acceptance of blood spatter analysis by the legal community.

...This book is not a spur of the moment effort and as the author informs us has been fourteen years in the making...

Although a scientific approach is required in interpreting bloodstains and especially when presenting them in court, I would not necessarily describe bloodstain interpretation as entirely a science, as most of it is to do with common sense. The author of this book Anita Wonder prefers it to be a science. It may well be one day but at the moment it is part science and part experience and common sense.

It is obvious that Anita Wonder is a devoted follower of Dr. Paul Kirk. In fact the author is so enamoured with him that his name keeps cropping up throughout the text! In fact the title of the book "Blood Dynamics", is a term used by Paul Kirk although personally my view is that "Blood Dynamics and Blood Stain Interpretation" would have been a more fitting title. This is of course a personal matter.

This book is not a spur of the moment effort and as the author informs us has been fourteen years in the making. The book is divided into 10 chapters and the chapters follow each other in a logical sequence.

In chapter 1 the author starts off with a list of alternative terms for Blood Dynamics wBloodstain pattern analysis, wBlood splash, wBlood distribution, wBloodstain interpretation, wBlood spatter evidence, wBlood splatters, wBlood spots, wspreckles, wspray expertise and wBloodstain dynamics

The origins of these terms are all explained in the footnotes, or rather the marginal comments, of that page.

...The objectives of the book are three-fold and it manages to achieve all of them...

Almost all are acceptable but personally I am not fond of the words "splatter" and "spreckles". "Spreckles" is apparently a term used by (American?) attorneys, which probably explains this unusual term! "Spatter" and "Splatter" are used interchangeably in Britain but most prefer "Spatter".

After a brief discourse on the history of the subject the objectives of the book are laid down. These are:
& To provide a reference for all pattern types in one source.
& To outline a science-based objective approach to pattern identification
& To update blood dynamics with technical discoveries from other sciences

The book manages to achieve all these objectives.

## What is blood?

Following these ground rules the author goes on to explain what blood is. This might seem pretty obvious and rather tedious reading to a medical man but then the vast majority of readers of this book are unlikely to be medically qualified.

Rather wisely there is no mention of white blood cells, as these have no real bearing on the understanding blood dynamics and would only have served the purpose of complicating matters.

There then follows a discussion on the *non-Newtonian properties of blood*. This is clearly an important topic and I always find that it comes as a surprise to most crime scene investigators that blood is not a simple (i.e. Newtonian) fluid.

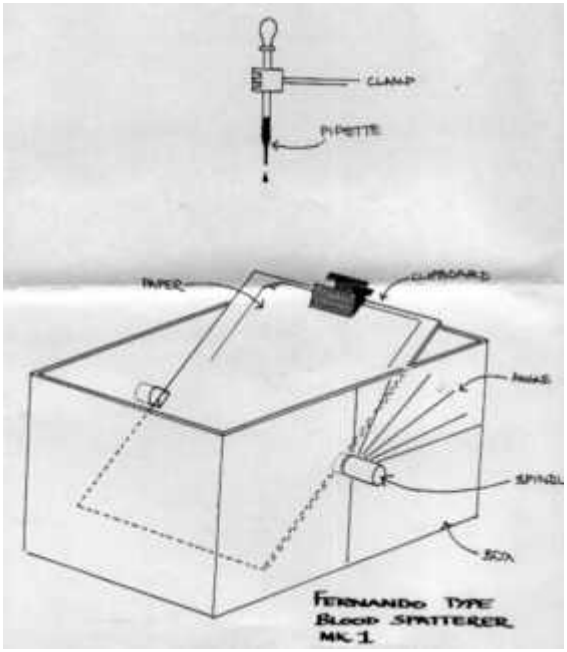
## Blood is not the same thing as red ink!

This has considerable bearing on the way spilt blood behaves. Furthermore blood has the ability to coagulate. Red ink doesn't coagulate! Spilt red ink just dries. Drying of blood stains is part drying and part coagulation.

Why we asked Dr Fernando to review this book

I became interested in Bloodstain pattern interpretation, way back in 1990, when on 8th June, I attended a seminar on the "Physical Significance of Bloodstain Evidence" at the University of Dundee, Scotland.

