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Minuscule Review


This case report warrants review because of the prestigious status of the journal publishing it and the institutions of which the authors are members. Additionally, it is probable that the paper will be frequently cited in future communications. The authors claim: “This report documents an unusual case of acute transmural myocardial infarction in a young man without coronary obstructive disease.”

The patient, a 19-year-old male student, had had several episodes of exertional pain over a period of 5 years. He was admitted to the hospital with retrosternal chest pain with radiation to the jaw and the left arm, and the discomfort persisted 4 hours. There was transient evidence of heart failure, and episodes of ventricular arrhythmia occurred. The electrocardiograms were interpreted as clearly documenting an acute “infero-lateral myocardial infarction.” The SGOT and creatine phosphokinase showed significant transient increases. The coronary arteriograms made 3 months after the myocardial infarction were normal. The patient has been followed 2 years since the myocardial infarction and has continued to have occasional episodes of exertional chest pain.

To experienced cardiologists, the demonstration of normal coronary arteries in young women with the story of angina and evidence of myocardial ischemia was perplexing but was, in a considerable measure reassuring; as reconciling the diagnosis of coronary disease with the often benign course and lack of development of myocardial infarction in such patients had been difficult. The development of infarction in patients with normal coronary arteries, however, generates, not only perplexity but also consternation. It is much more difficult to explain myocardial infarction than angina by redistribution of coronary flow or other hypotheses. Of the authors’ references to other reports, the most specific regarding gross infarction, is Eliot’s. He described subendocardial infarction in the hearts of three young women with angina who died some months after normal coronary arteriograms. His case reports have not been given in detail though the coronary arteries were found at necropsy to be normal.

It is to be hoped that the young man whose case is reported by Dr. Sidd and his associates will be the subject of a further report. The present report would have been improved by the inclusion of illustrative electrocardiograms, vectorcardiograms, and the arteriogram showing the left coronary bifurcation and of the coronary branches entering the zone of the previous infarction, i.e., posteroinferior wall of the left ventricle. The stubborn individualist would like to assess the data himself, and the New England Journal of Medicine has done its readers a disservice by publishing a “Brief Recording” on an important topic without supportive illustrations and has made it awkward for other editors to accept a detailed report as a complete, definitive study.

H. B. B.

Circulation, Volume XLII, August 1970
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Oxyhemoglobin Dissociation Curve


Circulation, Volume XLII, August 1970
exercise room may explain the apparent absence of regional hyperhydrosis in the patients of this series. The relative contribution from each of the two factors, however, cannot be assessed at this time.

Whatever the underlying physiologic cause of the skin coolness, thermography appears to have some potential as an objective method of assessing the presence or absence of angina pectoris. Indeed, with refinements in technic, it may become possible to anticipate the onset of angina.

The areas of skin coolness, are not entirely specific, however. We have seen transient central skin coolness in the acute stages of pulmonary catastrophes (such as thromboembolism and massive atelectasis). Lateral chest coolness of longer duration can be seen with unilateral pulmonary disease where regional pulmonary blood flow is reduced (thromboembolism, fibrosis, cysts). On the other hand, in seven patients with clearcut chest wall pain not related to the shoulder-hand syndrome; that is, wound pain, cervical arthritis, shoulder arthritis, aching and tender ribs, we have not been able to demonstrate skin coolness, but the number of patients is as yet too small for unequivocal conclusions.

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Notice to Authors
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Dr. Charles K. Friedberg
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Minuscule Review


The authors (from the Departments of Medicine and Physiology and Biophysics of the University of Washington School of Medicine) report further studies on the altered affinity of hemoglobin for oxygen using the index for a change in affinity as the oxygen tension when the hemoglobin is 50% saturated (P50) at a standard pH and temperature. Six patients with angina pectoris were studied with coronary sinus catheterization and atrial pacing, and in five anginal pain was produced. The one patient who did not have angina had myocardial lactate production during pacing although the coronary arteriograms were normal. In the patients who developed anginal pain, a significant difference in the P50 of the arterial blood compared with coronary sinus blood developed. The authors point out, however, that such a minor shift of the hemoglobin dissociation curve to the right could allow a release of an additional 1.7 cc of oxygen per 100 cc of coronary flow. The magnitude of the right shift of the curve correlated with the duration of the pain during pacing.

