



# Sones' laws of clinical conduct

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**EDITOR'S NOTE** — The following article by William Proudfit is unusual for the *Cleveland Clinic Journal of Medicine*, in that it is the personal reminiscence of one giant of medicine about another. F. Mason Sones, Jr. was a dynamo, one of the great innovators of cardiology. Together with his close associates William Sheldon and Earl Shirey, Sones founded a cardiovascular center of excellence at the Cleveland Clinic which continues to thrive under the leadership of Eric Topol. The atmosphere of inquiry that flourished among these physicians provided the foundation for the development of coronary artery bypass surgery by Rene Favalaro and Donald Effler, later perfected by their successor Floyd Loop.

William Proudfit brought scientific rigor to the evaluation of these procedures through several landmark studies, still widely cited today. Proudfit, now retired, is a wellspring of information about the early days of cardiology. He is an acute observer, much revered by the many residents whom he taught. Sones' "laws," as articulated by Proudfit, are a personal view of the man. They have historical significance because of their source, but they are not designed to always be taken literally. Rather, they reflect Sones' bold and uninhibited manner of expression. Sones' challenge not to read, write, or calculate may have worked for Sones, but it wouldn't work for most of us in today's environment. In fact, Proudfit reads, writes, and calculates with the best of them.

**JOHN D. CLOUGH, MD**  
Editor-in-Chief

**M**ORE THAN A DECADE has passed since the death of F. Mason Sones, Jr. Although he was best known for his innovation of selective coronary arteriography, he made many other scientific contributions.<sup>1,2</sup> And although his clinical contributions were great, his influence on the people he worked with was just as important. I remember him best for the guiding principles behind his work. Although he was often unconventional, physicians today might profit from reflecting on his "laws" as they reflect on their scientific and clinical practice.



F. Mason Sones, Jr., MD

## ■ THE CAREER OF F. MASON SONES, JR.

Sones trained at Henry Ford Hospital as a pediatric cardiologist and was brought to the Cleveland Clinic Foundation to develop a catheterization laboratory in the days before image amplification. Soon he made a major contribution to cardiology—neonatal catheterization in congenital heart disease. The principal authorities of the era condemned the approach, but Sones demonstrated that the lives of many infants could be saved by early accurate diagnosis and surgical treatment.

Sones never was satisfied with the quality of radiographic studies, and as soon as he heard about image amplification, he visited the Johns Hopkins Hospital for several weeks of intensive study of the development. He realized that he must understand the physical principles of image amplification in order to communicate with research engineers. The Phillips company worked with him and developed a practical image amplifier. Several generations of innovations in amplification followed, eventually resulting in the C-arm machine.

In addition Sones worked with Eastman engineers on film problems and secured an automatic film processor that enabled him to

**Guiding principles from a pioneer of modern cardiology**

view his studies soon after completion. In fact, almost nothing in the catheterization laboratory escaped being modified or replaced by Sones, even the standard report of the study used still by many laboratories throughout the world.

### Coronary angiography

Sones had already imaged the coronary arteries while investigating congenital and acquired cardiac disease, but after he acquired an image amplifier his interest in the coronary arteries increased. A bolus of contrast medium injected into the ascending aorta allowed better visualization, but soon he began introducing the catheter into the sinuses of Valsalva near the coronary orifices, obtaining much better studies.

During one such study, the catheter inadvertently slipped into the right coronary artery, and a large amount of contrast medium was injected into it. Immediate demise of the patient was anticipated, but the patient simply developed bradycardia. Sones decided that selective coronary arteriography using a much smaller bolus of contrast medium was the best approach, and a new era in cardiology was born.

Soon thereafter, Sones demonstrated functioning anastomoses between implanted internal mammary arteries and diseased coronary arteries and subsequently visualized functioning patch and bypass grafts of the coronary arteries. He also showed that the mitral valve was involved in hypertrophic subaortic stenosis.

### ■ SONES' LAWS

Despite his many contributions to technique, Sones always considered himself a practicing cardiologist. Certain guidelines enabled Sones to practice efficiently and well. He never advertised them, but they were obvious for all who worked with him, and he took no exception when these principles were listed at his retirement dinner as "Sones' Laws." The term "laws" is appropriate because Sones viewed the world in terms of black and white. These 12 rules were the framework of his professional career.

