The Golden Age of Cardiology: Told in *The Heart Healers*

Amazon reviewers’ comments [score 4.8]
“A heart-pounding, gripping read”
“An amazing story”
“I could hardly put the book down”
“A page turner”
“An incredible but true story of a medical revolution”
“It’s *The Emperor of All Maladies* for heart disease”
“Medical book of the year”

#1 new release on Amazon.com; upper 0.5% of sales
A Half-Century Ago With the Discovery of Antibiotics
Heart Disease Emerged as our #1 Killer…

As soldiers returned from World War II, we had:
- No heart surgery
- No defibrillator
- No pacemaker
- Few drugs
- No CCU

And no effective treatment for
- Congenital heart disease
- Valvular heart disease
- Coronary heart disease

Norman Rockwell painting
The First Great Turning Point Appears In the Midst of War

An inexperienced 34 y.o. Harvard surgeon
Chief, Thoracic Surgery, 160th Gen.Hospital
I first met him as a cardiology fellow
Fiery redhead with temper to match
A terror in the OR, an extrovert in public

Dwight Harken
In a London Army Hospital…

Dwight Harken

Bombs from above

Fire on the ground

Shrapnel in hearts

But Harken tried anyway…

“Surgery of the heart has reached the limits set by Nature: no new method, and no new discovery, can overcome the difficulties that attend a wound of the heart.”  Stephen Paget
“Then suddenly with a pop, as if a champagne cork had been drawn, the fragment jumped out of the ventricle, forced by the pressure within the chamber…blood poured out in a torrent…I put my finger over the awful leak. The torrent slowed, stopped, and with my finger in situ, I took large needles swedged with silk and began passing them through the heart muscle wall, under my finger, and out the other side. With four of these in, I slowly removed my finger as one after the other was tied….Blood pressure did drop, but the only moment of panic was when we discovered that one suture had gone through the glove on the finger that had stemmed the flood. I was sutured to the wall of the heart! We cut the glove and I got loose…”

Surgeons wanted to operate on a non-beating heart: 3 new problems:
• Arrest and restart the heart
• Circulate blood during cardiac arrest
• Oxygenate blood???
Lillehei’s Brilliant Intuition: Cross Circulation:
If the Mother’s Body Supports a Fetus, Why Not a Child?

Lymphosarcoma, 5% 5yr survival
In hospital: dedicated/caring MD
Outside: ignored others’ opinions

“For the 1st time in history, a surgeon may have a 200% mortality”

Cross circulation died that day, but the complications of open heart surgery led to amazing stories of development of pacemakers, defibrillators and the heart-lung machine

Pamela was chosen Minnesota’s and AHA’s Queen of Hearts
Pamela had a picture spread in Cosmopolitan Magazine
Lillehei gained admirers and further infuriated Watson
The Greek Tragedy of Walt Lillehei: His Strength Becomes His Weakness

Convicted on all 5 counts, fined, no jail
Completely Ostracized
Forced to step down at NY Hospital-Cornell
Unwelcome at University & his country club
Minnesota Medical License revoked
Visiting professorships & honors disappear

Surgeons needed one more technology: images of the heart.

John Kirklin
Medicine’s Strangest Story
The Birth of Cardiac Catheterization

Proposal to pass tube into heart rejected
Romanced nurse Ditzen to participate
She unlocked supply cabinet, lay down
Strapped her down… then cathed himself
Got an xray image to prove it
Denied cardiology posts, entered urology
Published in Medizinische Wohenschrift
10 yrs later 2 US MDs used in WWII shock
Catheterization gave 1st images of the heart
The 3 doctors won Nobel Prize in mid-50’s

Mavericks are risk takers.

24 yo Werner Forssmann in 1929
The 2\textsuperscript{nd} Great Paradigm Shift: Coronary Angiography

“The most unforgettable character I ever met”
A sartorial disaster
Cursed like a sailor
Irrepressible, delighted in shocking people
Kept lit cigarette in sterile forceps in lab

Mason Sones

9 years later, teaming with Argentinian surgical fellow Rene Favaloro they made the breakthrough to coronary bypass surgery
The Third Great Paradigm Shift: Pursuit of a Vision Despite Widespread Scorn

Andreas Gruentzig
His Zurich kitchen
Ignored at the AHA
Patient A. Bachmann

Mavericks use failure as fuel.
A Modern Icarus?

Divorces, marries a medical student
Buys a spectacular mansion, stages lavish parties
Buys his own plane and a cottage on Sea Island
In 9-85 disoriented while flying home from Sea Island during Hurricane Juan, he crashed in a Georgia field @ 300 mph
Son of a Mennonite minister
Motorcycles, fast cars & cowboy boots to work
Bass guitarist formed Heart Rock, made CD’s

Gruentzig feared he would destroy PTCA
Cath cancelled when patient had MI in hospital
Geoff un-cancelled it…went ahead anyway

Mortality rate for MI has fallen from 30% to 5%
The past generation’s mavericks made great breakthroughs… is there anything left to do?
The Past Informs the Future: Advances on the Horizon
The Greatest Science Achievements of Our Times?
Our Golden Age of Cardiology Deserves Consideration

Heart surgery  Coronary care units
Pacemakers    Defibrillators
Statins       Angiography and angioplasty

The Future
Valve replacement & repair without surgery
Complete coronary revascularization in the cath lab
Biodegradable stents
Cardiac regeneration
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The Revolution in Management of Cardiac Disease

Percutaneous aortic valve replacement
Management of mitral insufficiency and stenosis
  The mitral clip
  Valve replacement
Other Rx: tricuspid insufficiency, atrial fibrillation
Dr. Forrester is one of the great medical storytellers of our era. In this book he applies his exceptional talent to illuminate--and tell the backstories--of the momentous milestones in cardiovascular medicine and surgery.