The causes for such a change in affinity with one passage of blood through myocardial tissue are discussed. It could not be related to a change in the erythrocytic level of 2, 3-diphosphoglycerate (DPG) and no acceptable explanation could be given. The question arises whether coronary sinus blood hemoglobin is the same as that in the capillaries. Possible clinical significances of the observation are pointed out, viz., maybe the explanation of the disappearance of pain with continued exercise (the "walk-through" effect) and maybe an approach to therapy by the seeking of an agent which would modify hemoglobin affinity. The physician will think that the conventional views of auto-regulation of blood flow, with vasodilation and increase of oxygen extraction due to the Bohr effect, are still the most important mechanisms in the delivering increased oxygen to the tissues. Despite the possible perplexing aspects to some cardiologists of hemoglobin oxygen kinetics, they will be interested in the further developments in this now popular area of investigation.

H. B. B.
Minuscule Review


Paffenbarger and associates report recently a mortality follow-up of 3,263 San Francisco longshoremen on whom job assignment, cigarette habit, blood pressure, weight and height, and other characteristics were measured in a 1952 survey (Weinerman ER, Breslow L, Belloc NB, et al.: Amer J Public Health 42: 1552, 1952). The energy expenditure of the 68% of the men who handled cargo was estimated, from data in the literature, at 925 calories a day greater than that of the 32% less active longshoremen. Risk ratios were defined as CHD deaths per 1,000 person years of exposure in men with a "risk factor" divided by the rates for those without.

The largest CHD risk ratios were observed for men who smoked more than one pack of cigarettes a day (2.08) and for men above the mean for systolic blood pressure (1.89). A CHD risk ratio of 1.35 was reported for relative body weight above and below the mean, and 1.34 for less active men versus cargo handlers. No difference in CHD death rate was found between relatively sedentary and physically active longshoremen among cigarette smokers. However, a small but significant excess CHD ratio for the less active versus active persisted within classes of men above the mean for blood pressure (1.42) and relative weight (1.56).

Men high in three of the four risk factors measured (blood pressure, relative weight, cigarette smoking, and physical activity) had a CHD death rate that was 3.7 times that of men low in all four factors. In summary, a distinct association was found between activity of occupation and CHD mortality which persisted with control of several confounding risk factors, but which was relatively small compared to the risk of hypertension and smoking habit.

These results may be evaluated in the light of others' experience. Morris and his associates (Morris JN, Heady JA, Raffle PAB, et al.: Lancet 2: 1053, 1111, 1953) characterized the CHD risk factors of a cohort of London bus drivers and conductors and followed them for 5 years. The "physically active" conductors sustained a lower CHD rate than drivers. However, the drivers had higher serum cholesterol and blood pressure levels than did conductors, sufficient to account for the observed CHD incidence difference. It follows that the observed differences in CHD rates between cargo handlers and less active longshoremen in California may also be confounded by a difference in the serum cholesterol level.

In another study (Taylor HL, Blackburn H, Keys A, et al.: Circulation 41 [suppl I]: I-20, 1970) the 5-year CHD incidence in 850 active switchmen and 1,235 sedentary railroad clerks was not significantly different and serum cholesterol concentration and elevated blood pressure were evenly distributed between the active and sedentary groups. Industry-wide death studies of 70,286 railroad switchmen and clerks aged 40 to 59 at entry gave an estimated CHD risk ratio of sedentary to physically active men of 1.18:1. Calorie expenditure of switchmen during work was approximately 350 calories a day greater than rail clerks. The longshoreman study then suggests, assuming the cholesterol level is similar in the activity groups, that the much greater energy expenditure of the dockmen is not associated with a proportionate increase in "protection" from CHD.

In sum, CHD risk ratios in several studies are relatively low for the "risk factor" of physical inactivity compared to the more overwhelming association of risk with serum lipids, elevated blood pressure, and cigarette smoking habit. It should be mentioned that recreational activity has not been estimated in any of these population studies. Certainly more information is required to clarify the relationship of physical activity and CHD.

Henry L. Taylor and Henry Blackburn
Tufo HM, Ostfeld AM, Shekelle R: Central nervous system dysfunction following open-heart surgery. JAMA 212:1333, 1970.

The authors report the incidence of cerebral complications after open-heart surgery in a prospective study of 100 patients. That half of the sample showed evidence of neurologic damage after recovering from anesthesia is disquieting information, although fortunately in most patients the abnormality was transient. However, 15% of the survivors had signs of cerebral damage at the time of discharge from the hospital. The extent of the cerebral damage correlated with age and the degree of reduction of arterial blood pressure during perfusion.