#### Be honest

Occasional violation of other laws was forgivable, but Sones never forgot any dishonesty,

nor did he forgive it. All his messages to colleagues, referring physicians, and patients bore the hallmark of truth as he saw it. When rare complications of a diagnostic or therapeutic procedure occurred, he was so forthright in his confession that the question of compensation did not arise, even in the early days of new techniques. He could not be intimidated by ill-founded claims.

#### Aim for perfection

Nothing is "good enough." Sones demanded that procedures be done as well as possible and he sought to improve any that did not meet his high standards.

#### Find an expert

Many dynamic, imaginative people hesitate to consult colleagues. Sones asked opinions of those in other specialties but also of other cardiologists if he believed them to be more competent in certain situations than he. He held his consultants to the same standards that he observed.

#### Don't read (or write)

I think that Sones was dyslexic and learned early that he would have to depend on listening, observing, and thinking. It is probable that he never completely read a scientific paper. At least, he never admitted having done so. Sones did not advise others to avoid reading, but he wanted them to think critically about what they read. If one summarized a report to him giving a description of the methods, results, and conclusions, often he immediately pointed out a vital defect. Although Sones did little reading, he was well-informed by relying on his colleagues and medical friends elsewhere and by attending meetings.

Sones' personal published work was small; in most publications there were coauthors who did the writing. When a manuscript was to be submitted for publication, he would laugh and say, "Tell me what I said so that I will not be surprised if someone accosts me." Actually, he was quite aware of the project and had been responsible for most of the original ideas. Sones disliked long sentences and excessive punctuation. He said that semicolons were the Harvard man's substitute for thinking.

Thought is  
more  
important  
than statistics



Not only did Sones avoid writing, but he discouraged others from publishing prematurely. He refused to permit initiation of a study of correlation of clinical and coronary arteriographic findings in the first 1,000 patients, but he allowed analysis of the second thousand. He wanted to be sure that interpretations of the films were reliable. Sones knew that the many visitors to his laboratory would disseminate his techniques and ideas.

### **Don't calculate**

By this, Sones meant that one should be cautious of statistics. He believed that often truth could be discovered without calculations, and that careful thought is more important than statistical manipulation. This concept was unpopular in his time and is even more so now.

### **Don't rely on gadgets**

This law might surprise some because Sones was surrounded by gadgets, many of his own devising. He knew thoroughly all the gadgets that he used—and he knew their limitations.

### **Don't watch the clock**

This law is honored by all but observed by few. Sones was oblivious to time to the extent that he might work till 2:00 or 3:00 AM, but he would be at his desk in the morning because he knew that colleagues wanted to review films with him before they made rounds. He did not expect his associates in the laboratory to ignore the clock as completely as he, but their workload was heavy and they did not leave at the dinner hour in the evening. Sones gave as much time as a problem required, without regard to his schedule.

### **Don't repeat unnecessary measurements or tests indefinitely**

Sones had a talent for identifying data that would be used neither in patient care nor in clinical investigation, and he eliminated routine collection of such data. He rebelled at the expression "that is the way we have always done it."

### **Concentrate**

Sones was a fierce listener as long as the patient, physician, or lecturer had anything to say. Similarly, he concentrated on any task at

hand. He could ignore chaos as long as it did not interrupt his activity at the moment.

### **Simplify the problem**

Red herrings abound. Sometimes we thought that Sones did not notice them, but actually he recognized them for what they were and did not waste time. He had the refreshing attitude that the solution usually is simple once the real problem is identified.

### **Make a decision**

Sones made decisions quickly and usually accurately. If a decision proved to be wrong later, he would alter it. In reading arteriographic and ventriculographic films, an unequivocal opinion sometimes could not be reached, but in the written report Sones made a clear statement. Once I asked him why he was dogmatic in his final report. He smiled and said, "That way the referring doctor is happy to tell me that I was wrong and I have learned something."

### **Communicate**

Although Sones avoided formal writing, he was a master of communication with the patient or physician. He used terms readily understood and spoke clearly. He had a keen ear for confusion on the part of the listener and quickly altered his presentation.

## **SUMMING UP**

These are the laws by which Sones operated. All are applicable today, although "don't read" and "don't calculate" need some explanation. The one preeminent principle was honesty. Sones was furiously dedicated to the concept of "truth forever on the scaffold," and it was his duty to rescue it.<sup>3</sup> Directly or indirectly all these "laws" had a bearing on Sones' primary objective: the best care of the patient at hand.

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