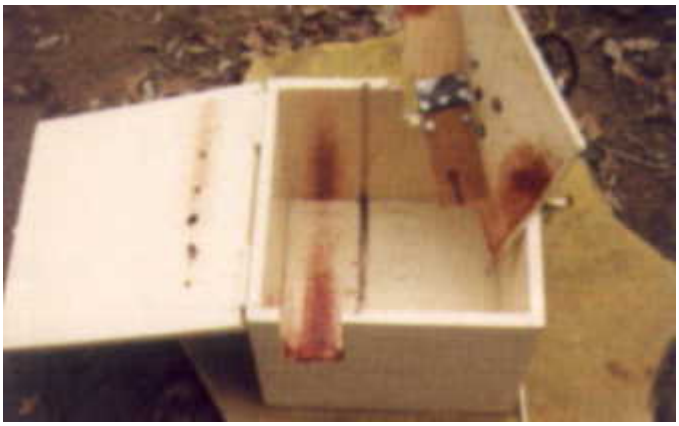
**Blood Spatterer - Fernando Type. [click figure to enlarge]**




The speaker was none other than the great Herbert Leon MacDonell, of *Bloodstain Institute*, Corning, New York. He even presented me with his book "*The Evidence Never Lies*", after the seminar, and also a practical manual called "*Laboratory Manual for the Geometric Interpretation of Blood Stain Evidence*". It described 14 simple experiments which were designed to strengthen one's knowledge of bloodstain pattern interpretation. Starting from Experiment 1, which was to measure the volume of a drop of blood, the manual went on to give detailed and complicated experiments such as Experiment numbers 9 and 10 which dealt with medium and high velocity blood spatters.

When I returned to the University of Edinburgh, where I was working at that time, and told Dr. Gyan Fernando (at that time working as a lecturer there) about it, I expected him to show some bewilderment. But quite unfazed, he reached for his drawer, and showed me a sketch of a "Fernando type" blood spatterer, he had devised himself (see the accompanying figure). It was at that point in time, I realized my own utter ignorance in the field.

**A fan device shown in the book at page 22. Devices such as these are used to study Impact Spatter Patterns. Compare it with Fernando's device, which basically makes cast-off spatters. [click figure to enlarge]**



When I returned home (New Delhi, India), I made it a point to perform those experiments. I even made some of my students perform these experiments. And I do remember having made good use of my recently acquired knowledge of blood stain pattern interpretation in a couple of crime cases.

That's why when Anita Wonder's book *Blood Dynamics* came to me for review, I read it with great fascination. I spotted several things I knew before, but a great number of facts in the book were completely new to me. Who would review this book for us? I didn't have to think hard!

*-Anil Aggrawal*

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Most of my own work and indeed those of Herbert MacDonell whose experiments I recreated were carried out on anti-coagulated blood. For most practical purposes this experimental model suffices but in real life or rather death, spilt blood defies Isaac Newton, undergoes the process of coagulation soon followed by clot lysis (depending on the volume) and then dries or gets washed away depending on the conditions! Blood is not a simple medium! The inclusion of this chapter is a wise move on the author's part, as increasingly the majority of crime scene investigators have no medical background. Whilst it is not a prerequisite to have a medical background in interpreting blood spatter a medical, or rather a physiological, understanding of the composition of blood helps.

...The inclusion of ..(the introductory).. chapter.. (on blood).. is a wise move on the author's part, as increasingly the majority of crime scene investigators have no medical background...

After this preliminary groundwork there follows an introduction to spatter groups followed by impact spatter patterns. Impact spatter patterns includes a short paragraph on *exhalation spatter* which in the reviewer's experience is largely unrecognised, or worse, misinterpreted as evidence of violence. Cast off spatter is discussed in the next chapter. All this of course is traditional stuff for old hands. These chapters are well written and well illustrated.

Arterial damage stains are quite rightly described in a separate chapter (Chapter 5). Arterial blood spattering is relatively virgin territory, difficult to recreate under laboratory conditions, difficult to interpret and moreover subject to a lot of myths. Political correctness prevents live "experiments" on animals except in slaughterhouses, which provides a last legitimate, politically acceptable method of observing arterial bleeding.

Whilst an arterial type spatter pattern invariably means that an artery has been damaged, the converse, i.e. finding arterial damage does not necessarily mean that an arterial pattern of spattering should be evident.

*The fact that the pathologist finds arterial damage at autopsy is no guarantee that arterial type of blood spattering will necessarily be found at the scene of the incident.*

There are several reasons for this of course. A deep-seated artery such as the Peroneal artery may or may not produce a typical arterial pattern because the overhanging tissue edges can moderate the pulsatile flow. The relatively superficial Radial artery might produce a typical arterial pattern. On the other hand it may not if the victim is wearing a long sleeved dress. Intervention of heavy clothes can stop arterial spurting.

...The chapter on physiologically altered bloodstains is lucid and timely...