The authors are to be commended for the report, bringing to the attention of the profession, the high frequency of cerebral dysfunction after open-heart surgery. Each institution involved in this type of surgery might profitably engage in similar prospective studies. One would hope that further studies might reveal that the past experiences at the Presbyterian-St. Lukes Hospital might not be representative of the complication rate in all hospitals throughout the world, and that no hospital group would gain permanent comfort or complacency if its results were similar or worse.

Cerebral complications associated with open-heart surgery are frequent and of grievous concern. However, the opening of the heart and the maintenance of the circulation by an artificial heart-lung bypass per se should be virtually without risk. That a majority of the patients reported by Tufo and associates were chronically ill prior to surgery is reflected by the fact that the large majority had had artificial valves replaced, 13 having had multiple valve replacement. The overall mortality rate was 15%. Only 12 patients with congenital defects were in the series. While specific data are lacking, the authors state that the frequency of cerebral damage was less in this latter group.

One fact seemingly well documented in this report was that cerebral damage could be related to the duration of the arterial hypotension during cardiac bypass surgery in patients over 40 years of age. With all charitableness of spirit and the knowledge that a cerebral complication after major surgery is a calculated risk, the question seems germane, whether the incidence of serious organic cerebral damage reported by Tufo and associates is an irrevocable prediction for future years. The selection of seriously ill elderly patients will always be an important factor in a high complication rate.

H.B.B.
Auricular flutter and fibrillation showing varying block associated with Cheyne-Stokes variation. Amer Heart J 7: 498, 1931
15. Langendorf R, Pick A, Winternitz M:
Mechanisms of intermittent ventricular bigeminy: I. Appearance of ectopic beats dependent upon length of the ventricular cycle, the "rule of bigeminy." Circulation 11: 422, 1955

Paradigms in Research

A paradigm [in scientific research] is defined as a shared and consensually agreed upon system of assumptions, acceptable operations, standards for evidence, and rules of conduct for a scientific endeavor that are dominant at a particular time in a field of investigation and is expressed in the form of model problems and solutions.—From A. J. Mandell, and C. E. Spooner: Psychochemical Research Studies in Man. Science 162: 1442, 1968.
A Rational Chest Lead System for Monitoring the Electrocardiogram in Intensive Care Units of Hospitals

The hookup for constant monitoring with $MCL_1$ (unbroken lines) with alternative temporary placement of the positive electrode to obtain $MCL_6$ and $M3$ (dashed lines).

Minuscule Reviews


Rashkind WJ: The complications of balloon atrioseptostomy.

Following the introduction of any new technic there is regularly a succession of reports detailing favorable or unfavorable results, as well as unpleasant reactions or complications. Thus, subsequent to the initial description of balloon septostomy for the palliation of transposition of the great arteries by Rashkind and Miller in 1965, numerous reports confirmed its great value. A variety of complications have also been described, including one appearing elsewhere in this issue of Circulation.

Ellison and associates report two instances of inability to deflate the catheter balloon, the proximal binding of the balloon having broken loose. In one case, the balloon was deflated by forceful withdrawal against the right atrial-inferior vena caval junction, causing the balloon to evert and discharge its contents into the atrium. In the other case, the balloon was punctured by pulling the balloon back against the projecting tip of a sharpened guide wire inserted through another catheter. The authors point out potential dangers to both of these solutions.

In a commentary in the same journal issue, the innovator of the technic, Dr. Rashkind, acknowledges complications with the procedure, both personally experienced and in published and unpublished reports of others, and sets out to describe how they can be avoided or minimized. Emphasis is placed on the use of a balloon of sufficient size, preferably one that can be inflated to a diameter of 1.5 cm, the use of an adequately sized vein, the preoperative softening of the catheter by immersion of its distal half in warm water, the preferential use of a double-lumen catheter to verify location, and the slow inflation of the balloon. Since balloon rupture is considered a rather common phenomenon, there is need for careful removal of air bubbles from the balloon catheter to prevent air embolization. The danger of balloon fragmentation, with consequent embolization, is viewed as having been virtually abolished by the use of improved balloon material.