Eric Topol MD, author of The Patient Will See You Now

Dr. Forrester makes a very compelling case about the misfits, mavericks, and rebels who persevered with their ideas truly impacted our society in ways that we cannot fully appreciate, since we now take those things for granted.

Elliott Antman MD, President, Am Heart Assn

Forrester is a gifted natural writer...his book is a fast-moving tale told by someone who has lived through many of the fascinating developments he describes. Bruce Fye, M.D. Author of Caring for the Heart: the Mayo Clinic & the Rise of Specialization.
Harken decision. **Cathedral** [after 2 quotes], Roosevelt Lillehei Poe the answer is **hidden in plain view** Lillehei trial reminded me of ET; showcase trial Forssmann idea: **If you don’t know** where you’re going Sones the lovable misfit Gruentzig failure: The **greatest bonanza** since Comstock Load Dog in pool: Let’s review what the mavericks taught us Cribier: I like to think I taught him to be maverick

End: Our Golden Age…our attack on heart disease…deserves consideration. Click I am excited, awed really, by the half centery of our profession’s accomplishments.

But I am jumping up and down cuz **now is the era of Int Card [list]**. And I see many mavericks here today. So that is why for each of us the **past is prologue** for the Golden Age of Cardiology.
The Breakthrough to Prevention of Coronary Disease

Cardiology’s Champion of Dogged Persistence

Biochemist at Sankyo in Tokyo
Screened 6000 fungi over 2 years
Found 2 cholesterol synthesis inhibitors
Considered irrelevant, fired by Sankyo
18 years later, 1st clinical trial: 42% ↓ death
Randomized trial era began
CAD will cease to be #1 killer in < 10 years

8:00 AM – 5:00 PM in the Fairway Ballroom

Akira Endo
Our Past Creates Our Present
Percutaneous valve replacement
Wireless Pacemakers and defibrillators
Outpatient heart failure management

And our future:
Drugs that can give “everyone” a normal LDL-C
Genetic technology for organ repair
Biocompatible artificial hearts
Sapien 3 propensity: A man and his dog have an average of 3 legs and half a tail
Lillehei: If you don’t know where you’re going, almost any road will get you there
TAVR: The greatest bonanza since the Comstock Load.
Gruentzig: Brakes don’t work get a louder horn

It’s the truth, but it’s not the whole truth
A serious mistake by the Celestial Design Committee
The jingling guinea soothes the hurt that honor feels (Tennyson)
Is there another side effect of this drug besides bankruptcy?
I run from bar to bar
Even teenagers don’t have the answers
Transition from Hx to future: As Eve told Adam as they were leaving the Garden of Eden, “We are living in a time of transition.”
Transition: I’ve seen future & it is like the present only longer (Woody A)

The art of medicine consists in amusing the patient while nature cures the disease.
Teasers: Harken to civilian life. How it happened would be impossible today
Lillehei to heart lung: astonishing behavior of H-L inventor after he finally succeed
The Continuity of the Past, Present & Future

Past, Present, Future
The Past Creates the Future: Rx of Heart Failure

430 LVEF <40% (avg, 23%), 18 mo f/u
Heart failure hospitalizations

With appropriate implementation, hospitalizations can be ↓↓ by half
From POBA to the Bioabsorbable Stent

Andreas Gruentzig + Geoff Hartzler + Julio Palmaz & Richard Schatz

ABSORB Trial. ESC 2015
Coronary Angiography Fathers Bypass Surgery

Rene Favaloro and Mason Sones

Born and raised on the Pampas
#1 in his class, exiled by govt to rural practice
Came to US to learn cardiac surgery with no job
Studied angios with Sones at night
The most focused on moral principles of MDs I knew
In 1967, relieved angina with coronary bypass surgery

On a Sunday morning in 2000, he walked into his bathroom, and symbolically shot himself thru the heart.
The Complications of Heart Surgery Fathered Modern Electrophysiology

14 yr old boy with pectus developed VFib
Carl Wigger’s nearby lab was studying defibrillation
Beck used Wigger’s device & child survived
Mankind’s dream of return from death was realized
Beck’s experience led to cardiac defibrillators

Later Beck slashed open the chest of an outpatient & defibrillated him
A period of slashing open chests for manual massage followed
Richard Ross at Hopkins like to relate his own experience
The Medical Device Industry Emerged From The Other Surgical Disaster: Heart Block

20% of Lillehei’s surgical mortalities were due to heart block.

Earl Bakken, repairman for hospital equipment, was asked by Lillehei to help with heart block.

Bakken brought his device to the hospital...

The American medical device industry was born.

Bakken retired to Kona, but Lillehei’s story was different…
The Future: Five Great Advances on the Horizon

Aortic Valve

Mitral Clip

Wireless pacemaker

Pressure monitor

PCSK-9 Inhibitors

53% ↓ events in 1 yr when added to a statin
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