The aorta, in the reviewer's experience, is too deep seated to produce arterial spatter in the average case of stabbing.

Regrettably, Anita Wonder has not emphasised this point strongly enough, if at all. Apart from that minor criticism this chapter is well written and timely.

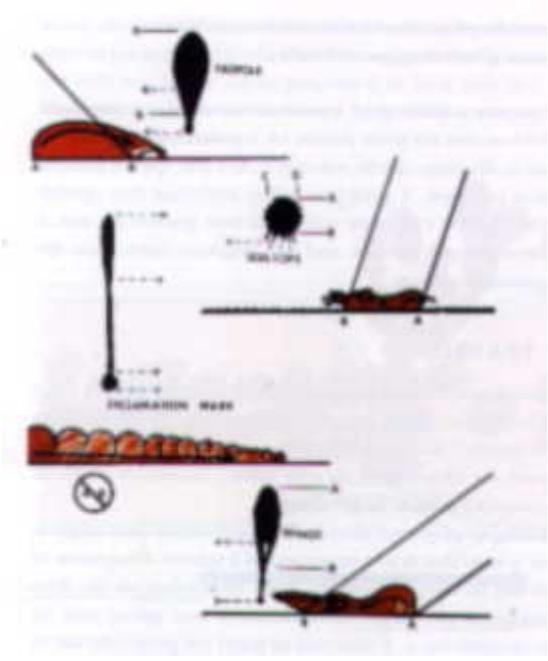
In the next chapters transfer bloodstain patterns, physiologically altered bloodstains and volume bloodstains follow in a logical sequence.

The chapter on *physiologically altered bloodstains* is lucid and timely. My personal experience of such stains is that the Police invariably misinterpret the stains: For example menstrual flow mixed with terminal evacuation of the bladder, perimortem blood flow mixed with putrefactive fluid (especially after a injury involving the nose) and blood stains in the toilet and the bath.

*Volume bloodstains* are discussed in the next chapter starting off with the appropriate disclaimer:

*"There are at least four approaches for estimating the amount of blood in a pool, none of which is recommended by the author. They are presented here for academic purposes only"*

**The book has several illustrative diagrams such as these. This one appearing on page 32 shows various examples of leading edge characteristics.**



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A timely warning and hopefully the Legal Profession will take note.

It is a pity that the author did not go as far as to attach a legal warning! I certainly would not like to see someone's freedom (and life!) dependent on such estimations. One certainly is reminded of the days when the time of death was based on the time that the stomach takes to empty itself! Or Rigor Mortis. Or post-mortem lividity

This is very definitely virgin territory, unexplored regions and the Wild West!

With composite Blood Stains we are back in "Sherlock Holmes territory". The reviewer wishes to stress that his use of this expression is not derisory but is an emphasis on the common sense approach to blood spatter interpretation.

Then follows *Reconstruction!*

This is where Science gives way to Art! *And experience*. Experiences of years of late night call outs to scenes of death, violent deaths, homicides, suicides and accidents! Many more cases than one cares to remember!

And finally! There is a good and comprehensive bibliography in addition to the references at the end of each chapter, an author index and a subject index. The bibliography not only includes the classic work of Paul Kirk but those of MacDonell, the book by Stuart and Eckert as well as 1993 video produced by the Metropolitan Police Laboratory, London. There is even mention of Joseph Wambaugh's 1989 book "The Blooding".

...a delightfully written book, a joy to read and of course will be a favourite in my collection...

Quality wise this book is bound well and is printed on coated and, as the fly pages inform us, "on acid-free paper". It has been typeset in Cheshire, England and printed in Barcelona, Spain! (The Author is American, by the way!)

The illustrations are mostly good but the author might think of replacing some of the easily replaced illustrative photographs and diagrams in the next printing/edition.

A few photographs suffer from a slight colour cast but nothing that good photo enhancement software cannot correct.

The colour cast in the photographs is mainly a lack of blue, or Cyan in printer's terminology. This may even be a minor printing problem. This however does not detract from the wealth of information in this volume.

It is a delightfully written book, a joy to read and of course will be a favourite in my collection.



*-Gyan Fernando*

*Gyan Fernando, the reviewer of this book is a Forensic Pathologist. He lives in rural Devon, England, not too far from a sheep slaughtering facility for the meat production industry and has observed humane sheep slaughtering techniques for scientific purposes mostly for the purpose of studying cut-throat injuries and arterial spatter. He was not involved in the mass slaughter of infected animals in Britain during the recent outbreak of "Foot and Mouth Disease".*

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