R.C.A.
HIS BUNDLE RECORDINGS

its recognition. Amer J Cardiol 24: 890, 1969

75 Years Ago

Limited Rewards from Auscultation (Dock)

. . . the epoch-making discovery of immediate auscultation engrossed the attention and diverted the minds of physicians, especially toward the examination of the valves of the heart, and away from the muscle itself. The reason for this is not far to seek. It depends on a phase of human nature which shows itself in connection with every new diagnostic method. Auscultation seemed at first to offer a short cut to treatment. The study of physical signs was but too likely to lead to a physical conception of cardiac disease, and the more recondite physiological processes were neglected. To be sure there were exceptions, even during the worst period.


*Name as printed in the journal of 1896.
Technic for Measurement of Collateral Coronary Flow and Relative Resistances in Adjacent Vascular Beds


30 Years Ago

"Infarction at a Distance"

The site of the occlusion or occlusions in the coronary arteries bears no necessarily constant and immediately obvious relationship to the location of an infarct which may be found in the heart. Of course, in some instances, rapid occlusion of a single, major, coronary artery in an otherwise normal heart will cause infarction of the region obviously supplied by this artery. . . . More often, however, in hearts with an anastomotic circulation there is no such direct relationship; instead, they may show occlusion of the right coronary artery and infarction of an area in the left ventricle which is normally supplied by the left circumflex or by the left anterior descending artery. . . . Similarly, occlusion of the left circumflex or left anterior descending artery may cause infarction of an area normally supplied by the other artery. The mechanism of this paradoxical phenomenon, "infarction at a distance," . . .

Minuscule Review


Incorporated in some research and training programs, there are organized sessions for the critical review of scientific papers. For such sessions, I recommend the report by Dr. Kannel and associates. Conclusive evidence supports their statement that the "risk of every clinical manifestation of coronary heart disease, and of death in particular, was increased" after the subject developed an electrocardiogram diagnosed as "definite ECG-LVH." The authors have exposed the long-standing difficulty of interpreting the electrocardiographic changes which may be associated with left ventricular hypertrophy, although seemingly content to regard the clinician's electrocardiographic diagnosis, "definite LVH," as a rather uniform pattern and use it as a specific marker for a population group. It seems unfortunate to apply this label, so useful in clinical communication (although flavored by provincialism), when more exact coding of the tracings would have been possible. This criticism does not obviate the epidemiologic study as a significant contribution, or the basic validity of the conclusions. In the application of the findings to clinical practice, however, some physicians will be perplexed. The criteria given for "definite ECG-LVH" are a combination of items and while the occurrence of these various items are listed, they are not related specifically to later coronary events.

Examples of noteworthy statements which help clarify an overall analysis of the report follow (admittedly they may appear strange out of context):

"The term 'ECG-LVH' is herein defined as a purely electrocardiographic phenomenon with no necessary anatomic connotation." "The 12-year period during which the electrocardiograms were read was one of continual flux in concepts of electrocardiographic left ventricular hypertrophy." (Valid?) "No serious doubts had been raised concerning ECG findings labeled LVH." "Only 35% of men and 50% of women beyond age 45 had cardiac enlargement demonstrable on X ray in association with an ECG pattern of LVH." (The roentgenologic method is not mentioned.)

Probably the charts and figures with the numerical insets can be more quickly interpreted by epidemiologists than by clinicians. The latter might more quickly appreciate the risk, if survival curves were presented. The grave prognostic significance of the definite ECG-LVH is impressive. "About 60% of men over age 45 who developed a 'definite' ECG pattern of LVH any time during the first seven examinations were dead by the eighth biennial examination." "Under age 55 at entry, 83% of coronary heart disease deaths in those with definite ECG-LVH were sudden." The clinician, however, may wonder what factors determined the survival of nearly half the subjects for more than 10 years. As he consults on the individual patient he will ask himself, "can I refine the overall gloomy prognosis by assessing the minute details of the electrocardiogram, paying particular attention to variations in intraventricular conduction and the effect of digitalis, as well as the evidences of the arterial havoc related to elevated blood pressure?"

A "promissory note" is included: "Further analysis of the tracings herein reported have been initiated to determine which features of ECG-LVH best discriminate those who have gone on to develop clinically manifest coronary heart disease from those who have for long periods of time remained free of it."

There is much national pride associated with the Framingham study and the promise of a more complete report is noted.

H.B.B.
75 Years Ago
Coronary Disease and Myocardial Infarction
Dock's Early Report (1896)

Case IV. Angina pectoris; dyspnoea; double hydrothorax; sudden death; atheroma and obstruction of coronaries; infarction of the heart.

Mr. B., lumber dealer, sixty-four years old, a man of large frame, was never sick until about three months before death. He then began to notice shortness of breath, especially when walking up hill. A week before death severe pain in the heart-region began.

The diagnosis was myomalacia following coronary sclerosis, with secondary pericarditis. This was based on the history of increasing dyspnoea and heart pain, without evidence of disease in lungs or kidneys, or other (valvular) disease of the heart, the history of the acute attack indicating infarction, and the acute onset of pericarditis without other cause.

Just below the orifice the left coronary artery became extremely atheromatous. The descending branch was narrowed, calcified, and about the middle of the anterior wall was obstructed by a red thrombus.

The circumflex branch was nodular, but its lumen was free as far as the first branch, 2.5 cm. from its origin. Here it was completely obstructed by nodular arteritis for a distance of 3 mm. Beyond this, the lumen of the circumflex proper was free, but the next large descending branch was also totally obstructed. The wall of the left ventricle from this point, i.e., from the anterior papillary muscle to the septum, the posterior part of which was involved, and from near the ring to the apex, was the seat of a recent infarction. Only a thin layer, under the epicardium, from one to two mm. in thickness, was not necrosed, and it was red, swollen, the fibres cloudy and granular.

In this case the relation of the coronary sclerosis to the gradually developing dyspnoea, and of the infarction to the acute attack a week before death is clear.


*Name as printed in the journal of 1896.
Minuscule Review


Probably only after some years of experience will the internist or cardiologist acquire a modicum of self-confidence in inquiring about the sexual habits of his patients and, specifically about intercourse as a cause of anginal pain. The disruption of connubial bliss by angina, in recent years, has been openly and helpfully aired in medical journals, and advertisements of a pharmaceutical house have capitalized on the problem with questionable taste. Following a myocardial infarction, the advice that physicians give to patients regarding a return to normal sexual activities undoubtedly varies greatly.

In general, with the widespread emphasis on returning to a normal life after a myocardial infarction, full permissiveness or careful encouragement of sexual activity is likely to be included.

If these prefatory statements are valid, physicians will be indebted to Drs. Hellerstein and Friedman for their detailed report on the sexual activity of two groups of men: one group with coronary sclerotic heart disease and the other designated as being "normal coronary-prone."

These authors found a decrease in sexual activity in the years after a myocardial infarction. Symptoms of coronary insufficiency, however, only infrequently influenced a return to previous sexual habits, whereas sexual activity was influenced favorably by the enhancement of physical fitness. In a subsample of 14 men, a physiologic measure to test the adequacy of physicians' advice was obtained by monitoring electrocardiograms during a sexual act. A continuous record obtained with a portable electromagnetic tape recording device over a period of many hours included the period of coitus. The multitudinous details of the investigations reported by Hellerstein and Friedman cannot be even listed in a short review.

I expect that the paper will become a standard reference for students and physicians who continue to feel a sense of insecurity, in the setting wherein each, with the façade of self-confidence, advises his patient concerning sexual relations. The data assembled by the authors will support the consultant who advises the usual patient, convalescent after a myocardial infarction, to return to his life pattern and marital relations in a few weeks following his dismissal from the hospital if he should wish to do so. The data also will support the physician who is encouraging a patient with angina pectoris to live normally, dispelling any untoward fear of sexual activity.

The only reservations that occurred to me on reading the report are (1) whether the adequacy of the sample would allow strong generalizations, as the variety of personalities and vagaries of coronary insufficiency are so legend, and (2) whether the emphasis on the short duration of increased oxygen needs of the body necessarily correlates with the main danger of the coronary insufficiency state, namely a fatal arrhythmia which might be initiated in less than a minute. Reliable data were apparently difficult to gather, but the authors have culled from the literature the information that of all sudden deaths only about 0.5% occur with intercourse.

The paper is an abridged version of a study published in Medical Aspects of Human Sexuality, March 1969.

H.B.B.
Minuscule Review
On a Paper Written a Century Ago
Da Costa JM: On irritable heart; a clinical study of a form of functional cardiac disorder and its consequences.

The author reports carefully conducted follow-up studies on soldiers of the late Civil War (1861-1865), who had been hospitalized because of a disability for which no organic cause was found. This was characterized by a true effort intolerance, with shortness of breath, palpitation of the heart, and pain in the chest. The group included many seasoned campaigners as well as recent recruits. Having described the syndrome in 1862, Dr. Da Costa had many patients referred to him and a “center” for the study of the condition evolved at the Military Hospital in Philadelphia, where he had been appointed as visiting physician. All the cases on which his special interest was focused had been in active service some months. The importance of a prior illness, particularly of the diarrheal diseases, and early reassignment to duty, often involving forced marches, are indicted as the causes precipitating the breakdown. Episodes of palpitations are described as occurring at any time of the day or night, but sometimes excited by exertion and “the seizures on occasion were so violent that the patient fell to the ground insensible.” The soldiers occasionally described their symptoms whimsically. While characteristically the rapid heart action was commented upon, a slow heart beat might occur. One soldier likened the cardiac disturbance “to the fluttering of a chicken when taken by the legs.”

Pain was almost a constant symptom, generally occurring in paroxysms described as a “burning,” “cutting” or “a dull sullen pain.” Exercise would usually produce the pain or a fit of palpitation. “The chief seat of the pain was the lower part of the precordium, particularly near the apex, but occasionally shooting to the left to the axilla and down the left arm . . . or under the left scapula.” On examination the pulse was usually recorded to be rapid, varying from 100 to 140. One case is described of an “irregular, jerking pulse, counted as accurately as possible, which was not under 192.” Gradually by rest and digitalis it was reduced to 110. When the complaint was shortness of breath, there was rather a sense of oppression on exertion, and “all the signs of dyspnea notwithstanding, the respiration was little increased.” Many illustrative cases are described in detail: some cases to document that complete cure had occurred and other cases to demonstrate the therapeutic trials of a large number of medications. In some patients, followed for the approximately 7-year period, evidence of cardiac enlargement and hypertrophy was found. Dr. Da Costa believes that a relationship can be assumed between the functional heart problem during army service and the development of permanent impairment of cardiac function and structural heart disease. One lad, aged 19, developed the typical effort symptoms following typhoid fever and recurrent diarrhea; cardiac enlargement ensued and the heart became available for examination a few months thereafter when death occurred from a strangulated inguinal hernia. The cavity of the left ventricle did not appear increased in volume, but the walls of the left ventricle were nearly 7/8 of an inch in thickness and microscopically the fibers were healthy.

While the patients ranged in age from 16 to 45 years, Dr. Da Costa points out, that if the question were considered with reference to the number of persons under 20 years of age in the ranks, these would have been found to have furnished the largest percentage. A table gives results of management of a series of 200 cases (38% returned to the regiment and only 7% were discharged from the service).

Dr. Da Costa asks the question, since the treatment was usually a protracted one, “Were not the rest and food rather than the medicine employed, the chief agents of cure; and was it not the amelioration of general health alone that caused any beneficial results?” What will have happened to this group of patients whose illnesses have been so carefully documented? Although Dr. Da Costa favors the opinion that the syndrome he has meticulously described is caused by a derangement of the nerves of the heart, it will be wondered whether in some cases the heart muscle had been intrinsically damaged or exposed to some strain not as yet identified. His careful study has indicated that the group is not a homogeneous one, but possibly an eponym has been born.

H.B.B.

Circulation, Volume XLII, August 1970

Basic Versus Applied Research
Two and a Half Centuries Ago

It is stranger that we are not able to inculcate into the minds of many men, the necessity of that distinction of my Lord Bacon's, that there ought to be Experiments of Light, as well as of Fruit. It is their usual word, What solid good will come from thence? They are indeed to be commended for being so severe Exactors of goodness. And it were to be wish'd, that they would not only exercise this vigour, about Experiments, but on their own lives, and actions: that they would still question with themselves, in all that they do; what solid good will come from thence? But they are to know, that in so large, and so various an Art as this of Experiments, there are many degrees of usefulness: some may serve for real, and plain benefit, without much delight; some for teaching without apparent profit; some for light now, and for use hereafter; some only for ornament, and curiosity. If they will persist in condemning all Experiments, except those which bring with them immediate gain, and a present harvest; they may as well cavil at the Providence of God, that he has not made all the seasons of the year, to be times of mowing, reaping, and vintage.—From Spat, Thomas: History of the Royal Society, ed 3, 1722. Quoted by Bennett I Jr: Trans Ass Amer Physicians 80: 57, 1967.